HUDSON-ESSEX
SERVICE STATION
EQUIPMENT

Approved and Recommended
by
The Hudson Motor Car Company

BLACK & DECKER PORTABLE ELECTRIC TOOLS
FOREWORD

ALL Black & Decker Portable Electric Tools and Fleming Electric Drill Tools are obtainable through the automotive jobbers with whom you regularly do business. For your convenience, we have inserted an order blank as the last page of this pamphlet and we urge that you immediately order from your jobber such material included in this bulletin that your shop may be in need of.

Black & Decker Electric Tools, if properly cared for, will give exceptionally long service by reason of their design and the use of best quality material. To best serve the users of Black & Decker tools, the Black & Decker Manufacturing Company have a very well-established service organization with service stations in the cities mentioned below:

CHICAGO .......................... 549 W. Washington Street
NEW YORK .......................... 461 Eighth Avenue
SAN FRANCISCO ..................... 75 Fremont Street
BOSTON ............................. 62 Brookline Street
ATLANTA ............................ 221 Spring Street
BUFFALO ............................ 31 Barker Street
CLEVELAND .......................... 2030 E. 22d Street
DALLAS .............................. 211 S. Pearl Street
DETROIT ............................. 8205 Woodward Avenue
KANSAS CITY ........................ 1537 Grand Avenue
MINNEAPOLIS ........................ 518 S. 4th Street
PHILADELPHIA ....................... 824 N. Broad Street
ST. LOUIS ........................... 2839 Locust Street
SEATTLE ............................ 514 Virginia Avenue
LOS ANGELES ......................... 857 S. San Pedro Street
TORONTO ............................ 96 Church Street
WINNIPEG ........................... 148 Princess Street
VANCOUVER .......................... 1059 Hamilton Street
CALGARY .............................

You can obtain twenty-four hour service on Black & Decker Electric Tools from any of the above service stations.

The Hudson Motor Car Company.
Correct engineering principles and design, and expert workmanship have made precision, ease and accuracy of operation the main features of the Black & Decker Electric Valve Refacer.

A specially designed collet holds the valve firmly in the same position as in the engine block. This insures the valve being ground in true relation to the valve seat in the block.

Two individual motors drive the Black & Decker Electric Valve Refacer—one driving the work head and the other driving the grinding wheel. The use of two motors insures steady and abundant power to the grinding wheel and work head and eliminates many small parts that would otherwise have to be used in transmitting power from one common motor. This increases the life of the machine and insures a better job. Individual switch for each motor.

Work head and grinding head operate on "L" slides and are held tightly to slides by spring clamps. Both work head and grinding head have three-point suspension. Base rests on three points instead of four points, eliminating possibility of machine teetering which would endanger accuracy. The work head is adjustable to any necessary angle.

Complete with three collets, 5/16", 5/8" and 1/2" capacities, one truing diamond, one attachment for grinding valve seat reamers, one grinding wheel, and electric cable with attachment plug.

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>60</td>
<td>$150.00</td>
</tr>
<tr>
<td>110</td>
<td>25, 40 or 50 cycle A.C.</td>
<td>$154.00</td>
</tr>
<tr>
<td>220</td>
<td>60 cycle A.C.</td>
<td>$154.00</td>
</tr>
<tr>
<td>110 or 220 volts D.C.</td>
<td>$154.00</td>
<td></td>
</tr>
</tbody>
</table>

Special size collets up to 1/2", each $3.00

These machines are not equipped with universal motors. In ordering be sure to specify whether for D.C. or A.C. They can be operated from ordinary electric light circuit.

Valve Refacer Cabinet

In response to a number of requests, we have designed and built a separate Pedestal Cabinet for our Valve Refacer. This provides a suitable bench for the Valve Refacer and a cabinet for keeping the collets, parts and attachments which are furnished with it. The valve refacer is a precision tool and consequently all of the collets and attachments should be kept in a place free from dirt and where they will not be damaged or misplaced.

Price $20.00
Fleming Valve Seat Grinder

For Use with 1/4" and Heavy-Duty 1/4" Black & Decker Drills

The Fleming Valve Seat Grinder is made practical by the use of an abrasive material that is so hard it retains its shape—always grinding the seat to the correct angle. Its cutting qualities are also maintained over a large number of jobs.

Accuracy and Finish—This valve seat grinder stone, accurately cut, and running at high speed on a precision pilot, grinds a truly accurate seat, leaving a highly polished surface, free from chatter.

Lapping—This reseating method is so accurate that, if the valves are relaced, hand grinding or lapping with a little compound may be used to prove the seat, but the usually tedious process of grinding is eliminated.

Removes Minimum Amount of Seat—No chance of widening the seat beyond what is absolutely necessary to get below the pits.

Low Cost and Long Life—Costs less than a valve seat reamer and does many more jobs—the cost per job being therefore much less. When the abrasive crystals in the stone become dulled after long use, relace the stone as described below.

Instructions for Operating

1—Use only with the Black & Decker 1/4" or Heavy Duty 1/4" Drill. Larger drills run at too slow speed and their excessive weight may injure the stone and pilot.

2—Use Kerosene, or preferably a mixture of half kerosene and half lubricating oil, on the face of stone while grinding. Do not allow the stone to run dry. When it becomes dirty, clean it by rubbing with a rag saturated with kerosene.

This is important, as the stone will be injured if operated dry.

3—Use plenty of pressure.

4—Keep the stone clean.

Stone Easily Resharpened

When the stone begins to dull, after many seats, it may be easily reconditioned by simply chucking it by its pilot in an electric valve refacer and grinding off a light cut, just as a valve is ground, and requiring but a moment. This restores the stone to its original condition and makes it good for many more seats. This regrinding of the stone may be done many times, thus giving the stone long life.

A Special Grinding Wheel must be used to regrind these stones as a wheel suitable for reacing valves will not leave the proper cutting finish on the stone.

Cat. No. F-630—Stone Regrinding Wheel. ....................... $1.85

PRICE LIST
For Hudson
F-7—1/4", 45-deg ........................................... $1.85
F-52—5/8" Pilot ......................................... 1.50

Essex 6
F-7—1 1/2", 45-deg ........................................... $1.65
F-51—3/8" Pilot ......................................... 1.50

Essex 4
F-7—2 1/2", 45-deg ........................................... $1.85
F-52—5/8" Pilot ......................................... 1.50
Fleming Carbon Cleaning Tools
For Use with 3/4" and Heavy-Duty 3/4" Black & Decker Drills

The Valve Guide Cleaner
A few strokes with the Valve Guide Cleaner leaves a clean, polished valve guide, removing no metal. The time is so small that a practice may be made of cleaning all guides as a precaution against sticking valves, and to remove any grit that may cause stem and guide wear.

Made of spring wire, set spirally about a shank and expanded to give tension on the guide wall.


The Carbon Removing Brush
Cleans carbon from cylinder heads, tops of pistons, valve ports, etc., in a fraction of the time required by hand scraping, and does a better job.

Made of tempered steel wire, with hollow centre to prevent clogging and to enable cleaning of valve parts.

The holder is so constructed that it may be refilled with a new brush by simply removing a nut.

PRICE LIST

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-101</td>
<td>Set of Six Brushes with Holder</td>
<td>$5.00</td>
</tr>
<tr>
<td>F-102</td>
<td>Single Brush with Holder</td>
<td>1.50</td>
</tr>
<tr>
<td>F-103</td>
<td>Refill Brushes, each</td>
<td>.75</td>
</tr>
<tr>
<td>F-104</td>
<td>Holders, each</td>
<td>.75</td>
</tr>
<tr>
<td>F-501</td>
<td>4&quot; Wire Wheel Brush</td>
<td>2.50</td>
</tr>
<tr>
<td>F-525</td>
<td>Arbor for 4&quot; Brush</td>
<td>.75</td>
</tr>
<tr>
<td>F-176</td>
<td>Stand for 3/4&quot; Black &amp; Decker Drill</td>
<td>1.00</td>
</tr>
<tr>
<td>F-310</td>
<td>Stand for Black &amp; Decker Heavy-Duty</td>
<td>1.50</td>
</tr>
<tr>
<td></td>
<td>3/4&quot; Drill</td>
<td></td>
</tr>
<tr>
<td>F-15-1</td>
<td>Valve Guide Cleaner (3/16&quot;) for Essex</td>
<td>1.00</td>
</tr>
<tr>
<td>F-152</td>
<td>Valve Guide Cleaner (3/8&quot;) for Hudson-Essex</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The 4" Wire Wheel Brush
With the drill mounted in the stand, this brush quickly cleans valves, effecting a large saving in time on this operation.
Black & Decker Six-Inch Twist Drill Grinder

The Black & Decker Six-Inch Twist Drill Grinder will quickly and accurately grind straight or taper-shank twist drills up to 5/8 inch diameter.

The twist drill is fed to the countersunk grinding wheel by means of a micrometer screw. No adjustments are necessary for grinding different size twist drills, this being compensated for in the design.

Heretofore, the garage, service station or small machine shop has had to depend upon "free-hand" methods of grinding twist drills because they could not obtain a machine which would quickly and accurately do the job at a price that could be afforded. The Black & Decker Six-Inch Twist Drill Grinder fills a long-felt need and its use will insure twist drills being ground at the right angle, with proper clearance and with both cutting lips exactly the same length.

Complete with one general purpose grinding wheel, one countersunk wheel, one tool rest, two wheel guards, electric switch in base and electric cable fitted with attachment plug.

Price $66.00

No-load speeds—same as bench grinder described on opposite page.
Net weight ........................................................................ 42 lbs.
Price for 110 volts, 60 cycle A.C. ....................................... $66.00
110 or 220 volts, 25, 40 or 50 cycle A.C. .................... 70.00
110, 220 or 22 volts D.C. .............................................. 70.00

This grinder has not a universal motor and current must be specified. It can be operated from ordinary Electric Light Circuit.
Pedestal with water pot, extra .......................................... $12.00
Diamond Truing Attachment for refacing countersunk grinding wheel, extra ........................................... 10.00

Black & Decker Eight-Inch Electric Grinder

Pedestal with detachable water pot, extra, $18.00

$96.00

Complete with two 8-inch grinding wheels, one coarse and one fine, two wheel guards, two adjustable tool rests and switch in base. This is an exceptionally husky, ball bearing, heavy-duty electric bench grinder. One-half horsepower, 3,600 R.P.M. Totally enclosed to keep out abrasive dust. Attractively finished in gray enamel.

Size of grinding wheels, 8-inch diameter by 3/4-inch face by 5/6-inch hole.

This grinder has not a universal motor and current must be specified.
Price for 110 volt, 60 cycle A.C. ....................................... $96.00
110 volt, 25, 40 or 50 cycle A.C. ................................. 100.00
220 volt, 60 cycle A.C. .............................................. 100.00
110 or 220 volt D.C. .................................................. 100.00

Order from your jobber
Black & Decker Quarter-Inch Portable Electric Drill

"With the Pistol Grip and Trigger Switch"

Quarter-Inch Drill $28.00
Operates on Direct or Alternating Current

DRILL complete with three-jaw geared chuck for straight-shank drill bits up to 1/4 inch, 7 1/2 feet of special lightweight duplex electric cable fitted with attachment plug.

A special all-purpose portable electric drill embodying all of the time-tested and proven features of the larger Black & Decker Portable Drills, including the "Pistol Grip and Trigger Switch," aluminum case and switch handle, special alloy steel gears heat-treated, grease lubrication, extra large bearings, ball thrust bearing, air cooling, universal motor, etc.

No-load speed ........................................ 2,000 R.P.M.
Net weight ........................................... 9 lbs.
Price for 110 volts ................................ $28.00
220, 250 or 32 volts ............................... 32.00
Three-wire cable permitting ground connection, extra 2.50

Black & Decker Grinding Outfit

Grinding Outfit, $2.50

The Black & Decker Quarter-Inch Drill can be used as a small bench grinder for sharpening drill bits, chisels, and doing other light grinding. Stand in which this drill can be quickly and easily fastened, grinding wheel and arbor, extra................................. $2.50

Black & Decker Bench Drill Stand

Bench Drill Stand for Quarter-Inch Black & Decker Drill as illustrated .................. $12.00

As a power unit for driving:
Fleming Carbon Brushes.
Fleming Valve Guide Cleaners.
Fleming Valve Seat Grinding Stones.
Wire Brush Wheels, Grinding Wheels, and Rag Buffing Wheels.
Black & Decker Heavy Duty ¼” Drill

"With the Pistol Grip and Trigger Switch"

Price $38.00
220, 250 or 32 volts, $42.00
Weighs only 7 pounds
¼-Horsepower Ball-Bearing
Motor, Chuck Speed, 3000
R.P.M., Heat Treated Gears,
15 Feet of Electric Cable.

Universal Motor—Operates on
A.C. or D.C.

The Heavy-Duty, Quarter-Inch Portable Electric Drill is designed for continuous production work and for all types of maintenance work where heavy-duty performance is required. Its tremendous power, together with high spindle speed, makes possible the drilling of more holes per minute and per day than any quarter-inch electric drill heretofore developed. This drill does not in any way take the place of the regular quarter-inch drill which has for years past won popular approval in scores of thousands of shops and manufacturing plants for maintenance work and for odd jobs of drilling.

Valve Reseating—The great power and high spindle speed (3,000 R.P.M.) makes this new drill particularly efficient for driving Fleming Valve Seating Stones. The Fleming Stones will restore a valve seat quicker and do a better job at the high speed made possible by the new heavy-duty ¼-inch drill.

Carbon Cleaning—The hardest carbon can be quickly removed from cylinder heads by driving the Fleming Carbon Removing Brush with this new high-speed, heavy-duty electric drill. Used with a Fleming 4-Inch Wire Wheel Brush it will quickly clean carbon from valves.

Grinding—With a 4-inch grinding wheel and arbor this drill may be used for light grinding jobs.

This Electric Drill, because of its tremendous power and high speed is particularly adapted for driving Valve Reseating Stone, Carbon Removing Brushes and Valve Guide Cleaners.

ORDER FROM YOUR JOBBER
Black & Decker Half-Inch Special Portable Electric Drill

"With the Pistol Grip and Trigger Switch"

$58.00
Operates on Direct or Alternating Current

A GOOD mechanic is a good mechanic regardless of the trade in which he is engaged. It is not surprising, therefore, to find that there are more Black & Decker Half-Inch Specials in use in automotive repair shops than any other make.

This is not an exaggerated statement. You can confirm it for yourself by inquiring among your friends in the auto repair business.

Drill complete with combination spade handle and breast plate, three-jaw geared chuck for straight-shank drill bits up to \( \frac{3}{8} \) inch, 15 feet of duplex electric cable with attachment plug, and detachable side handle.

Capacity in steel: \( 0 \) to \( \frac{3}{4} \) inch
Capacity in hardwood: \( 0 \) to \( \frac{3}{4} \) inch
No load speed: 475 R.P.M.
Net weight: 15 lbs.
Price for 110 volts: $58.00
220, 250 or 32 volts: 62.00

EXTRA EQUIPMENT
Feed Screw, extra: $3.50
Three-wire cable permitting ground connection, extra: 2.50

CAN BE USED AS A POWER UNIT for driving cylinder honing, burnishing and grinding tools.

Bench and Post Drill Stands to fit this Drill are described on page 12

Black & Decker Half-Inch Heavy Duty Portable Electric Drill $68.00

A heavy duty drill with a no-load speed of 600 R.P.M. and power delivered at the chuck in excess of \( \frac{3}{4} \) horsepower. Net weight, 21½ lbs.

Price for 110 volts: $68.00
220 or 32 volts: 72.00

ORDER FROM YOUR JOBBER
Black & Decker Five-Eighths-Inch Portable Electric Drill

"With the Pistol Grip and Trigger Switch"

$72.00
Operates on Direct or Alternating Current

DRILL complete with combination spade handle and breast plate, three-jaw geared chuck for straight-shank drill bits up to ¾ inch, 15 feet of duplex electric cable, attachment plug and detachable side handle.

Capacity in steel ........................................... ¼ to ½"
Capacity in hardwood ........................................... ½ to ¾"
No-load speed ........................................... 475 R.P.M.
Net weight ........................................... 22 lbs.
Price for 110 volts ........................................... $72.00
220, 250 or 32 volts ........................................... 76.00
Special speed of 800 R.P.M., extra ........................................... 2.50
Feed Screw, extra ........................................... 3.50
Three-wire cable permitting ground connection, extra ........................................... 2.50

THE CORRECT POWER UNIT
for driving cylinder hones, grinders and burnishers.

This drill delivers in excess of ½ horse power at the chuck and will accomplish the work more quickly than any ½-inch drill.

Bench and Post Drill Stands to fit this Drill are described on page 12

ORDER FROM YOUR JOBBER
Black & Decker Heavy Duty Bench and Post Drill Stands

Heavy Duty Post Drill Stand
$28.00

Heavy Duty Bench Drill Stand
$32.00

Illustrations show Black & Decker Drill Stands complete with Black & Decker Portable Electric Drill.
(See page 8 for illustration of Special Quarter-Inch Bench Drill Stand.)
When Stand complete with Portable Electric Drill is desired, this should be specified, and price of Portable Electric Drill added to price of Stand.
ORDER BLANK

Date ____________________________

To ________________________________________________________________
NAME OF YOUR AUTOMOTIVE JOBBER

Address ____________________________________________________________

Ship by ____________________________________________________________

<table>
<thead>
<tr>
<th>Quantity</th>
<th>NAME OF ITEM</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Give Specifications as to Voltage, Current, etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Signed ________________________________

By ________________________________

Address ________________________________
Recommended for

HUDSON-ESSEX SERVICE STATIONS

by the

HUDSON MOTOR CAR COMPANY

Detroit, Michigan, U. S. A.

Manufactured by the
WEAVER
Manufacturing Co.
Springfield Illinois U.S.A.

Weaver Canadian Co.Ltd.
Chatham Ontario
Weaver Lo-Way Jack

Built Low for Balloon Tires.

The Lo-Way, as the name implies, is built unusually low for handling cars equipped with balloon tires, as shown in Cut No. 1. Minimum height, 6 in.; maximum height, 14 in.; with extension standard, 17 in.

Ample Ground Clearance.

Considering its low design, this Jack has an exceptional ground clearance, approximately 4% of an inch, ample to enable it to transport loads over rough floors, etc., without difficulty.

Steer it as You Would a Car.

The front axle of the Jack is pivoted at its center, and can be cut to the right or left by turning the handle, as shown in Cut No. 1. This exclusive feature enables the operator to place the Jack quickly and accurately in any desired position under the car, without need of "Jockeying" it around, and thus allows it to be operated in a much more limited space than the usual Jack. This feature also enables operator to guide car while transporting it on Jack.

Saddle Quickly Adjusted to Load.

The saddle can be run up to the car axle instantly by means of the foot lever, ready to lift car on the first stroke of the lever handle.

Easy to Raise and Lower Load.

The Jack is extremely simple and easy to operate. The load is lifted by pumping the Jack up and down. To lower the load is equally simple. There are no complicated adjustments to make which waste time. As the Jack handle is grasped, the latch under the handle is drawn up with a finger of the right hand and the handle pumped up and down as in raising the load. There is no difficulty in turning the weight of the load while lowering it and no danger of the handle being thrown against the car and damaging it.

When the standard is removed from the load, it can be dropped to its lowest position automatically.

Long Body Reaches Rear Axles.

The long body of the Jack enables it to be used under rear axles without interference from bumpers, trunk racks, rear tires or overhanging truck bodies.

Handle Upright When Not in Use.

The handle of the Jack is held in a vertical position when not in use by a spring. It is off the floor and out of the way and ready to grasp when the Jack is to be used.

Capacity 5,000 Lbs.

The long lever handle of the Jack enables the operator to lift loads up to the recommended capacity of the Jack, 5,000 lbs., ample to handle the heaviest passenger cars and light trucks. Each Jack is tested to lift this amount before leaving the factory.

Simple and Rugged.

The lifting mechanism of the Lo-Way Jack is unusually simple and rugged. The frames is of spring steel. Weight of load is carried by a set of heavy roller bearings in the quadrant and two sets of roller bearings between the axle housing and solid steel axle. Ball bearings in the rear caster facilitate operation under heavy loads. Jack can be had equipped with steel wheels or rubber tires.

Symbol  Ship. Wt.
Steel Wheels ........ W.A.20 110 lbs.
Rubber Tires ........ W.A.21 110 lbs.

Lo-Way Jack, $36; Tub. Tired, $48; East of and Including Denver. For Western & Canadian Prices, Ask Your Jobber.

National Distribution—Obtainable from Your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.
Weaver Canadian Co., Ltd., Chatham, Ontario
THE Weaver Auto Twin Jacks are especially designed to facilitate handling dismantled as well as complete cars in the service station, garage, repair shop and wash room at a great saving of time and labor.

Enable Car To Be Manipulated in Small Space.

With a Jack under each axle, the car (even with all four wheels removed) can be pushed sideways, turned completely around within its own length or otherwise manipulated in a space no larger than the car itself occupies, since they are confined within the limits of the car. This is of great advantage in handling cars under crowded conditions in the service station and repair shop. As they can be used in any location in the garage, they are preferable to a turn table.

Absolutely Safe.

The dependable screw mechanism and broad wheel base afford an absolutely safe foundation for supporting the car, so that the mechanism will feel perfectly secure while at work, as illustrated in Cut No. 2.

Ball and Roller Bearings Facilitate Operation.

The center wheels are equipped with ball bearings and the wheel hubs with roller bearings. The weight of the load rests on balls which operate between two hardened steel cases, as shown in Cut No. 3. This construction greatly facilitates the handling of heavy burdens.

Of Great Assistance in Unloading Cars.

The Auto Twin Jacks are especially adapted to unloading automobiles from freight cars, as shown in Cut No. 4. The center wheels enable the operator to shift the load in the desired directions with the least possible effort. And being confined within the limits of the car, these Jacks require a minimum amount of space for manipulation.

Especially Adapted for Use in Repair Shops, Wash Rooms, Etc.

The ability of the Weaver Auto Twin Jacks to handle cars with or without their wheels removed makes them of particular value in the repair shop, wash room, etc., where it is necessary to transport cars about the shop to take advantage of the best the shop to the proper equipment to enable repairs to be made or to take advantage of the best possible light.

Fit Front or Rear Axles.

Auto Twin Jacks will fit either front or rear axle. Extension blocks are supplied to reach unusually high axles. These are so designed as not to interfere with truss rods.

Rubber Tires Easy on Floors.

These Jacks can be had equipped with heavy rubber tires at a nominal additional cost.

Construction.

The general construction of the Auto Twin Jacks is of high carbon steel and malleable iron to withstand hard usage.

Lifting capacity, 6,000 lbs.
WA 12, regular, shp. wt., 100 lbs.
WA13, rubber tired, shp. wt., 100 lbs.

No. 1. Cars can easily be moved wherever desired in the garage.
No. 2. Mechanic can work under car supported by the Auto Twin Jacks with absolute safety.
No. 3. Full ball and roller bearing construction reduces friction.
No. 4. Handy to unload cars.

Twin Jack, $24; Rub. Tired, $36; U. S. East of and Including Denver. For Western & Canadian Prices, Ask Your Jobber

National Distribution—Obtainable from Your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.
Weaver Canadian Co., Ltd., Chatham, Ontario
Weaver Hi-Lift Jack

This Weaver Hi-Lift Jack is a distinctly new and efficient development in jack construction, designed to supply the service station a much needed range of lift not afforded by any other jack on the market.

Screw Hoisting Principle Used.
The lifting arm of the jack is raised and lowered by means of a heavy nut attached to the lower end of the arm which pivots on the triangular body casing, the nut traveling forward and backward on the screw. Pressure on the handle to the right raises and to the left lowers, the lifting arm. The arm can be more quickly elevated or lowered to reach the load by turning the handle on the casing into which the long lever handle fits after first removing this long handle.

Increased Capacity.
The increase in capacity to 3,000 lbs. and the extreme range of lift, 40½ in., make this new model the ideal jack for handling heavy passenger cars and commercial cars.

Extreme Range of Lift.
The saddle of the Jack can be lowered to 6 inches and raised to 23½ inches. The extension screw standard illustrated, which fits into a hole in the saddle, gives an additional height up to 7 inches, affording a maximum elevation of 40½ inches. This screw extension standard permits the lift to be applied directly to the frame of the car in spite of low running boards, gas tanks, etc., which latter frequently prevent the use of the ordinary type of jack.

Wide Range of Usefulness.
The Hi-Lift Jack can be used to elevate the front or rear of the car to a convenient height to enable the mechanic to reach any part of the under side of the car and is especially useful for removing crank and transmission cases and rear systems, inspecting brake adjusting bearings, etc. It can also be used to elevate the body of the car to take the weight of the springs in order to lubricate springs, replace broken spring leaves and shackle bolts, attach shock absorbers, etc. It is also of assistance in unloading double deck shipments of cars and in handling other jobs too numerous to mention.

Absolutely Safe.
The screw and nut principle of hoisting insures absolute safety. Accidental release of the load is rendered practically impossible by a special locking mechanism. The twin motion of the saddle always keeps it level, so there is no danger of the load sliding off.

Can Be Operated Under Crowded Conditions.
Since the handle of the Jack can be operated through a very small arc to raise or lower the load, the Jack can be operated under crowded conditions that prevent the use of the ordinary jack. The body of the Jack is also low enough to pass under the running board of the average car, enabling under portions of the car to be reached without difficulty.

Easily Guided Into Position.
A special socket is provided for the handle, which enables the operator to easily steer the Jack into the desired position under the car and about the shop.

Construction.
The construction of the Jack is extremely strong, the screw being of high carbon steel and the main casing and lifting arm of special alloy cast steel. Shipping weight, approximately 210 lbs.; Symbol, WA18; Code, "Arbor.

No. 1. Weight of body can be taken off springs when replacing spring leaves or shackle bolts.

No. 2. The Hi-Lift Jack can be used to splendid advantage with Weaver Safety Stands, as illustrated above.

No. 3. The extension screw standard fits into a slot in the saddle and can be quickly attached, giving an additional height up to 7 inches and permitting an extreme elevation of 40½ inches. It also enables obstructions to be avoided in applying the lift to the frame bolster of car.

Hi-Lift Jack, U. S. East of and Including Denver, $75.00. For Western & Canadian Prices, Ask Your Jobber

National Distribution—Obtainable from Your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.
Weaver Canadian Co., Ltd., Chatham, Ontario
The Weaver Motor Service Press is designed to supply in one
compact unit a convenient means of handling all pressure
and straightening work, fitting connecting rod assemblies
complete, including aligning, straightening and branching, relining
brake bands and disc clutches and handling more quickly and efficiently
innumerable other jobs that come in daily.

It brings within reach of the repair shop the services of at least
a dozen essential tools at a fraction of their cost if purchased as
separate units. It enables the job to be handled on one machine and
saves time usually required in moving the work from one machine
to another.

For Fitting Connecting Rod Assemblies.

The Weaver Motor Service Press provides a quick and accurate
means of testing and correcting the alignment of connecting rod
assemblies, as shown in the accompanying illustrations.

For Relining Brake Bands and Clutches.

The rapid action of the Brake Lining Attachment shown enables
the operator to reline brake bands and clutches in a fraction of the time
required by cumbersome hand methods and to turn out far better
work that will bring new customers to the shop.

Specifications.

Maximum diameter of work 15 in. Capacity over 1 inch plate.
10 inches. Floor space, 18 x 20½ in. Rack and pinion leverage,
46 to 1. Pressure up to 10,000 lbs. can be exerted with screw.

Sold as Follows:

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>WD14</td>
<td>Press Complete</td>
<td>370 lbs.</td>
<td>$140.00</td>
</tr>
<tr>
<td>WD15</td>
<td>Press, with Pressure Plate, Test Block and one Arbor, less attachments, shipping weight, 200 lbs.</td>
<td>$85.00</td>
<td></td>
</tr>
<tr>
<td>WD16</td>
<td>Base, shipping weight, 120 lbs.</td>
<td>$18.00</td>
<td></td>
</tr>
<tr>
<td>WD17</td>
<td>Brake Reliner, shipping weight, 21 lbs.</td>
<td>$20.00</td>
<td></td>
</tr>
<tr>
<td>WD18</td>
<td>Straightening Fixture, shipping weight, 20 lbs.</td>
<td>$7.00</td>
<td></td>
</tr>
<tr>
<td>WD19</td>
<td>Dial Gauge, shipping weight, 1 lb.</td>
<td>$10.00</td>
<td></td>
</tr>
</tbody>
</table>

Brake Reliner removes old rivets, punches and countersinks clean
cut holes in lining for new rivets and inserts them quickly and accurately. No electric tools to
bother with and no drills to sharpen.

Prices for U. S. East of and Including Denver Given Above. For Western & Canadian Prices, Ask Your Jobber

National Distribution—Obtainable from Your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.

Weaver Canadian Co., Ltd., Chatham, Ontario
EVERY day in the average service station countless jobs arise that can be properly handled only by a press. A few minutes saved on each job means a decided increase in profits at the end of the month. To meet the demand for better work and greater speed, this new Weaver Rack and Pinion Press has been developed.

Simple in Construction.

The extreme simplicity and ruggedness of the rack and pinion is shown in Cat. No. 1 at the right and requires no detailed explanation. There is nothing to get out of order.

Hi-Speed or Great Leverage.

For work requiring pressure up to 2,000 lbs., the rack and pinion will be preferred on account of its superior speed. It is also of special advantage in handling delicate work, as the operator can feel when sufficient pressure has been applied.

When greater pressure is required, the screw can be instantly spun down in contact with the work by the hand wheel and the ratchet lever thrown into engagement, as shown in Cat. No. 2. Two adjustments provide leverages of 1,000 to 1 and 2,000 to 1 respectively. Thus pressure from 1 lb. to 28 tons can be exerted with proper speed without moving the work, once it is properly placed in position under the screw.

Screw Always in Direct Contact with Work.

The width between uprights, 32 inches, is unobstructed the entire height of the frame and the height of the bolster is readily adjustable by one man. Thus there is nothing to interfere with placing the work at the proper height to permit the screw to come in direct contact with it. Very wide and bulky work can readily be accommodated.

Pressure Quickly Released.

When pressure on the screw is developed by means of the ratchet lever, two ear shaped thrust washers tend to climb against each other. Pressure can be instantly relieved by one reverse stroke of the lever, which releases their action, regardless of the amount of pressure and permits the screw to be spun up quickly by the hand wheel. This construction, together with the Hi-Speed Feature previously described, make this an extremely quick acting Press.

Ball Bearing Hand Wheel.

The weight of wheel and screw is carried on heavy ball bearings, allowing screw to be spun its entire length up and down in a few seconds. The long bearing of the wheel hub on the screw gives increased strength at this vital point.

Can Be Moved About Shop.

The vertical movement of the lever makes it unnecessary to bolt the Press to the floor and permits it to be moved about the shop as needed or turned over on its side and operated horizontally when long shafts, etc., are to be handled.

Attachments and Equipment.

Two pressure blocks, two vice blocks and two sections of 6-inch channel steel are regularly furnished with each Press. Special attachments including the Weaver Puller clamp, Truing Pictures, Riveting Tool and Rear Axle Attachment, which enable a wider variety of work to be handled, can be had at a slight additional cost.

Two Sizes and Styles.

The Weaver Press is made both with and without the hi-speed rack and pinion and in two sizes. WD12, Hi-Speed Press, 32 inch width, 600 lbs.; WD13, 42 inch width, 645 lbs.; WD19, Regular Press, 32 inch width, 615 lbs.; WD11, 42 inch width, 620 lbs.

Hi-Speed Press, 32-in., $100; 42-in., $115; U. S. East of and Including Denver. For Western & Canadian Prices, Ask Your Jobber

National Distribution—Obtainable from Your Nearest Jobber
Made by the
WEAVER MFG. CO., Springfield, Illinois, U. S. A.
Weaver Canadian Co., Ltd., Chatham, Ontario
RECOMMENDED FOR

HUDSON-ESSEX SERVICE STATIONS

Attachments for Weaver Presses

Brake Reliner and Bracket

WD17, Brake Reliner.  WD31, Bracket for Brake Reliner.

For Hi-Speed Presses

The Brake Reliner and Bracket illustrated are now offered. They are designed to hold the brake in place while the brush is being changed. The bracket fits on the press bolster and holds the brake in position, while the brush can be mounted to bring the various plungers under the press ram.

The Reliner carries four plungers, one for punching out old rivets, two for punching and countersinking holes in the brake lining for No. 1 and No. 18 rivets, and one for inserting and clinching rivets.

The high-speed lever of the Weaver Hi-Speed Press can be conveniently operated with the right hand while the left hand holds the brake in position. The press screw, which operates the plungers, can be adjusted up or down to bring the lever at a convenient angle for the operator to exert pressure.

WD17, Brake Reliner, $3.00. WD31, Brake Reliner Bracket, $3.00.

The above prices are effective in the United States east of and including Denver only; for Western and Canadian prices, ask your jobber.

Truing Fixtures

for Regular and Hi-Speed Presses

The Weaver Truing Fixtures enable the operator to test the alignment of shafts, axles, etc., and to true them on the same equipment, without wasting time moving them.

Fixtures can be set at any desired points on the press bolster to accommodate shafts of varying length and are held in position by set screws. The height of each V-block is adjustable, to handle shafts of varying diameter.

WD24, Truing Fixture; shipping weight, 19 lbs.; $10.00 in United States east of and including Denver. For Western and Canadian prices, ask your jobber.

Puller Clamp

for Regular and Hi-Speed Presses

The Weaver Puller Clamp is essentially designed for use with Weaver Presses to support small ball races, gears and other delicate parts, while pressing them off shafts.

Blades of Puller Clamp operate in slots in the side brackets and are forced into contact with work by heavy thumb screws. The curved notches in blades are beveled to this edge which can be inserted in a very narrow opening. Made in two sizes—WD22, 5-inch Plate; shipping weight, 7 pounds; $5.50. WD23, 14-inch Plate; shipping weight, 24 pounds; $9.50.

The above prices are effective in the United States east of and including Denver; for Western and Canadian prices, ask your jobber.

Pressure Vise

for Regular and Hi-Speed Presses

The Weaver Pressure Vise is designed to be used on Weaver Forging Presses and similar presses to rigidly support shafts for removing and mounting gears, sleeves, etc. Accommodates shafts from 1/4 to 2 1/8 inches in diameter. Especially useful for handling axle and drive shafts, for which two special pressure blocks are supplied. Work quickly inserted and immediately released. Toggles construction makes jaws grip work tighter as pressure on vise is increased. WD26, shipping weight, 30 lbs.; price, $22.50 in United States east of and including Denver. For Western and Canadian prices, ask your jobber.

Ring Gear Riveting Tool

for Regular and Hi-Speed Presses

The Ring Gear Riveting Tool can be used to advantage in handling ring gears which are riveted on, as in the case of most older models. It provides a quicker, better method of riveting, because the rivet, being expanded by the enormous pressure of the press, fits tightly in the hole its entire length. The ram is held in perfect alignment with the lower die, preventing rivet from getting out of line.

WD25, Ring Gear Riveting Tool; shipping weight, 45 lbs.; $12.60 in United States east of and including Denver. For Western and Canadian prices, ask your jobber.

Prices for U.S. East of and including Denver Given Above. For Western & Canadian Prices, Ask Your Jobber

National Distribution—Obtainable from Your Nearest Jobber

Made by

WEAVER MFG. CO., Springfield, Illinois, U. S. A.

Weaver Canadian Co., Ltd., Chatham, Ontario
THE Weaver Auto Hoist is designed to meet quickly and economically every requirement of hoisting service, both inside and outside of the service station and repair shop.

Cheapest from Standpoint of Service.

Because it can be easily and quickly applied to any car under any condition, it will be used a score of times while other hoisting devices, less flexible in their application will be allowed to lie idle.

Occupies Small Space.

The Hoist requires only 12 to 16 inches on each side of the car and can thus be operated under very cramped conditions. When set in use it can be run outside a car, thus occupying practically no more space than the car itself.

Telescoping Frame Handles Limousines.

The frame of the Hoist can easily be elevated by its own power, as shown in Cut No. 1, from 7 ft. 6 in. to 9 ft. 2 in. Sufficient elevation is thus afforded to handle limousines without difficulty.

Can Be Run Through Doorway.

The minimum elevation of the frame allows the Hoist to be run through the average garage door so that it can be used in other departments or outside the garage, if necessary.

Absolutely Safe.

The worm drive mechanism shown in Cut No. 1 not only supplies enormous leverage but makes it impossible to release the load accidentally. The load can also be raised or lowered the minutest fraction of an inch and held in that position indefinitely. By pulling the crank out of engagement with the drum, the latter can be rapidly spun to wind up stack chains, as shown in Cut No. 2.

Single Suspension for Light Work.

Light work, such as engines, can often best be handled by a single chain dropped over the rollers in the center of frame, as shown in Cut No. 3. Capacity, single suspension, 2,000 lbs.

Double Suspension for Heavy Work.

Heavy work is best handled by the two chains passed over the rollers in the extreme corners of the frame, as shown above. This method affords a safer and more rigid support. Capacity, double suspension, 4,000 lbs.

Car Can Easily Be Transported With Hoist.

The large ball and roller bearing casters make it easy to move partially dismantled cars supported in this Hoist wherever desired in the shop. The wide base, 62 inches between casters, makes it impossible for the Hoist to tip over.

Construction.

Hoist is constructed primarily of 6 inch channel steel, with arch reinforced by heavy steel plates. Lifting chains are extremely heavy and are tested to withstand strain far in excess of recommended capacity. Five inch casters, full roller bearing. Lifting leverage, 200 to 1. Width between frames, 6 ft. 4 in. Wg19, shipping weight, 546 lbs.

Heavier Hoist For Trucks.

If the service station has any occasion to handle heavier work than passenger cars, such as trucks, the Weaver Truck Hoist is recommended. It is similar in design to the Auto Hoist, but is much more heavily constructed of “T” beam stock. It has a compound lifting leverage with a capacity of 4,000 lbs. single suspension and 8,000 lbs. double suspension. Width between frames, 8 ft. 4 in. Height, minimum, 8 ft. 4 in.; maximum, 10 ft. Wg11, shipping weight, 940 lbs.

Auto Hoist, $120; Truck Hoist, $200; East of and including Denver. For Western & Canadian Prices, Ask your Jobber

National Distribution—Obtainable from your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.

Weaver Canadian Co., Ltd., Chatham, Ontario
RECOMMENDED FOR

Hudson-Essex Service Stations

Weaver Auto Crane

Model "G"

Simplicity in design and operation and comparative lightness are outstanding features of the Weaver Auto Crane every garageman will appreciate. Its high power leverage and strength enable it to handle burdens up to 6,000 lbs. to be handled with ease and the saving in weight materially reduces wear and tear on the service car. There are no complicated adjustments to cause trouble.


A big percentage of car sales these days is to persons already owning cars, who appreciate service and are going to buy where they can get it. And there is no service that will be appreciated more or that will bring bigger profits in dollars and cents than tow-in work. The quick, business-like way you can handle even the worst wreck with a Weaver Auto Crane will make a hit with your customers and furnish you many a good prospect for the sale of a new car. And this service can be maintained at a low cost, because once a man can handle practically any wreck with the Auto Crane.

Increased Height and Overhang.

The length of the boom has been materially increased, providing a range in height from 2 ft. 4 in. to 5 ft. 6 in. The height of the Crane is, of course, increased by the height of the service car. Range of over-hang is from 3 ft. 4 in. to 5 ft. 7 in. (Cut No. 1).

Height of Boom Quickly Adjusted by Crane's Own Power.

The spring steel tension bars, which support the boom at the desired height and overhang, are composed of two sections, locked together by a spring bumper. When chain is wound up until pulley wheel is wedged between sheave wheel and boom and plunger is withdrawn one man can easily raise or lower boom by operating crank. When car is suspended from boom, chain can easily be blocked and car raised or lowered.

Operated from Ground or Car.

The compound gears afford two distinct speeds and leverages and permit the Crane to be operated conveniently either from the ground or service car.

To raise the load, open the operator, when standing on the ground, use the end of the handle on the long shaft on the left in Cut No. 2. When standing in the service car, he can use the top shaft or either side for this purpose. The extreme leverage ratio of 114 to 1 enables the heaviest loads to be lifted with ease. Friction is reduced to a minimum by roller bearings.

To quickly adjust the chains to the load, the center socket of the crank handle is applied to the center shaft on the right hand side as shown in the above cut.

Swivel Head.

The wheel at the end of the boom is swiveled, permitting a direct pull from the side without the chain binding (Cut No. 3). This facilitates handling any wreck while parallel to it, without obstructing the road.

Drum Can Be Used as Winch.

When a long, horizontal pull is necessary, the chains can be released from the sheave wheel at the end of the boom and the pull can be taken directly from the drum of the Crane. Drum is mounted on roller bearings.

Chain or Cable Furnished.

Thirty-five ft. of the best quality 3/8 in. chain is furnished as a part of the regular equipment with each Crane, ample strong to handle loads to 6,000 lbs. Fifty ft. of 7/16 in. flexible plow steel cable will be supplied in place of the chain at the same price when specified.

For quick adjustment of chain to load-from ground or car.

No. 1. Showing range in height and overhang and ease with which boom can be raised and lowered.

No. 2. Chains can be quickly adjusted to load and maximum lift obtained while operator is standing on ground or in car.

No. 3. The swivel head permits side pull without chain binding.

Model G Auto Crane, East of and Including Denver, $110.00. For Western & Canadian Prices, Ask Your Jobber

National Distribution—Obtainable from Your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.
Weaver Canadian Co., Ltd., Chatham, Ontario
THE Weaver Auto Ambulance, Model 
"C", is a new and very efficient and 
convenient development in tow-in 
equipment. It will enable you to ren-
der a quick, business-like service that your 
customers will appreciate and will bring 
you in contact with a number of good 
prospects for new cars. It will also effect 
a material economy in handling tow-ins, as 
one man can accomplish in a shorter time 
work that would ordinarily require several 
men.

Simple and Strong in Design.

Strength and durability, together with 
simplicity in design and application are 
outstanding features of this equipment. The 
wide yoke is constructed of cast steel and 
provides a two point support for the car 
axle, 18 in. between centers. This, together 
with the extremely wide track (28 inches 
between centers of tires), supports the car 
rigidly in position and prevents its tipping 
even on very rough roads.

Applies to Front or Rear Axle.

The application to the front axle is 
shown in Cut No. 1. The car axle rests 
snugly in the crotches of the yoke and can be 
damped in position by heavy chains ap-
plicated to axle or springs on each side, in 
applying to the rear axle, as shown in Cut 
No. 2, the yoke straddles the differential 
and the overhanging forsyk permit the rear 
axle to rest securely in the crotches.

Two Sockets for Standard.

When the Ambulance is applied to the 
front axle the yoke is set in the forward 
socket to keep the Ambulance tongue down, 
and to prevent it from lying up in case it 
should become accidentally disengaged from 
the towing car. When applied to the rear 
axle the yoke is set in the rear socket to 
keep the tongue up against the bottom of 
the car and not jab into the ground under a 
similar contingency. This principle is illus-
trated in Cut No. 2.

Heavy Telescoping Tongue.

The telescoping tongue is unusually 
strong, the outer section being of 1 1/2 inch 
steel tubing, while the inner section is of 
1 1/4 inch stock. The length is adjustable 
from 7 ft. to 13 ft. by means of a conven-
ient pin arrangement.

Roller Bearings Between Axle 
and Housing.

Heavy roller bearings are located be-
tween the solid, one-piece axle and the axle 
housing, at the outer ends of the frame on 
either side, 21 1/4 inches apart, as shown in 
the right hand portion of Cut No. 4. This 
construction avoids throwing an undue 
strain upon the bearings when towing a car 
on the side of a high crown road, as would 
happen if the bearings were located within 
the hub of the wheel (see left hand portion 
of Cut No. 4). A heavy thrust bearing is 
installed between the end of the frame and 
the wheel hub on each side, reducing wear 
to a minimum.

Rubber Tired or Cast Steel 
Wheels.

This Ambulance is equipped with the 
highest quality Goodyear rubber tired wheels 
with solid tires. 3 1/4 x 16 inches. Heavy 
cast steel wheels of approximately the same 
diameter and width can be supplied at pro-
portionately reduced price. Capacity pas-
senger cars and light truck service.

Shipping weight, WDI3, rubber tired, 
265 lbs.; WDI2, cast steel wheels, 195 lbs.

Model C Ambulance, East of and Including Denver, Steel Wheels, $55; Rubber Tires, $95. For Western & Canadian 
Prices, Ask Your Jobber

National Distribution—Obtainable from Your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.

Weaver Canadian Co., Ltd., Chatham, Ontario
THE New Weaver Model "D" Towing Pole is unique in providing a connection which is absolutely rigid to prevent jamming and yet amply flexible to prevent bending the pole when turning corners, towing over rough roads, etc. These essential properties are due to the construction of the jaw clamps at the end of the Pole, which fasten securely to any front or rear axle without danger of slipping, and to the two hooks which form universal joints, allowing play in any direction but which cannot become unhooked in towing.

Spring Absorbs Shocks.

Pulling and jamming shocks caused by sudden starting or stopping, towing over rough roads, etc., are absorbed by the heavy coil spring, an indispensable feature in a rigid pole of this type.

Cars Can Be Pushed As Well As Pulled.

The Weaver Towing Pole is amply rigid to enable a car to be pushed as well as pulled, which is often an advantage under crowded conditions where there is insufficient room to tow it into the desired position.

Length Adjustable.

The Pole proper is of double strength steel tubing in two sections, one telescoping within the other. A convenient pin adjustment permits the length to be varied from 5 ft. 6 in. to 8 ft. The heavy coil spring is amply strong to meet any requirements of towing service. The yoke which encases the spring is of malleable iron. W170, shipping weight, 47 lbs.

Rigid connection prevents disabled car from smashing into towing car on sudden stops.

Model D Towing Pole, East Of and Including Denver, $15.00. For Western & Canadian Prices, Ask Your Jobber

National Distribution— Obtainable from Your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.
Weaver Canadian Co., Ltd., Chatham, Ontario
**Weaver Universal Tire Changer**

**Model “E”**

---

The new Model “E” Weaver Universal Tire Changer has been developed to meet the demand for a quick, convenient, safe means for changing tires not only on all types of split and solid detachable rims but also on wire and disc wheels.

**Handles Balloon Tires.**

The Changer will handle pneumatic tires, including the new balloon tires, up to and including 7 ½ inches, for both passenger cars and light trucks.

**A Money Maker.**

The Weaver Tire Changer will prove a big money maker for the tire shop and garage not only in the saving of time and labor it effects, but also by attracting new customers who appreciate having their tires and rims handled in a way that eliminates danger of injury to tires, rims and wheels.

**For Handling Wire and Disc Wheels and Solid Rims.**

In removing tires from wire and disc wheels and solid rims, the tire is placed on three supports attached to the three jaws. There are no overhanging arms to interfere. The jaws are then expanded against the rim by turning the double handle. This way the lower edge of the rim is firmly held by the notch at the top of each jaw. The supports are then released to allow tire to be forced downward off rim.

**Goose Neck Adjustable.**

To facilitate placing goose neck over tire, it can be pulled outward after unlocking ratchet segment by means of foot lever. To remove tire the goose neck is adjusted inward as shown in Cut No. 1, to give it an inward drag on rim and thus keep it in contact with rim. Goose neck can be moved up or down on vertical ratchet bar according to size of tire to be handled and to enable operator to exert maximum leverage.

**Tire Can be Revolved on Base.**

A very convenient feature lies in the fact that, in removing the tire, the frame carrying the tire is unlocked by pressing the foot pedal, allowing the tire to be rotated on the base and bringing each section of the tire under the goose neck. When mounting tire the frame is locked by spring plunger.

**Tires Easily Remounted.**

Tires can readily be mounted on wire and disc wheels and solid rims with the aid of the goose neck. The rim is then held in the pockets at the base of each jaw.

**For Handling Split Rims.**

In removing tires from split rims, the rim is contracted by pressure of the hooks on the outer side of the three jaws, which are operated by the double handled crank as shown in Cut No. 3. After the rim is sufficiently contracted the tire can easily be lifted off. To remount the tire, the operation of the jaws is reversed and the rim expanded into proper position on tire.

**Complete Directions Provided.**

A permanently mounted direction chart giving specific detailed illustrations and instructions for operating accompanies each Tire Changer. Changer shipped set up ready for use. Floor space, 42 x 48 inches, WPI$, approximate shipping weight, 250 lbs.

---

Model E Tire Changer, U. S. East of and Including Denver, $58.00. For Western & Canadian Prices, Ask Your Jobber

**National Distribution—Obtainable from Your Nearest Jobber**

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.
Weaver Canadian Co., Ltd., Chatham, Ontario
This Weaver Balloon Tire Spreader, Model "L," is designed to enable the repair man to quickly and conveniently spread casings for inspection and to hold the casing permanently spread for repairs. It will be found a real money maker in any service station that handles tire repairs because it enables the operator to turn out more careful work and also to show customers the condition of the interior of their tires, which will often lead to the sale of new tires.

Handles Balloon or High Pressure Tires.

The outstanding feature of the Model "L" Spreader is its instantaneous adjustment to handle balloon or high pressure tires, by merely raising or lowering a hand lever, as shown in Cut No. 1. The foot lever has the same amount of travel when handling either type of tire, a point to be specially noted.

Quick and Simple in Operation.

The casing is placed on the Spreader resting on the four rollers shown in Cut No. 2, with the hooks of the Spreader jaws over the beads. Pressure on the foot lever draws these hooks and with them the rollers downward and spreads the casing over the buffing plate. When the foot lever is released the casing resumes its original shape with the hooks of the Spreader jaws still in position over the beads. It can then be revolved to right or left on the rollers and another portion inspected.

Casings Permanently Spread for Buffing.

When the break is located the beads of the casing can be inserted under the four hooks of the detachable buffing plate and the casing thus permanently spread can be removed for buffing. It also holds the casing conveniently for stripping.

Extra Buffing Plates.

Extra buffing plates, interchangeable on any of Model "L" Spreaders, can be purchased at a nominal cost. It is desirable to have several on hand as there are frequently a number of tires being repaired at the same time.

Hand Tool for Extra Heavy Casings.

For unusually heavy casings a hand tool is supplied to draw down the beads so they can be inserted under the hooks of the buffing plate.

Portable.

The Spreader is so designed that it will support the heaviest passenger car tires without danger of overturning. As it does not need to be bolted to the floor, it can be moved about the shop as desired. Floor space, 24 x 30 inches. WP12, shipping weight, 15 lbs. Extra buffing plates, WP14, shipping weight, 15 lbs.

Tire Spreader, Model 1, $28.00; Extra Buffing Plates, $3.50; U. S. East of and Including Denver. For West & Canadian Prices, Ask Your Jobber.

National Distribution—Obtainable from Your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.
Weaver Canadian Co., Ltd., Chatham, Ontario
Hudson-Essex Service Stations

Weaver Valveless Bucket Pump

Three Methods of Operation.

The construction of the Bucket Pump, described in the preceding paragraph, makes possible the following three distinct methods of operation.

1. The lubricant can be forced out of the Bucket Pump and into differential, transmission housing, etc.

2. Old grease or oil can be squeezed out of differential, transmission housing, etc.

3. The cylinder of the Bucket Pump can be squeezed full of lubricant from a different container and discharged again without disturbing contents of Bucket Pump.

This three-way method of operation is an exclusive feature of the Bucket Pump.

Invaluable for Cleaning Gear Housings.

The above described three-way method of operation makes it possible to draw old lubricant from differential or transmission, pump in kerosene to clean the gears, draw kerosene out and fill with new lubricant.

Customers Appreciate Quick Service.

Differentials can be easily cleaned while the customer's car is waiting for service at the filling station or garage and the garage man who makes this a feature of his service will find it a source of considerable profit.

Spring Plunger Insures Perfect Suction.

The two leather washers shown in Cut No. 3 are especially treated to withstand grease and are held expanded against the inner wall of cylinder by spring expanders, thus insuring perfect suction.

Self Measuring.

One cylinder of lubricant weighs one pound. Ten full strokes of lever handle discharge one quart.

Construction.

Bucket proper is made of very heavy galvanized sheet iron and has capacity of 25 lbs. of grease. Barrel is of 14 gauge brass tubing, 3 inches in diameter. The lower edge of the bucket is welded snugly into a corresponding groove milled into the heavy cast base, and is securely riveted and soldered. When, shipping weight, 25 lbs.

No Valves to Get Out of Order.

There are no valves to get out of order and cause trouble. The cover cylinder carries an open "plug" near its base. By rotating this cylinder one-quarter turn to right or left, this port is respectively thrown into direct communication with the inlet from the Bucket Pump or with the outlet to base. When in communication with one of these openings the other is automatically cut off.

Bucket Pump, U. S. East of and Including Denver, $15.00. For Western & Canadian Prices, Ask Your Jobber

National Distribution—Obtainable from Your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.
Weaver Canadian Co., Ltd., Chatham, Ontario
THE Weaver Safety Service Can is designed to furnish a convenient, quick, safe and economical means of handling fuel and lubricants in the service station, garage and repair shop. While designed primarily for this service, it is well adapted to the needs of private owners of cars, tractors, motor boats, etc.

Flexible Steel Hose Will Reach Gas Tank.

No matter how obstructed by tires or inconveniently located the opening of the fuel tank may be, it is readily reached by the flexible steel hose of the Safety Service Can. The need of special funnels, so easily forgotten or lost, is thus eliminated.

Prevents Waste.

When the oil or gas is stored or transported, the tapered nozzle on the flexible steel hose is inserted in the vast in the screw cap, as illustrated, thus rendering the can essentially air-tight and preventing evaporation, contamination and spilling. When the nozzle is withdrawn from the can, preparatory to discharging the contents of the can, the open vent insures a free flow of the liquid.

Reduces Danger from Fire.

Danger from fire in both public and private garages and in service stations will be greatly reduced by handling inflammable liquids in this sealed container. A cigarette butt or match carelessly dropped by an employee or customer will not cause the dangerous results that often follow when gas or oil is stored in open cans.

Easy to Fill.

By removing the screw cap, a large opening for filling is afforded.

For the Garage Man.

Our Safety Service Can will be found especially useful to service stations, garages and for transporting gas in the service car to cars which have run out of gas on the road. Valuable time will be saved and the service to the customer will be improved by keeping several cans filled and ready for service. When the mechanic loads this can onto the service car, he has nothing further to think or worry about—there are no funnels to be left behind or lost and there is no danger of gas slopping over and the ashes of his pipe or cigarette causing fire.

Construction.

The construction of our Service Can is extremely rugged throughout to withstand the severest usage and abuse to which it may be subjected. It is made of heavy galvanized iron strengthened by horizontal ribs. The bottom of the can is specially reinforced to prevent leaks. The two-foot flexible steel hose is practically indestructible. WREI, capacity 5 gallons up to the rim. Shipping weight, 84 lbs. WREII, 2 gal. capacity, shipping weight, 5 lbs.

5 Gal. Size, $5.00; 2 Gal. Size, $4.00, East of and Including Denver. For Western & Canadian Prices, Ask Your Jobber

National Distribution—Obtainable from Your Nearest Jobber

Made by the

WEAVER MFG. CO., Springfield, Illinois, U. S. A.

Weaver Canadian Co., Ltd., Chatham, Ontario
WEAVER MFG. CO., Springfield, Illinois, U. S. A.
Weaver Canadian Co., Ltd., Chatham, Ontario
How to Keep the "Ills" Out of Your Electric Drills

This Bulletin contains valuable suggestions on the operation and care of Portable Electric Drills:— Suggestions that will keep your Electric Drills in good running condition, reduce their cost of maintenance and prolong their life and usefulness.

Automotive Service Stations will find this folder useful no matter what makes of Electric Drills they operate.

Compiled for the Dealers of the Hudson-Essex Motor Car Company
How to Prevent Drill Troubles and How to Cure Them

Electric Drills Need Servicing Same as Other Tools and Machines

For some unaccountable reason many owners and operators of a Portable Electric Drill feel that it is a rough and tumble piece of machinery that doesn’t require the greasing, cleaning and adjusting so freely given to other machine tools or to motor cars and trucks.

As a matter of fact, an Electric Drill is made of finer materials, with parts more accurately fitted and assembled, and has more power for its light weight than shop equipment or tools ordinarily found in service stations.

Did you ever think that an Electric Drill is built as accurately as a watch:—Light enough to be handled easily by a man, yet strong enough to perform the hardest drilling and honing operations in the service shop and sturdy enough to stand the abuse and neglect many operators give it?

While they are rugged, patient, hard working little tools that require comparatively little care, the neglect of certain fundamental requirements might lead to serious trouble, if not to the loss of the tool. A moderate amount of care and attention in remedying troubles before they become serious will keep Electric Drills off the sick list, reduce their cost of maintenance and prolong their life and usefulness. 15 minutes attention will often save $15.00 in repairs.

How to Keep the “Ills” Out of Your Electric Drills

Cleaning, Greasing, and Re-Brushing Every 60 Days

1—Carbon Brushes

Regular attention to the following items every sixty days or six times a year, will keep your Electric Drills in tip-top shape. Time required: Half hour to an hour.

Carbon Brushes will wear off with use. They must be replaced before they get short enough to relieve the tension of the spring that presses them against the Commutator.

Short brushes, loose brushes or poor quality brushes cause arcing. This arcing generates heat and serious troubles will soon follow. It is a good rule to use only brushes supplied or recommended by the maker of your Drill.

It is estimated by the manufacturers that 80% of Drill Ills are traceable to inattention to Carbon Brushes.
2—Clean the Commutator

Clean the Commutator every 60 days with 00 sandpaper. *Don’t use* emery paper, as it will cut the copper Commutator bars. In service Commutators sometimes become corroded, covered with grease or dirt, and frequently pitted or worn from improper brush contacts. Sandpapering every sixty days takes care of all these conditions.

3—Cleaning and Greasing the Drill Every 60 Days

(a) To remove the armature for cleaning, take off top head and gear housing cover at the bottom. Slip out the armature and using air from ordinary air hose blow off the dust and dirt. Also blow out the accumulation of dust and dirt in the motor housing around the field coils as well as ventilation holes in motor housing. If compressed air is not available clean by hand or by brushing.

(b) When Drill is apart, examine top ball bearings to see whether grease is required. Put in just enough “Electric Drill” grease to fill the bearing or to properly cover the balls. “Electric Drill” grease is specially prepared to overcome difficulties experienced with grease that melts too easily. *Too much grease is as bad as too little*, as it is likely to be forced through to the Commutator and furthermore the balls won’t properly turn in too much grease. Install a new felt washer at this point if the grease shows a tendency to run through.

(c) The Gear Case at the bottom of Drill should be \( \frac{2}{3} \) filled with “Electric Drill” grease after removing the old grease. Install new felt washers in case there is any indication of grease leakage into the motor.

(d) Sometimes chuck jaws do not work freely on account of an accumulation of dirt. Immersing chuck in a can of gasoline for about ten minutes will take care of the trouble.

(e) When Drill is open for cleaning and inspection, oil moving parts of the switch mechanism with light machine oil. Keep switch contacts bright and clean.
Interior View of ½" Electric Drill

(arrows and captions indicate servicing that should be done every 60 days to keep your Electric Drills in tip-top shape.)

1. Replace brushes before they get short enough to relieve the tension. This tension should be about 4 pounds per square inch of brush cross section. Use brushes specified by The Van Dorn Electric Tool Company to avoid trouble.

2. Clean the commutator with No. 00 sand paper at least every 200 working hours. Never use emery cloth. If the surface becomes pitted or grooved, refinish it in a lathe.

3. To remove the armature: Take off top head and gear housing cover. Hold the armature with a screw driver in the top end bearing clamp screw and unscrew the armature pinions with special pinion wrench or pliers. The pinion has a right hand thread. Remove the gear housing and hold the fan with the fingers to take out the bearing clamp screw. This is a left hand screw. The fan is screwed on with a right hand thread.

4. To remove chuck: Put in the key and give it a sharp rap to the left with the hammer handle. If this fails, take off the gear housing cover and hold the gear in a vise between blocks of wood.

5. To lubricate, remove gear housing cover. Clean out the gear housing every 200 working hours and fill ⅔ full with “Electric Drill” grease. Install a new felt washer if the grease shows a tendency to run into the motor.

6. Oil moving parts of the switch mechanism whenever the tool is inspected. Use a light machine oil. Keep the contacts bright and free from blisters.

7. Protect the cable from unnecessary abuse. Do not use it as a convenience to drag the tool around. Do not allow trucks to run over it.

8. To lubricate the top bearing, remove these two screws and the top head. Put in just enough “Electric Drill” grease to fill the bearing. Too much grease at this point may be forced through to the commutator. Install a new felt washer if the grease shows a tendency to run through.

Cross-section view showing interior construction of “Van Dorn” Universal Electric Drill.

This particular drawing is made from ½ inch drill designed for either direct or alternating current operation.
What to Look for
When Your Electric Drill Stops

A Systematic Method of Locating the Trouble

Even though all the foregoing preventive measures are taken, it sometimes happens that an Electric Drill stops in service, just as a motor car or other types of machinery.

A quarter century of drill experience has taught us that more than 90\% of the causes of stoppage is due to some minor difficulty that can be remedied quickly by the operator and thereby have the tool back on the job in a few minutes.

To save time, this "trouble shooting" should be done systematically about as follows:

(a) Start by removing top head and examining the carbon brushes. Are they worn down so short that poor contact on the commutator is being made? If so, put in new ones. Are they stuck in the brush holders, due to an accumulation of dust or dirt? In this case, a simple process of cleaning is the only thing required.

(b) Then examine the Commutator to find out whether it is corroded, whether it has a film of grease or dirt that might cause poor contact between brushes and itself, or whether it might be pitted or worn down irregularly.

Remedy—Sandpaper with 00 sandpaper. Don't use emery paper.

If Commutator should be so badly pitted that it can't be smoothed by sandpapering, remove armature and have Commutator turned in lathe.

(c) While examining the surface of the Commutator look carefully at the mica insulation between the Commutator bars. If the insulation between one or more of the Commutator segments is burned, it pretty clearly indicates a short circuited armature. This is serious and the Drill should be sent to the maker's nearest service station for repairs.

(d) The next in order would be an inspection of the switch. Look at both stationary and moving contacts to see if the contact is being actually made. An open circuit through the switch would most likely occur if the switch contacts were bent by rough handling. Bending back into their original position is the simple remedy.

(e) Cable. This is a fertile cause of Drill stoppage. Start at the switch end of the cable and see that perfect contact is made at the binding posts inside the switch handle.
Next test the cable for open circuits (breaks) from the switch terminal out to the plug. This can be done by means of ringing magneto, incandescent lamp or any method commonly employed by service shops in testing open circuits in the electrical wiring and equipment on cars or trucks that they repair.

(f) Finally examine the socket at end of cable and the receptacle into which it fits. Also see whether the fuse on the lighting circuit might be blown.

A Place for the Drill When Not in Use

Too many Drills are "kicked under the bench" or thrown into a dusty, dirty corner when not in use. An Electric Drill is a valuable part of the shop equipment and should be kept in:

(a) A clean dry place either on top of the tool bench or hanging on the wall.

(b) Preferably should be kept in a dust-proof cabinet or in the stock room where it will be well kept during the hours when not in operation.

Overloading Drills—A Source of Trouble

If a truck owner attempts to carry a five-ton load on a one ton truck, he is going to have trouble. The one-ton truck will occasionally carry more than its rated capacity without harm, but if overloaded continuously will soon break down and go to pieces.

The same is true of Electric Drills. Any good Electric Drill can be used occasionally to drill holes over its rated capacity without doing it any harm, but if continuously overloaded serious damage will soon occur.

One of the most common causes of damage to Electric Drills in garage use is the continual overloading of them with heavier work than they are made for. No \( \frac{3}{4}'' \) drill can possibly stand up if used on \( \frac{1}{2}'' \) drilling or \( \frac{1}{2}'' \) Drill if used on \( 1'' \) drilling. Give your Electric Drills a square deal, analyze your drilling needs, and equip yourself with the size Drills that have the rated capacity to handle the job.
ELECTRIC DRILLS
AND GRINDERS

Time Savers and Money Makers for Garages and Service Stations

1/4 Inch Portable Electric Drill

$30.00

1/2 Inch Portable Electric Drill

$60.00

5/8 Inch Portable Electric Drill

$75.00

3/8 Inch Portable Electric Drill

$90.00

1/4 Inch Grinding Outfit

$3.00

6 Inch Bench Grinder

$38.00

A sturdy, serviceable drill of proper power, weight and speed for work in close quarters and for drilling the hundreds of smaller holes in both production and automotive maintenance work. An unusually handy tool in every shop and factory, for mounting accessories and score of other drilling operations. Also a tool of great value for installing fixtures and for odd maintenance jobs in office buildings, hotels, apartments, schools, etc.

Motor—Universal, will run on alternating or direct current.

Speed—1200 R. P. M., no load, 800 R. P. M. full load.

Drilling Capacity—1/4" in steel.

Weight—6 pounds. Shipping weight—8½ pounds.

Over all Length—11¼".

Equipment—Grip handle; three jaw chuck; 7½ feet of cable with plug.

Shipping Dimensions—13" x 7½" x 4½".

Price for 110 volts—$30.00.

220 or 32 volts—$4.00 extra.

A heavy duty all around general purpose drill. Its construction, weight and speed make it especially adapted for outside construction work.

Motor—Universal; will run on alternating or direct current.

Speed—375 R. P. M., no load; 185 R. P. M. full load.

Drilling Capacity—3/8" in steel.

Weight—22 lbs. Shipping weight—26 lbs.

Overall Length—18½" with spade handle; 13½" with feed screw; length of feed 2½".

Equipment—Spade handle; No. 2 Morse taper socket; 10 feet of cable with plug. Following equipment can be furnished extra if desired: feed screw, either 5/8" or ¾"; chuck with special chuck adaptor.

Shipping Dimensions—20" x 14" x 8".

Price for 110 volts—$90.00.

220 volts—$2.00 extra.

"This is a sturdy, well balanced, heavy-duty Ball Bearing drill (not a special light duty drill) with AUTOMATIC RELEASE SAFETY SWITCH, hardened gears, threaded back chuck and driven by the powerful Van Dorn built motor.

Positively the most powerful 3/8" Universal motor drill we have ever produced.

This machine is truly called the "drill of a thousand users," for production, millwrighting and automotive maintenance work. A ideal machine for driving cylinder nuts.

Motor—Universal; will run on alternating or direct current.

Speed—550 R. P. M., no load; 315 R. P. M., full load.

Drilling Capacity—3/8" in steel.

Weight—16 pounds. Shipping weight—19 pounds.

Over all Length—16¼".

Equipment—Combination spade and breast plate handle; three jaw chuck; 16 feet of cable with plug.

Shipping Dimensions—18½" long x 11½" x 6½".

Price for 110 volts—$50.00.

220 or 32 volts—$4.00 extra.

Van Dorn Grinding Outfit, consisting of stand, arbor and grinding wheel completely converts ¼" electric drill into a small bench grinder. Specially adapted for light grinding jobs such as tool dressing, burr removing, etc.

Stand, Arbor and Grinding Wheel Complete—No. 8169.

Price $3.00.

Grinding Wheel Arbor to fit Van Dorn 3/8" drill—No. 8449.

Price $1.80.

Grinding Wheel, 6½" diameter by 3½" face by ½" hole—No. 8433.

Price $2.75.

Cylindrical Wire Brush, 5½" diameter—No. 8433A.

Price $1.25.

Van Dorn Grinding Outfit complies with all requirements of National Safety Council. Guards can quickly be adjusted so that front end of guard is always close to the grinding wheel.

Size of Wheels—6½ diameter x 3½" face x ½" hole.

Speed—1100 R. P. M.

Weight—38 pounds net. Shipping Weight—53 pounds.

Shipping Dimensions—18" x 10" x 10".

Price—For 110 volt single phase 60 cycle—$38.00.

Add $4.00 for 110 volt 25, 40 and 50 cycle A.C., 32 volt; 115 volt and 230 volt D.C. and for 220 volt single phase current.

Not built with a universal motor. Specify your current when ordering.
Bench Drill Stand for 1/2 and 5/8 Inch Drills

This stand converts your "Van Dorn" 1/2 or 5/8" portable electric drill into an efficient bench drill press almost instantly. Electric drill is attached to the stand by means of an adaptor plate which holds it securely in place as illustrated above. The tension spring lifts the drill out of the work instantly when the handle is released. The stand weighs 55 pounds and is well balanced and steady in use.

Shipping Weight—75 pounds.
Shipping Dimensions—40" x 11" x 15".
Price Complete—$28.00.

Post Drill Stand for 1/2 and 5/8 Inch Drills

Wherever benches are not available and where space is limited, this post drill stand converts your Van Dorn drill into a stationary drill press almost instantly. The stand is easily and quickly mounted on most any form of post or column, or permanently mounted by bolts to the wall. Electric drill is attached to the stand by means of an adaptor plate which holds it rigidly in place. The tension spring lifts the drill out of the work instantly when the handle is released.

Shipping Weight—90 pounds.
Shipping Dimensions—54" x 11" x 15".
Price Complete—$35.00.

8 Inch Grinder

This Van Dorn 8" Grinder is furnished as a Bench Grinder or as a Floor Grinder with pedestal as a Floor Grinder. Comes complete with wheel guards, tool rests that are adjustable both horizontally and vertically, switch, two grinding wheels, and boss for twist drill grinding attachment. Water not furnished with pedestal type. Ball bearings are properly mounted in dust proof housings. Provided with grease cups to facilitate lubrication. Shaft is extra large to increase stability and steadiness in use.

Motor—Fully enclosed rating 5/8 H. P. Momentary overload 100%.
Size of Wheels—8" diameter x 3/4" face x 5/8" Arbor.
Speed—A. C. 50 Cycle, 3600 R. P. M., D. C. 2900 R. P. M.
Weight, Bench Type—85 lbs., Shipping weight 115 lbs.
Weight, Pedestal Type—160 lbs., Shipping weight 210 lbs.
Height of Pedestal Type from floor to shaft—42".
Shipping Dimensions—Bench Type—14" x 11" x 15". Pedestal Type—24" x 11" x 15".
Price—Bench Type for 110 volt single phase, 60 cycle, $95.00.
Price—Pedestal Type for 110 volt single phase, 60 cycle, $134.00.
Add $40.00 for 25, 40 and 50 cycle A. C., 115 and 230 volt D. C. and for 220 volt single phase and for 220 volt 3 phase windings.

12 Inch Ball Bearing Floor Grinder

A utility grinder for all classes of work requiring a 12" wheel with the maximum wheel accessibility. Van Dorn Motor rated and tested to meet standards of A. I. E. E. and E. P. Club.

Motor—Fully enclosed self ventilated. Continuous rating 40" basis 5/8 H. P. Momentary Overload capacity 100%.
Current—Alternating, three phase, 60 cycle, Voltage=220 or 440.
Speed=1800 R. P. M. no load.
Equipment—Two 12" x 1 1/2" x 1" hole wheels; hinge wheel guard; wheel flanges; exhaust connection on wheel guard; adjustable work rests; removable water pot; line switch and plugs with time limit characteristics to give both starting and running protection.
Bearings—Two large ball bearings properly mounted and protected from dust.
Dimensions—Height to center of spindle, 39"; distance between wheel centers, 26"; floor space, 17" x 18".
Weight—Complete with wheels, 400 pounds.
Price—$210.00.

1/4 Inch Bench Drill Stand

When small drilling jobs needing a number of holes come up, this bench drill stand makes a small drill press of your 1/4" drill for handling these jobs quicker and easier. Increases the efficiency of your portable drill when drilling holes in small pieces, etc. Specially useful in garages, small shops, experimental departments, etc. Drill is easily and quickly fastened to stand and held securely in place by a metal strap adjusted with a wing nut. Drill carriage is movable on column so that drill pressure may be applied with long or short strokes. Tension spring holds drill up in idle position as well as lifting it out of the work when drilling is finished. Correct size screws are furnished for attaching drill to bench. Weight, Stand Only—14 lbs.
Shipping Weight—22 lbs.
Price—$12.00.

Shipping Dimensions—20" x 11 1/2" x 9".

Valve Grinder

This valve grinder has ample power to grind valves of all sizes in automobile motors. Same construction as Van Dorn Drills except that spindle is designed to oscillate and progressively rotate. The oscillating movement keeps at all times a proper coating of grinding compound on the high spots on the two surfaces to be sanded. The progressive rotation of travels produces a rougher top surface to the high spots. The combination of these two movements gives for a better and quicker job than the oscillating movement alone.

Motor—Universal, will run on alternating or direct current.
No Load Speed—Rotations per minute 45.
Oscillations 500 per minute.
Weight—754 lbs. Shipping weights—11 lbs.
Equipment—Furnished with complete equipment including spindle shaft, four detachable bits, spring and box of grinding compound.
Price—110 volts $38.00, 220 or 32 volts $40.00.

Price—Extra lift springs, per 5/8 doz., 60c.
Black bits to be filed to fit valves, 60c per 5/8 doz.

The Van Dorn Electric Tool Company
Makers of Portable Drilling, Reaming and Grinding Machines, etc.
Cleveland, Ohio.
With the HUTTO Portable Cylinder Grinder

A Precision Tool of Highest Quality and Remarkable Performance, giving the same high grade results in service as are being obtained with HUTTO Model KKS "Brake Type" production grinders at the factory.

Protection against accidental damage to the Hutto portable service grinder when not in use is afforded by the heavy metal box here shown, providing an inexpensive kind of insurance against the evil effects of the neglect to which some garage service tools of lesser importance from a precision point of view are commonly subjected. In supplying such a container the manufacturers emphasize a desire that users of Hutto grinders shall obtain from them the greatest possible amount of effective service as a result of taking proper care of the grinders at all times. With proper care Hutto grinders not only will last for a very long time but they will be found less troublesome in operation than any other cylinder reconditioning tools ever devised much easier to handle, faster and more accurate in action, and of much greater profit - producing capacity on account of the time they save and quality of work they do. Whenever the results obtained are not satisfying to the highest degree in any particular, it is certain that the reason or cause for the difficulty encountered will be found in a failure to use the grinder precisely as directed, notwithstanding that the directions for use are extremely simple and easily followed.

An extremely important item among these instructions, however, calls for the use of an electric drill sufficiently powerful to drive the grinder fast enough to insure high-grade results while doing honest-to-goodness corrective grinding not mere polishing or burnishing. Another point it is wise to observe carefully is, check accuracy of work done and don't be satisfied with anything outside the Hutto half-thousandth limit. This particular point should under no circumstances be overlooked if service satisfaction of a higher grade is to be guaranteed to the owner.

Car owners are an appreciative lot of folks to the man who entertains a thoroughly sincere desire to serve them efficiently. Good workmanship draws trade and holds it everywhere. Hutto grinders serve well in building profitable good will. They and the trade they build last.

HUTTO-GROUND BORES WEAR LONGER because the close-grained hard-finish surface produced is free from high or low spots, chatter marks, and the fuzziness, which is usually of coarse thread-like appearance, commonly found in bores finished by "dry" grinding done with small abrasive wheels rotating at high speed.
HUTTO PRODUCTION GRINDER

Below is a picture of the Hutto Model KKS twin-three production grinder used for finishing cylinder bores at the factory, where the grinder is driven by an ordinary single-spindle drill press.

With the exception of the driving head, which is equipped with an automatic stone-adjusting mechanism of micrometer type, this grinder embodies exactly the same principles of construction as the Hutto twin-three grinder that we recommend for service regrinding, because

1. Any untrained shop hand can get results with it.
2. Impossible to grind bores out of parallel or out of round with it because stone setting is positive.
3. Cylinder bores can be ground with it in from five to twenty minutes, depending on amount of metal removed.
4. Accuracy limits for roundness and taper easily held by it to half a thousandth.
5. Quality of work done by it is better than that produced by highest grade stationary grinders costing fifty times more.
6. It is more accurate and much faster in operation than reborering or reaming and hand lapping.
7. Open-end cylinders can be reground with it without removing engine from chassis.
8. It satisfactorily replaces fixed or stationary grinding equipment and cylinder retooling tools.
10. It is usable wherever a lamp socket is available as a source of current.
11. It is driven by portable 1/2-inch electric drill or by ordinary drill press, using taper shank adapter and double universal drive shaft shown on next page.
12. "Charging" of cylinder walls with abrasive particles from stones is entirely impossible with it.
13. The die-cast, metal-backed stones are serviceable even when cracked, chipped, or broken, being usable until worn out.
15. It pays for itself quicker than any other cylinder finishing tool ever produced.

HUTTO SERVICE GRINDER

Details of Construction. The Hutto "twin-three" type of grinder for service work is constructed as indicated by the accompanying conventional vertical cross-sectional view, which shows the operative relationship of the various parts. One end of the driving spindle is designed for insertion in the chuck of the electric drill used for rotating the grinder, to the central or driving member of which the other end of the driving spindle is attached by means of a ball-and-pin type of universal, which permits of "offset" or out-of-line operation of the grinder without detrimental effect upon the quality of work done. This type of "universal" drive, with "bayonet" style of connection to the upper end of the grinder body, also provides for easy access to the stone-adjusting mechanism.

Under the driving spindle is the adjusting screw for drawing the upper and lower adjusting cones together so as to force the stoneholder pins, or jaws, outward and press the stones against the cylinder wall. The lower cone is slotted on one side to receive the end of a pin which prevents it from turning when the adjusting screw is turned.

When the adjusting screw is "backed off," or turned in an anticlockwise direction, the adjusting cones are forced apart by the action of the coiled spring that surrounds the adjusting screw and bears on the small ends of the adjusting cones, and under the inwardly pulling influence of the retaining springs provided for that purpose the stone-holder supporting pins or jaws move inward, relieving the stone pressure against the bore wall, thus permitting the grinder to be removed easily and without scratching the bore. The retaining springs keep the inner ends of the stone-holder supporting pins or jaws in contact with the adjusting cones at all times, so that whenever the adjusting screw is turned in a clockwise direction there is a positive outward movement of the pins or jaws towards the bore wall, against which the stone pressure developed, and hence the speed of grinding, depends on manipulation of the adjusting screw, a quarter turn of which sets out the stones approximately one thousandth of an inch.

Neither of the two adjusting cones is attached to the grinder body, within which both are therefore free to "float" to an extent sufficient not only to prevent binding of parts but to insure equalization of seating area and pin pressure on the two cones and thus make the stones self-aligning as well as self-centering.

Parts are proportioned to withstand hard, rough usage, also being hardened to resist wear, thus insuring long life in service—strength with durability.

Satisfactory Results are Easy to Get With Hutto Portable Service Grinders
Stones—The grinding elements or abrasive members of Hutto grinders for both service and production work are called stones. Service grinders have 4-inch stones set in die-cast metal run into steel holders having two ground steel pins or jaws whose outer ends are ground to conform to the angularity of the two oppositely positioned adjusting cones against which the pin, or jaw, ends are held in close contact by the strong inwardly-acting pull of retaining springs that tend always to force the stone holders towards the central driving body of the grinder.

Stones are made in four grades, namely: fine, for polishing only, removing not more than .0005; medium, and coarse, an extra-coarse or “roughing” stone also being made for use when a great deal of stock must be removed to true up a badly worn bore. When ordering stones be specific as to desired grade, selection of the latter depending on the amount of stock to be removed and character of finish desired.

Operating Instructions—Before proceeding with the work of regrinding, size up or gauge the cylinder bores to find out to what size it will be necessary to grind them to suit whatever size of piston may be available. Be sure that all pistons used are of the same diameter and weight.

Wrap the crankshaft very thoroughly with rags to keep any abrasive or dirt from lodging in the bearings. Have plenty of clean kerosene on hand, also a can that will allow a generous flow of the kerosene into the cylinder while grinding.

Before starting to grind, decide whether the amount of stock to be removed demands the use of coarse, or “roughing,” stones in order to remove stock quickly.

Before placing the grinder in bore of cylinder, examine the stones carefully to see if they have a “glazed” or polished appearance, because the presence of “glaze” destroys the cutting effect of the stones, which should have a dull grey appearance of cast iron. Glazing is caused by running the grinder too loosely in the cylinder bore, or may result from lack of enough kerosene. Glaze may be removed easily by using a “dressing stick” made for the purpose. The grinder must not be allowed to run in the cylinder bore loosely. Put the grinder in the smallest or least-worn part of the cylinder and tighten the stone-adjusting screw. In other words, begin at the bottom of bore and work upward. Tighten the screw as much as possible and yet allow the motive power you are using to turn the grinder. Successful operation demands at least the power of the best 3/8-inch electric drill. If such a drill is being used, make it work to its limit. Work the grinder up and down, allowing it to grind at the tight spots, or where the work of the drill seems the hardest. When the grinder seems to speed up, STOP and again tighten the adjusting screw while the grinder is in the small or tight part of the bore. With a constant flow of kerosene while grinding and a continual repetition of this process the bore will soon be straight and round. Keep in mind the fact that lack of kerosene or failure to keep the grinder tight in the bore will cause the stones to become glazed, when they will not cut. Keep them well dressed with a dressing stick or the edge of a file.

If the grinder is started when tight, and if the stones have been properly dressed, the grinder will remove about one-half thousandth of stock, the amount varying according to the softness or hardness of the cast iron in the block. Also it should be noted that the grinder will cut faster after the polished part of the old cylinder wall surface has been removed. The polished surface has the same effect as very hard, so that unless the grinder is set up good and tight, as tight as a 5/8-inch drill will pull, getting through this hard skin will be slow.

There are a few items of caution that it is well to keep constantly in mind. Do not allow the grinder to extend beyond the cylinder bore, either top or bottom, farther than the center line of the outer pin. If in this respect care is not taken while the grinder is rotating, you are sure to wreck the grinder or break the stones.

After all the tight spots have been removed and the bore has the same “feel” from top to bottom, then the proper procedure is to make a light adjustment and work the grinder the full travel of the bore and as rapidly as possible, letting the grinder work itself to the point where it will not cut at any part of the cylinder. During this “finishing” process be sure to use plenty of kerosene. If this is done, the walls will have a wonderfully smooth finish and will be round, straight, or parallel, and will give the best of satisfaction in actual operation.

After one of the pistons has been fitted to the first bore in the block, the others may be used very much like plug gauges to which to grind and fit the other bores.

For regrinding cylinder bores of blocks removed from chassis, double universal drivers and adapters with No. 2, No. 3, or No. 4 Morse taper shanks, as here shown, are available for drill press operation of grinder.

Faster and Better than any other known method of Refinishing Cylinder Bores.
HUTTO Combined “Stroking’ and Drill Stand

Easier, Faster Operation Than With Manual Control

POSITIVE mechanical control of the stroking movement of Hutto Portable grinders is essential to speed in getting desired results in accuracy, finish, and quantity of stock removed as is regulation of the pressure with which grinding stones bear against cylinder wall. The higher the wall pressure the greater the grinding load and the harder it becomes to hold the electric drill while moving the attached grinder up and down in the bore.

When the Hutto stroking stand is used, limitation of the up and down movement of the grinder, regardless of load on drill, is accomplished easily by setting stop collars on the column on which the drill-holding carrier, or fixture, is forced to slide up and down by manipulating the hand-lever control mechanism attached to the carrier.

When the stroking movement is thus limited, the operator is relieved of any fear that he may push his grinder too far down or pull it too far out of the bore. As a consequence he feels freer to increase both wall pressure and stroking speed, with the result that the work of grinding is done more quickly and with less physical effort than when the operator depends entirely upon manual limitation of the stroking movement.

The Hutto stroking stand provides a degree of rigidity that is extremely favorable to quick grinding action. The “foot” to which the vertical column is attached, and with which it is “square,” is solidly bolted to the top of the cylinder block in such a position as ordinarily to bring the drill chuck directly over, or in line with, the cylinder bore center. Drive shafts with ball-and-pin type “universal” ends are provided, to compensate for lack of alignment, even when extreme, between the driving and driven members of the grinding outfit. The “foot” is slotted to receive one of the studs by which the cylinder head is held in place and which, when head is removed, serves equally well to hold the foot in position on top of the block. The stand, which is 38 inches high and weighs 27 pounds, can easily be adapted for other uses, such as drilling.

The accompanying illustrations serve to bring out the extreme adaptability of the stroking stand for purposes other than manipulation of the Hutto portable or service type of grinder to get quicker results with greater ease, ready attachment to bench or work being made possible by the supporting “foot.” The operating handle may be used on either side of the column, all that is necessary to make the change being to remove the upper link bolt, throw handle over to other side, and reconnect link in new position, as indicated by dotted lines in cut below, which

SOLD BY AUTHORIZED HUTTO JOBBERS EVERYWHERE.
HUTTO FACTORY SERVICE MEN ALWAYS AVAILABLE.

For Further Information, Write Direct to Manufacturers, HUTTO ENGINEERING CO.
515 Lycaste Ave., Detroit, Mich.
Recommended for HUDSON and ESSEX Service Stations

Kleenkar Shop Covers

Every Hudson-Essex Dealer Should Provide Himself With Car Covers

When the customer knows that covers are being used to protect his car, he appreciates the entire service of the station. This is particularly true of women drivers.

KLEENKAR cover equipment helps to popularize a service station thereby increasing the volume of service work and stimulating sales.

KLEENKAR fender, cowl, radiator, lamp and the outside of double door covers are made of a kniit slate color jersey cloth, extra heavy weight, with soft fleece lining.

KLEENKAR upholstery and interior covers are made of heavy blue and white striped fabric which is subjected to a hot-water shrinking process before cutting. Both materials are guaranteed non-shrinkable, and are easily laundered.

KLEENKAR fender, cowl, radiator, lamp and the outside of double door covers are made of a kniit slate color jersey cloth, extra heavy weight, with soft fleece lining.

KLEENKAR upholstery and interior covers are made of heavy blue and white striped fabric which is subjected to a hot-water shrinking process before cutting. Both materials are guaranteed non-shrinkable, and are easily laundered.

Careful workmanship is used in the construction of KLEENKAR shop covers. All seams are finished with good stout thread, and he tie tapes are securely sewn to the covers and are the proper length for rapid tying.

The cost of this equipment will be more than offset by the good will created through its use.

Hudson-ESSEX KLEENKAR SHOP COVER PRICE LIST

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>FENDER COVERS</td>
<td>Each 3.00</td>
</tr>
<tr>
<td>COWL COVERS</td>
<td>Each 2.50</td>
</tr>
<tr>
<td>RADIATOR COVERS</td>
<td>Each 3.00</td>
</tr>
<tr>
<td>LAMP COVERS</td>
<td>Pair 3.00</td>
</tr>
<tr>
<td>DOUBLE DOOR COVERS; Jersey Knit outside, Express Stripe inside, 30 inches wide</td>
<td>Pair 4.00</td>
</tr>
<tr>
<td>DOUBLE DOOR COVERS; 38 inches wide for Coach</td>
<td>Pair 4.50</td>
</tr>
<tr>
<td>WIDE FRONT SEAT COVERS—Interchangeable all models</td>
<td>Each 4.00</td>
</tr>
<tr>
<td>REAR SEAT COVERS—Interchangeable all models</td>
<td>Each 4.00</td>
</tr>
<tr>
<td>SINGLE SEAT COVERS; for Coach</td>
<td>Each 3.00</td>
</tr>
<tr>
<td>DOOR COVERS: INSIDE only, 30 inches wide</td>
<td>Pair 2.00</td>
</tr>
<tr>
<td>DOOR COVERS: Inside only, 38 inches wide for Coach</td>
<td>Pair 2.25</td>
</tr>
<tr>
<td>STEERING WHEEL COVERS</td>
<td>Each .75</td>
</tr>
<tr>
<td>CONTROL LEVER COVERS</td>
<td>Each .25</td>
</tr>
</tbody>
</table>

By agreement with Hudson Motor Car Company the manufacturer of Kleenkar Shop Covers will allow all HUDSON and ESSEX maintenance stations a DISCOUNT OF 25% from above prices. P. O. B. Milwaukee.

Orders Should Be Placed Direct With

AUTOMOTIVE FABRIC EQUIPMENT CO.

Exclusive Manufacturers

235 EAST WATER STREET - MILWAUKEE, WISCONSIN

PRINTED IN U. S. A.
THE IDEAL WHEEL ALIGNING GAGE

Can be used on all cars—balloon tires—four wheel brakes

I DEAL—Because it meets every requirement.
I URABLE—Years of service cannot affect its accuracy.
I ASILY OPERATED—An accurate test in ten seconds.
I CURATE—Will register the slightest misalignment.
I OW COST—Much lower than other gages.

QUICK AND ACCURATE

Place the Ideal Gage between the wheels at the front with the chains just touching the floor. Set the pointer at Zero. A spiral spring presses the ends of the gage against the wheels holding it in this position.

The gage is then transferred to a corresponding position at the back of the wheels by moving the car forward. The chains will indicate where to stop. The spiral spring allows the gage to shorten or lengthen as the car is moved and if the wheels are closer together or farther apart at the back the pointer will register the amount on the scale.

The pointer and scale are plainly visible from the front of the car when the gage is in the second position.

No figuring, no forgetting, no chance for mistakes

A good feature of the gage which should not be overlooked is that both readings are taken from the same identical part of the wheels.

Conditions arising from disc wheels, wire wheels, balloon tires, front wheel brakes, different sized wheels, and the various forms of axle construction are all taken care of so that each car is automatically given the correct amount of toe in without making any special allowances.

The Ideal Gage saves time and tires. Insures easy steering.

Book on Wheel Alignment, Tire Wear, "Shimmy," etc. with each Gage

Price to Car Dealers - - $8.50

MANUFACTURED BY J. F. DUBY, 11 River Street, Mattapan, Mass.
Recommended for HUDSON and ESSEX Service Stations

“WALKER MICROGAGE”
An Accurate Gauge For Measuring Cylinder Bores

By comparing the “Walker Microgage” with other methods of checking inside cylindrical measurements, its many advantages are obvious. When inside micrometers are used for measuring cylinder bores much depends upon the operator’s skill and ability at using such instruments.

The “Walker Microgage” gives an accurate reading even though the operator be inexperienced. It is truly a time and labor saving device and a valuable addition to your shop equipment.

The Advance Pattern and Production Co.
Manufacturers and Sole Distributors
3024 West Fort St. DETROIT, MICH.

Printed in U. S. A.
Instructions for Setting Microgage

The gauge consists of an aluminum shell having a shoe on one side and pressure bars on the other. Inside the shell is a dial indicator reading in thousandths of an inch with its plunger projecting through the outside wall of the shell so that it will bear on the cylinder wall. A setting ring is provided with each gauge. The inside diameter of this ring is ground to the exact size of the new cylinder bore. In operation the gauge is placed inside the setting ring and the pointer on the indicator set at zero. This is done by turning the knurled rim of the indicator dial. Now when the gauge is inserted in the cylinder bore and moved up and down at full length, any variation from the standard will be shown in thousandths on the indicator dial.

Do not put more than .020 tension on the dial indicator when clamping it in the gauge shell, that is do not clamp the indicator in position so that the pointer shows more than .020 movement when the gauge is inserted in the setting ring. Keep the gauge in the box when not in use.

1st. Take gauge (A) insert it in master ring (D) which is ground to standard size.
2nd. Then, while (A) is in (D), take thumb and first finger and revolve dial (B) around until (O) zero comes directly under hand of indicator (E).
3rd. Be sure that jam nuts (C) have $\frac{3}{8}$ of an inch clearance between face of nuts and castings while gauge (A) is in master ring (D).
4th. Take gauge (A) out of master ring (B) and insert it in cylinder to be measured, any deviation either + or — from O registers the true condition of the cylinder in thousandths of an inch.

Prices Covering The “Walker Microgage”

Complete Microgage Set Includes—
Microgage, Rings and Shoes for Hudson 3 1/2", Essex 4 3/4", Essex 6 2 5/6" Essex 6 2 1/2" $35.00 net

Standard Microgage Set Includes—
Microgage, Ring and Shoes, any size, $22.75

Fittings—
Master Ring Essex 6—2 1/4" $3.25
Master Ring Essex 6—2 5/6" $3.25
Master Ring Essex 4—3 1/2" $3.25
Master Ring Hudson—3 1/2" $3.25
Shoe Essex 6—2 1/4" $98
Shoe Essex 6—2 5/6" $98
Shoe Essex 4—3 1/2" $98
Shoe Hudson—3 1/2" $98

All orders must be placed direct with the Advance Pattern and Production Company, 3024 West Fort Street, Detroit, Michigan. Unless remittance accompanies order goods will be shipped on C. O. D. basis.
THE HALL CYLINDER HONE
RECOMMENDED FOR
HUDSON-ESSEX SERVICE STATIONS

The Hall Hone is a combination long and short cylinder hone with which you can fit .005" oversize pistons in from one and one-half to two hours with little practice. The stones are held rigidly parallel by cantilevers that are actuated by one spring plunger which cause it to produce a round hole. The hone can also be used as a solid hone for final paralleling by removing spring and adjusting to size required.

For Hudson Super Six and Essex Four Cylinder Models
Standard No. 1 Hall Hone, range 2¾" to 3½"
Price $35.00

For Essex Six Cylinder Model order
1 set No. 1-AJ coarse stones and 1 set No. 1-CJ fine stones. For use with the Standard No.
1 Hall Hone.
These stones handle down to Essex Diameters of 2¾" and 2¼".

Standard Equipment with each Hone.
1 Set Short Coarse Stones.
1 Set Finishing Stones.
1 Rubbing Stone.
1 Suspension Spring.
1 Ball Driving Joint and Extensions.

Standard No. 1 Hone Stones
1A Short, Coarse Stones, set of 4 . . . . $3.80
1B Long, Coarse Stones, set of 4 . . . . 4.50
1BM Long, Medium Stones, set of 4 . . . 4.50
1C Finish Stones, set of 4 . . . . . . . . 4.50

No. 1 Jr. Hone Stones
1AJ Short, Coarse, set of 4 . . . . . . . . $3.80
1BJ Long, Coarse, set of 4 . . . . . . . . 4.50
1CJ Long, Fine, set of 4 . . . . . . . . 4.50

Driving Power
Electric Drills of ¾" capacity with speed from 475 R. P. M. up will handle both small and large Hones ¾" Heavy Duty preferred. Drill Presses require a double Ball Joint.

Lubrication
Stones are Oil Treated before leaving Factory. Wash Cylinders and Stones with half and half solution of Kerosene and Cylinder Oil. Use Hall's Rubbing Stone to sharpen Stones.

Orders should be placed with your nearest Automotive Equipment jobber.

Manufactured By
The Hall Manufacturing Company  Toledo, O.
THE HALL CYLINDER HONE

The first HALL Hones were put on the market in the Spring of 1923 and have been improved from time to time, the result being our present tool, which we believe to be the most practical Hone made.

The HALL Hone is made of a nickel zinc base alloy bearing metal, which has a tensile strength of 39,000 pounds, making it practically as rigid as cast-steel.

The stones are cemented into steel jackets, eliminating any trouble with stone breakage.

The internal construction consists of precision ground steel plungers, so connected that they actuate the cantilever dogs equally at all times, making the tool precision constructed.

The pressure being equal at all times, it is impossible for two Stones to grind in a larger diameter (See “X” on diagram) than the two Stones grinding in the smaller diameter (See “T” on diagram). If our operating instructions are followed carefully, any ordinary automobile mechanic can do a perfect job of resizing and fitting new pistons.

Condensed Instructions for operating Hall Hones

This Hone is a combination solid and spring pressure tool. Spring pressure follows up and cuts faster than solid pressure. To secure the solid pressure simply remove the internal spring from under the adjusting screw. Solid pressure is ideal for sizing cylinders up to .005", but over that amount spring pressure is better to save time and speed up cutting; especially on cylinders that show .010" to .020" tapers. Use the Hone in these cases with spring pressure, but remove spring, making hone solid to size accurately the last few thousandths. Cylinders having a tendency to become bell, mouthed at top or bottom can be rectified by making the hone Solid.

On closed blocks with no opening in top of cylinder, it is necessary to turn block upside down on the floor to do. Use the short course stones in the bottom of the hone and insert hone so these stones are in the largest part or worn part of the cylinder. The hone should be used solid for this type cylinder. Apply the pressure and gradually work the hone towards the mouth of the cylinder.

FAST CUTTING—The Hall Hone will at times reach a cutting speed of .007" in one minute, depending upon the hardness of the metal. The operator must be careful to run only 30 seconds at first and with only about half the pressure applied, until he finds how fast he is cutting and how hard the block is. Also, if he only has a few thousandths to remove, then he will require less pressure. But if he has .008" or more to take out he can apply all the pressure he wants after the first run. Screw the adjusting screw down, until you cannot turn the Hone in the Cylinder, by inserting a screwdriver through the slot in the top of the hone; then let off very slightly just so the drill will drive the hone at a fair speed. Runs of 30 and 45 seconds are the best because the stones will fill up with metal and slide instead of cutting. Every time the tool is removed from hone, wash off with kerosene soaked brush and rub with Hall rubbing stone and wash again and continue honing.

CAN BE PURCHASED FROM YOUR NEAREST JOBBER.

Manufactured By

The Hall Manufacturing Company, Toledo, O.
"WHITE MULE"
ONE MAN AUTO TOWER

Reduces Delivery Costs From Factory and Distributing Points

50%

One Man Operates Two Cars at One Time
White Mule Tower Can Easily be Carried in a Suit Case
Attached In Five Minutes
Pays For Itself in One or Two Trips

The design and application of the White Mule Tower produces a positive operation which causes the second car to follow in the tracks of the first. It may be attached to the rear axle housing, spring shackles, bumper or any convenient connection of the leading car to the front axle and tie rod of the car behind. (If car to be towed has worm steering gear—disconnect one end of drag link, after the tower has been attached to cars.)

For use in driving new cars from the factory the White Mule Tower is an economical necessity. It is the only towing device of its kind which can be carried folded in a suit case.

The clearance between cars may be adjusted by adding or eliminating a middle section of tongue.

The savings in time and money pay for its first cost over and over again.

(OVER)
SPECIFICATIONS:

Construction—Steel throughout. Fittings are steel castings—
Tongue is Steel U-Bar—Wearing bolts are hardened and fitted
with oils.

Connecting parts pivoting on hardened bolts are bushed with steel
bushings.

Interlocking movable members are milled and machined to fit
within 2/1000".

Drag Link Assembly, connecting steering arm and tie rod clamp,
is equipped with ball and socket fittings, the compression springs
at both ends of which automatically compensate for road vibration
and wear.

Length—Maximum 76 inches.
Length—Minimum 56 inches.* (One section omitted)
Weight—35 lbs.

Standard equipment applicable to all cars with I-beam front axle.

Every Service Car Should Have A
WHITE MULE TOWER
As a Part of Its Equipment

Manufactured by
Marion Auto Devices Co.
Marion, Ohio
1926 Hudson-Essex Service

Flat Rate Operations
# A—FRONT AXLE AND STEERING ASSEMBLY

<table>
<thead>
<tr>
<th>Operation Description</th>
<th>Hudson Hrs</th>
<th>Hudson Price</th>
<th>Essex 4 Hrs</th>
<th>Essex 4 Price</th>
<th>Essex 6 Hrs</th>
<th>Essex 6 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>A—1 Renew or Straighten Bent Axle Center. Inspect, lubricate and replace all parts necessary. When axle is to be straightened use this operation for labor of removing and reinstalling only. Charge extra for straightening.</td>
<td>4 1/4</td>
<td></td>
<td>4 1/4</td>
<td></td>
<td>4 1/4</td>
<td></td>
</tr>
<tr>
<td>A—2 Rebuff Front Axle. Install new bushings, pins and thrust washers where necessary. Inspect, clean and repack wheel bearings. Align wheels.</td>
<td>3 1/2</td>
<td></td>
<td>3 1/2</td>
<td></td>
<td>3 1/2</td>
<td></td>
</tr>
<tr>
<td>A—3 Adjust or Renew Front Wheel Bearings. Remove wheels, wash bearings in kerosene, install new felt washers, repack with clean grease and adjust. (Use this operation to eliminate grease leak at front wheels).</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>A—4 Align Front Wheels. Adjust steering tie rod so that wheels range between 3/8&quot; toe-in and straight ahead.</td>
<td>1/2</td>
<td></td>
<td>1/2</td>
<td></td>
<td>1/2</td>
<td></td>
</tr>
<tr>
<td>A—5 Renew Front Wheel. Clean, inspect and lubricate bearings.</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>A—5a Install Front or Rear Wheel Hub and Flange.</td>
<td>2 1/2</td>
<td></td>
<td>2 1/2</td>
<td></td>
<td>2 1/2</td>
<td></td>
</tr>
<tr>
<td>A—6 Overhaul Steering Assembly. Inspection, adjustment or replacement of necessary parts from steering wheel to and including tie-rod.</td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>A—7 Overhaul Steering Gear Assembly. Replace all parts necessary. Fill housing with oil.</td>
<td>3</td>
<td></td>
<td>3</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>A—8 Adjust Steering Worm Shaft and Drag Link. Eliminate excessive end play in worm shaft by means of adjustment provided. Inspect drag link springs and adjust tension. Align wheels.</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>3/4</td>
<td></td>
</tr>
<tr>
<td>A—9 Renew Steering Spindle or Arm. Align wheels and lubricate.</td>
<td>1 1/2</td>
<td></td>
<td>1 1/2</td>
<td></td>
<td>1 1/2</td>
<td></td>
</tr>
<tr>
<td>A—10 Renew Steering Gear Assembly.</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td>1 1/2</td>
<td></td>
</tr>
<tr>
<td>A—11 Renew Steering Wheel.</td>
<td>1 1/4</td>
<td></td>
<td>1 1/4</td>
<td></td>
<td>3/4</td>
<td></td>
</tr>
<tr>
<td>A—12 Renew Steering Post Jacket Tube Bushings.</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td>1 1/4</td>
<td></td>
</tr>
<tr>
<td>A—13 Rebuff Steering Spindle Arms. Essex Four and Six cylinder models.</td>
<td>1 1/2</td>
<td></td>
<td>1 1/2</td>
<td></td>
<td>1 1/2</td>
<td></td>
</tr>
<tr>
<td>A—14 Rebuff Tie Rod and Overhaul Drag Link. Thoroughly lubricate these parts. Align wheels.</td>
<td>1 1/2</td>
<td></td>
<td>1 1/2</td>
<td></td>
<td>1 1/2</td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
### A—FRONT AXLE AND STEERING ASSEMBLY—Continued

<table>
<thead>
<tr>
<th>A—15</th>
<th>Renew One or Both Tie Rod End Clevises or Tie Rod Clevis Pins.—Align wheels.</th>
<th>Hrs.</th>
<th>Price</th>
<th>Hrs.</th>
<th>Price</th>
<th>Hrs.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A—15a</th>
<th>Tighten Tie Rod Bolts or Clevises.</th>
<th>Hrs.</th>
<th>Price</th>
<th>Hrs.</th>
<th>Price</th>
<th>Hrs.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A—16</th>
<th>Overhaul Spark and Throttle Controls.—Renew or repair rods, sectors, ball joints, levers and all parts of spark and throttle controls. Lubricate.</th>
<th>Hrs.</th>
<th>Price</th>
<th>Hrs.</th>
<th>Price</th>
<th>Hrs.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A—17</th>
<th>Renew Tie Rod.—Install new tie rod. Lubricate. Align wheels.</th>
<th>Hrs.</th>
<th>Price</th>
<th>Hrs.</th>
<th>Price</th>
<th>Hrs.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1½</td>
<td>1½</td>
<td>1½</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A—18</th>
<th>Re bush Tie Rod.—Renew clevis pins only. Lubricate. Align wheels.</th>
<th>Hrs.</th>
<th>Price</th>
<th>Hrs.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1½</td>
<td>1½</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A—19</th>
<th>Renew Steering Main Tube—Lower.—Install throttle and sector tubes. (Use this operation when steering gear is not removed).</th>
<th>Hrs.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2½</td>
<td>2½</td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
### B—BRAKES

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>HUDSON Hrs.</th>
<th>HUDSON Price</th>
<th>ESSEX 4 Hrs.</th>
<th>ESSEX 4 Price</th>
<th>ESSEX 6 Hrs.</th>
<th>ESSEX 6 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>B—1</td>
<td><strong>Reline Foot Brakes.</strong>—Make necessary replacements, repairs or adjustments to place brakes in first class condition. Adjust end play in axle shafts, if necessary. This does not include any operation on the hand brakes.</td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>B—2</td>
<td><strong>Renew Foot Brake Bands.</strong>—Renew any other necessary parts. Adjust end play in axle shafts, if necessary.</td>
<td>3½</td>
<td></td>
<td>3½</td>
<td></td>
<td>3½</td>
<td></td>
</tr>
<tr>
<td>B—3</td>
<td><strong>Adjust Foot Brakes.</strong>—(Wood Wheels) Foot brake operations only.</td>
<td>¾</td>
<td></td>
<td>¾</td>
<td></td>
<td>¾</td>
<td></td>
</tr>
<tr>
<td>B—3a</td>
<td><strong>Adjust Foot Brakes.</strong>—(Disc. Wheels).</td>
<td>1½</td>
<td></td>
<td>1½</td>
<td></td>
<td>1½</td>
<td></td>
</tr>
<tr>
<td>B—4</td>
<td><strong>Reline Hand Brakes.</strong>—This does not include any operation on foot brakes, except to take up on adjusting nuts, as needed. Adjust end play in axle shafts, if necessary.</td>
<td>5</td>
<td></td>
<td>5</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>B—5</td>
<td><strong>Renew Hand Brake Bands.</strong>—Replace springs and any necessary parts. Adjust end play in axle shafts, if necessary.</td>
<td>3½</td>
<td></td>
<td>3½</td>
<td></td>
<td>3½</td>
<td></td>
</tr>
<tr>
<td>B—6</td>
<td><strong>Adjust Hand Brakes.</strong>—Remove wheels. Replace springs and clevis pins. Adjust end play in axle shafts, if necessary.</td>
<td>1½</td>
<td></td>
<td>1½</td>
<td></td>
<td>1½</td>
<td></td>
</tr>
<tr>
<td>B—6a</td>
<td><strong>Adjust Hand Brake Rods Only.</strong></td>
<td>¾</td>
<td></td>
<td>¾</td>
<td></td>
<td>¾</td>
<td></td>
</tr>
<tr>
<td>B—7</td>
<td><strong>Renew Hand Lever Latch and Ratchet.</strong></td>
<td>¾</td>
<td></td>
<td>¾</td>
<td></td>
<td>¾</td>
<td></td>
</tr>
<tr>
<td>B—8</td>
<td><strong>Reline Foot and Hand Brakes.</strong>—Reline both brake bands. Clean grease from drum and internal parts. Adjust both brakes. Adjust end play in axle shafts, if necessary.</td>
<td>7</td>
<td></td>
<td>7</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>B—9</td>
<td><strong>Adjust Both Brakes.</strong>—Remove wheels. Adjust end play in axle shafts, if necessary.</td>
<td>2½</td>
<td></td>
<td>2½</td>
<td></td>
<td>2½</td>
<td></td>
</tr>
<tr>
<td>B—10</td>
<td><strong>Free up Brake and Clutch Pedal Assembly.</strong>—Remove brake pedal assembly from transmission, disassemble, clean bearings and reassemble.</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>B—11</td>
<td><strong>Remove Anchor Clip Pins When Rusted or Frozen.</strong></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>B—12</td>
<td><strong>Install New Anchor Bracket.</strong></td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>B—13</td>
<td><strong>Rusted or Frozen Brake Connections.</strong> Add letter “A” to above operation numbers, and add additional hours.</td>
<td>2</td>
<td></td>
<td>3</td>
<td></td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
<table>
<thead>
<tr>
<th>Description</th>
<th>Hudson Hrs.</th>
<th>Hudson Price</th>
<th>Essex 4 Hrs.</th>
<th>Essex 4 Price</th>
<th>Essex 6 Hrs.</th>
<th>Essex 6 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>C—1  Overhaul Clutch Assembly. Make necessary replacements, repairs or adjustments to place clutch in first class condition.</td>
<td>6</td>
<td></td>
<td>6</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>C—2  Renew Clutch Throw-Out Collar and Thrust Sleeve Washers (Old Style). Remove clutch. Renew throw-out collar, bearing, thrust sleeve washers and grease tube, if necessary. Lubricate thoroughly.</td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>C—2a Renew Clutch Throw-Out Ball Bearing or Install Clutch Cover Gasket.</td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>C—3  Adjust Clutch Pedal. Pedal should clear toe board 3/8&quot;.</td>
<td>1/4</td>
<td></td>
<td>1/4</td>
<td></td>
<td>1/4</td>
<td></td>
</tr>
<tr>
<td>C—4  Renew Clutch Complete. Remove old and install new clutch. (Except pedal and fork). Refill clutch with clutch oil.</td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>C—5  Overhaul Clutch When Down For Other Repairs. Renew all parts necessary. Refill clutch with clutch oil.</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>C—6  Install New Grease Tube to Clutch Collar (Old Style).</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C—7  Free Up Clutch and Brake Pedals. Remove assembly from transmission, disassemble, clean bearings and reassemble.</td>
<td>2</td>
<td></td>
<td>21/2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>C—8  General Overhaul of Transmission and Clutch. Make necessary replacements or adjustments to place both units in first class condition. Thoroughly lubricate.</td>
<td>9</td>
<td></td>
<td>9</td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>C—8a Overhaul Transmission (Old Style). Where clutch is not removed.</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C—9  Remove End Play at Transmission Main Shaft. (Rear) Remove rear main bearing cap and necessary shims for proper adjustment. (Use this operation for oil leak at rear end of transmission).</td>
<td>3/4</td>
<td></td>
<td>3/4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C—10 Remove End Play at Transmission Main Shaft. (Front) Adjust main shaft gears and bearings. Remove transmission and clutch. Renew thrust washers to obtain proper adjustment. Refill with oil.</td>
<td>6</td>
<td></td>
<td>6</td>
<td></td>
<td>51/2</td>
<td></td>
</tr>
<tr>
<td>C—10a Remove End Play at Main Shaft. (Front). Use this operation when transmission is down for other work.</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>C—11 Renew Gear Shift Lever—New Style Transmission.</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>C—11a Renew Transmission, Main Shaft or Sliding Gears.</td>
<td>3</td>
<td></td>
<td>3</td>
<td></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
### C—CLUTCH AND TRANSMISSION

---Continued---

<table>
<thead>
<tr>
<th>Service</th>
<th>HUDSON Hrs.</th>
<th>Price</th>
<th>ESSEX 4 Hrs.</th>
<th>Price</th>
<th>ESSEX 6 Hrs.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-12 Renew Idler Gear. —Refill transmission with oil. (Old Style).</td>
<td>2½</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-13 Renew Countershaft Gear and Bearings. —Renew any one or all countershaft gears, bearing and bearing cups if necessary. Remove and adjust main shaft, first and second speed gears, or reverse idler gear. Refill transmission with oil.</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-14 Eliminate Rattle in Transmission Control Lever. —Make adjustments necessary to eliminate rattle.</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-15 Renew Transmission Assembly. —Covers removal of old cover and control levers, also installation of these parts on new unit.</td>
<td>4</td>
<td>4</td>
<td>3½</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-16 Renew Transmission Lock. Remove lock and renew. (Use this operation when key is broken in lock, if it cannot be removed without disassembling).</td>
<td>3</td>
<td>3</td>
<td>3¼</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### D—REAR AXLE AND DIFFERENTIAL

<table>
<thead>
<tr>
<th></th>
<th>HUDSON Hrs.</th>
<th>Price</th>
<th>ESSEX 4 Hrs.</th>
<th>Price</th>
<th>ESSEX 6 Hrs.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>D—1</td>
<td>General Rear Axle Overhaul.—Make necessary replacements, repairs or adjustments to place rear axle in first class condition. (Use this operation when it is necessary to remove housing for riveting or welding seams).</td>
<td>8½</td>
<td></td>
<td></td>
<td>8½</td>
<td></td>
</tr>
<tr>
<td>D—2</td>
<td>Renew Ring Gear, Pinion Gear, Bearings and Cups.—Replace ring gear, pinion gears, bearings and bearing cup, if necessary. Lubricate pinion bearing and differential housing.</td>
<td>6</td>
<td></td>
<td>6</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>D—3</td>
<td>Adjust Rear Axle Gears Without Removing Gear Set Assembly.—Adjust pinion and ring gear.</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D—4</td>
<td>Renew Pinion Gear and Pinion Bearings.—Does not include operations on ring gear, differential or differential bearings. Lubricate pinion bearings and differential housing.</td>
<td>5</td>
<td></td>
<td>5</td>
<td></td>
<td>3½</td>
</tr>
<tr>
<td>D—5</td>
<td>Remove End Play in Rear Axle Pinion.—Remove end play in rear axle pinion by adjustment only. Use this operation on new cars only. Use D—4 on old cars.</td>
<td>½</td>
<td></td>
<td>½</td>
<td></td>
<td>½</td>
</tr>
<tr>
<td>D—6</td>
<td>Tighten Rear Wheels on Axle Shafts.</td>
<td>½</td>
<td></td>
<td>½</td>
<td></td>
<td>½</td>
</tr>
<tr>
<td>D—7</td>
<td>Renew Differential Carrier Gear Set Assembly.—Remove old carrier from rear axle housing, assemble new carrier to housing. Lubricate.</td>
<td>2½</td>
<td></td>
<td>2½</td>
<td></td>
<td>2½</td>
</tr>
<tr>
<td>D—8</td>
<td>Adjust End Play in Axle Shafts.—Renew Felt Washers, Axle Shafts, Adjusting Nuts and Bearings, if Necessary.</td>
<td>1½</td>
<td></td>
<td>1½</td>
<td></td>
<td>1½</td>
</tr>
<tr>
<td>D—9</td>
<td>Renew Rear Wheel and Inspect Axle Shaft.—Replace shaft if bent. Adjust end play.</td>
<td>1½</td>
<td></td>
<td>1½</td>
<td></td>
<td>1½</td>
</tr>
<tr>
<td>D—10</td>
<td>Renew Axle Shaft or Bearing Adjusting Nut.</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>—If adjusting nut is frozen add</td>
<td>1½</td>
<td></td>
<td>1½</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D—11</td>
<td>Tighten Rear Axle “U” Bolts.</td>
<td>½</td>
<td></td>
<td>½</td>
<td></td>
<td>½</td>
</tr>
<tr>
<td>D—12</td>
<td>Frozen Wheels.—Add “A” to the above operation numbers and add additional time. This also applies to frozen pinion adjusting nuts.</td>
<td>½</td>
<td></td>
<td>½</td>
<td></td>
<td>½</td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)

April, 1926
### E—ELECTRICAL SYSTEM

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Hudson Hrs.</th>
<th>Hudson Price</th>
<th>Essex 4 Hrs.</th>
<th>Essex 4 Price</th>
<th>Essex 6 Hrs.</th>
<th>Essex 6 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 1</td>
<td>Renew Starter or Generator. Connect up and test. Install Bendix pinion or spring.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 2</td>
<td>Rewire Chassis High and Low Tension Wires.</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 3</td>
<td>Overhaul Horn Wiring. Adjust or Renew Horn.</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 4</td>
<td>Replace Distributor Drive Shaft or Make Necessary Repairs to Distributor Drive Unit.</td>
<td>$2\frac{1}{2}$</td>
<td>$2\frac{1}{2}$</td>
<td>$2\frac{1}{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 5</td>
<td>Renew Distributor. Adjust ignition timing.</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 6</td>
<td>Renew Ignition and Lighting Switch.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 7</td>
<td>Renew Ammeter. Renew ammeter wiring, and connections if necessary.</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 8</td>
<td>Advance or Decrease Charging Rate. Set generator charging rate at 10 amperes when hot. 12 amperes when cold. Check by test ammeter.</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 9</td>
<td>Renew Generator Flexible Coupling.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 10</td>
<td>Adjust and Focus Lights.</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 11</td>
<td>Renew Headlight and Bracket. Focus lights.</td>
<td>$3\frac{1}{4}$</td>
<td>$3\frac{1}{4}$</td>
<td>$3\frac{1}{4}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 12</td>
<td>Renew Headlight Wire Terminal.</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 13</td>
<td>Overhaul Dash and Tail Light Circuits. Make necessary repairs to wires, bulbs and connections.</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 14</td>
<td>Remove Headlight Lens. Replace lens. Clean reflector and replace bulb, if necessary.</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 15</td>
<td>Adjust Automatic Spark Control. Remove distributor head, adjust bearings. (Delco)</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 16</td>
<td>Install New Tail Light Wire.</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 17</td>
<td>Clean Ignition Contact Points. Adjust ignition timing. Clean spark plugs and adjust to proper gap.</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 18</td>
<td>Adjust Starter Pedal Throw. Adjust by set screw in top of transmission. Shim up switch contact points by removing holder from starter unit. Replace same. (Bosch).</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 19</td>
<td>Install New Battery Terminal.</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
**F—FENDERS AND FRAME**

<table>
<thead>
<tr>
<th></th>
<th>HUDSON</th>
<th></th>
<th>ESSEX 4</th>
<th></th>
<th>ESSEX 6</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>F—1</td>
<td>Renew Front Fender.—Install new Fender. Replace spare tire or any other parts disturbed.</td>
<td>2</td>
<td>1½</td>
<td>1½</td>
<td>1½</td>
<td></td>
</tr>
<tr>
<td>F—2</td>
<td>Renew Running Board.—Bump our fenders and splash guard, if necessary.</td>
<td>1½</td>
<td>1½</td>
<td>1½</td>
<td>1½</td>
<td></td>
</tr>
<tr>
<td>F—3</td>
<td>Renew Running Board and Splash Guard. —Bump out fender.</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
<td></td>
</tr>
<tr>
<td>F—4</td>
<td>Renew Running Board and Bracket.—Bump out splash guard and fenders, if necessary.</td>
<td>2½</td>
<td>2½</td>
<td>2½</td>
<td>2½</td>
<td></td>
</tr>
<tr>
<td>F—5</td>
<td>Recover Running Board.—Renew linoleum on running board. Install new outer moulding.</td>
<td>1½</td>
<td>1½</td>
<td>1½</td>
<td>1½</td>
<td></td>
</tr>
<tr>
<td>F—5a</td>
<td>New Running Board Moulding.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>F—6</td>
<td>Renew Frame End.—Front and Rear.—Replace bumper or other parts removed.</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>F—7</td>
<td>Straighten Frame Horn.—Front and Rear. —Reset spring. Replace parts removed.</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>F—8</td>
<td>Tighten Body Bolts.—Replace any necessary shims.</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
</tr>
<tr>
<td>F—9</td>
<td>Renew Frame.—Remove all parts necessary. Install new frame. In reassembling use all old parts except those that must be replaced.</td>
<td>40</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>F—10</td>
<td>Renew Radiator Splash Guard.—Replace bumper or other parts removed.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>F—11</td>
<td>Renew Running Board Step Irons.—Replace step irons when running board has been removed.</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
</tr>
<tr>
<td>F—12</td>
<td>Renew Rear Fender. (Clamp Type).</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>F—13</td>
<td>Renew Front or Rear Fender. (Bolt Type).</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>F—14</td>
<td>Renew Rear Cross Tube.—Remove gasoline tank. Rivet new cross tube or channel parts removed.</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>F—14a</td>
<td>Renew Front Cross Tube.</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>F—15</td>
<td>Remove and Replace Body.—Disconnect all parts necessary, remove body and replace.</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>F—16</td>
<td>Install Bonnet Lacing. (Radiator or Cowl).</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*(Printed in U. S. A.)*

April, 1920
## G—GASOLINE SYSTEM

<table>
<thead>
<tr>
<th></th>
<th>Standard Flat Rates for Hudson and Essex Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>HUDSON</strong></td>
</tr>
<tr>
<td>G—1</td>
<td><strong>Renew Carburetor.</strong>—Change carburetor. Renew gaskets. Check over springs and controls, and renew, if necessary.</td>
</tr>
<tr>
<td>G—2</td>
<td><strong>Overhaul Carburetor.</strong>—Make necessary replacements, repairs or adjustments to place carburetor in first class condition.</td>
</tr>
<tr>
<td>G—3</td>
<td><strong>Clean Carburetor, Gasoline Lines and Check Control.</strong>—Disassemble carburetor, clean all parts.</td>
</tr>
<tr>
<td>G—4</td>
<td><strong>Clean Carburetor.</strong>—(Hudson Carburetor). Drain carburetor, clean strainer, polish bell and tighten gland nut. Replace metering pin if necessary. (Carburetor is not removed from block for this work).</td>
</tr>
<tr>
<td>G—4a</td>
<td><strong>Clean Carburetor.</strong>—(Stewart Carburetor). Follow instructions outlined on page 14 of &quot;Carburetor Instructions&quot; book.</td>
</tr>
<tr>
<td>G—5</td>
<td><strong>Repair Float, Replace Float Needle and Seat Valve.</strong> Adjust regulating sleeve if necessary. (On Hudson carburetor also repair or repack gland). Use this operation for carburetors that flood.</td>
</tr>
<tr>
<td>G—6</td>
<td><strong>Clean Gasoline Lines and Tank.</strong>—Remove gasoline tank. Repair or replace gasoline gauge. Blow out all gasoline lines with air hose. Clean vacuum tank, carburetor screens and connections, if necessary.</td>
</tr>
<tr>
<td>G—7</td>
<td><strong>Renew Gasoline Line.</strong>—Renew one or all gasoline lines necessary.</td>
</tr>
<tr>
<td>G—8</td>
<td><strong>Overhaul Vacuum System.</strong>—Check float and valves and all connections. Replace all parts necessary.</td>
</tr>
<tr>
<td>G—9</td>
<td><strong>Renew Vacuum Tank Complete.</strong>—Check gasoline lines and suction lines for leakage.</td>
</tr>
<tr>
<td>G—10</td>
<td><strong>Repair or Replace Gasoline Gauge.</strong></td>
</tr>
<tr>
<td>G—11</td>
<td><strong>Repair or Renew Gasoline Tank Strap.</strong></td>
</tr>
<tr>
<td>G—12</td>
<td><strong>Renew Gasoline Tank.</strong>—Remove Gasoline tank straps, gasoline, and replace.</td>
</tr>
<tr>
<td>G—13</td>
<td><strong>Renew Mixture or Throttle Control Wire.</strong></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
<table>
<thead>
<tr>
<th>H—MUFLER</th>
<th>HUDSON</th>
<th>ESSEX 4</th>
<th>ESSEX 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>H— 1</td>
<td>Renew Muffler.</td>
<td>1¼</td>
<td>1¼</td>
</tr>
<tr>
<td>H— 2</td>
<td>Repack Exhaust Packing Gland or Renew Gasket.</td>
<td>½</td>
<td>½</td>
</tr>
<tr>
<td>H— 3</td>
<td>Tighten Muffler and Tail Pipe.—Tighten brackets and clamps on muffler and tail pipe. Install new brackets, if necessary.</td>
<td>¾</td>
<td>¾</td>
</tr>
<tr>
<td>H— 4</td>
<td>Change From Old to New Style Muffler.—Change from old to new style muffler and brackets.</td>
<td>2¼</td>
<td>2¼</td>
</tr>
<tr>
<td>H— 5</td>
<td>Renew Exhaust Pipe From Manifold to Muffler.</td>
<td>1¼</td>
<td>1¼</td>
</tr>
</tbody>
</table>
### J—SPRINGS

<table>
<thead>
<tr>
<th>J—</th>
<th>Description</th>
<th>Hudson Hrs.</th>
<th>Hudson Price</th>
<th>Essex 4 Hrs.</th>
<th>Essex 4 Price</th>
<th>Essex 6 Hrs.</th>
<th>Essex 6 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Renew Front Spring</strong>—Install new shackles and spring bolts, if necessary. Lubricate parts.</td>
<td>1 ½</td>
<td></td>
<td>1 ½</td>
<td></td>
<td>1 ½</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><strong>Renew Rear Spring</strong>—Install new shackles and spring bolts, if necessary. Lubricate parts.</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td><strong>Renew Right Rear Spring</strong>—(Essex 4-cylinder only). Install new shackles and spring bolts, if necessary. Lubricate parts.</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><strong>Install New or Extra Leaf on One Front or Rear Spring</strong>—Rebush and install new shackle bolts, if necessary.</td>
<td>2 ¼</td>
<td></td>
<td>2 ¼</td>
<td></td>
<td>2 ¼</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td><strong>Overhaul and Rebush Springs and Replace All Parts Necessary</strong>—Oil all spring leaves, replace center bolts, clips, shackles and shackle bolts where necessary. Lubricate parts.</td>
<td>7</td>
<td></td>
<td>6 ½</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td><strong>Adjust All Shackles to Eliminate Side Play and Lock in Place.</strong></td>
<td>¾</td>
<td></td>
<td>¾</td>
<td></td>
<td>½</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td><strong>Replace or Tighten Spring &quot;U&quot; Bolts.</strong></td>
<td>¾</td>
<td></td>
<td>½</td>
<td></td>
<td>½</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td><strong>Install One Shackle Bolt</strong>—Remove broken or frozen shackle bolt and install one new bolt. When new bushing is installed add</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td><strong>Tighten all Front or Rear Axle Spring Clips.</strong></td>
<td>½</td>
<td></td>
<td>½</td>
<td></td>
<td>½</td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)

April, 1926
### L — LUBRICATION

<table>
<thead>
<tr>
<th></th>
<th>HUDSON Hrs.</th>
<th>Price</th>
<th>ESSEX 4 Hrs.</th>
<th>Price</th>
<th>ESSEX 6 Hrs.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>L—1</td>
<td>Thorough Lubrication.—(Models equipped with current type oil cups.) Lubricate each part of motor and chassis that requires lubrication. Change oil in motor and clutch. Lubricate transmission and rear axle by adding sufficient oil to bring to proper level. Fill universal joints. Fill all oil cups. Remove front wheels. Clean bearings and repack with grease. (Use this operation when car is equipped with pressure oil or grease system).</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—1a</td>
<td>Lubricate Front Wheel Bearings.—Clean bearings with kerosene. Repack with grease. (This operation is not to be used when operations L—1 or L—2 appear on shop order).</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—1b</td>
<td>Lubricate Rear Wheels and Axle Shaft Bearings.—Rear wheels must be removed when this operation is performed.</td>
<td>1½</td>
<td>1½</td>
<td>1½</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—2</td>
<td>Thorough Lubrication.—(Models equipped with Grease Cups). Turn down grease cups until grease is forced out between moving parts. (This operation includes all motor and chassis instructions contained in operation L—1.)</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—3</td>
<td>Fill All Grease Cups.—Turn down once and refill.</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—4</td>
<td>Fill All Oil Cups.</td>
<td>¼</td>
<td>¼</td>
<td>¼</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—5</td>
<td>Oil Springs Complete. Fill oilers or grease cups on springs. Saturate spring with motor oil.</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—6</td>
<td>Change Clutch Oil.—Drain clutch oil. Wash clutch with gasoline. Refill with ½ pt. equal mixture of kerosene and motor oil.</td>
<td>¼</td>
<td>¼</td>
<td>¼</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—7</td>
<td>Change Motor Oil.—Drain crankcase. Refill with fresh motor oil. (When oil pan is removed and cleaned, use operation L—18.)</td>
<td>¼</td>
<td>¼</td>
<td>¼</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—8</td>
<td>Change Motor Oil, Lubricate Universals, Check Oil in Rear Axle and Transmission.</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—9</td>
<td>Lubricate Rear Axle and Transmission.—Drain rear axle and transmission and refill.</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—10</td>
<td>Lubricate Universal Joints.—Front and Rear.</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—11</td>
<td>Overhaul Oil Pump.—Make necessary replacements, repairs or adjustments to place oil pump in first class condition.</td>
<td>1¼</td>
<td>1¼</td>
<td>1¼</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
## L—LUBRICATION—Continued

<table>
<thead>
<tr>
<th>Description</th>
<th>Hudson Hrs.</th>
<th>Hudson Price</th>
<th>Essex 4 Hrs.</th>
<th>Essex 4 Price</th>
<th>Essex 6 Hrs.</th>
<th>Essex 6 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>L—12 Adjust Oil Pump Stroke.—Renew plunger and springs if necessary. Adjust spring in top of oil pump so that dash gauge registers between three and four.</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
</tr>
<tr>
<td>L—13 Renew Oil Pump.—Adjust new pump to develop a reading of from three to four on dash gauge.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—14 Renew Oil Pump Eccentric.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—15 Renew Suction Pipe to Pump Complete.—Includes Operation L—12.</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td>$1\frac{1}{2}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—16 Clean Oil Pipe Lines.—Disconnect all oil lines, blow out with air hose. Clean oil strainer in reservoir. Renew all parts necessary.</td>
<td>$1\frac{1}{4}$</td>
<td>$1\frac{1}{4}$</td>
<td>$1\frac{1}{4}$</td>
<td>$1\frac{1}{4}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—17 Renew Oil Pressure Gauge or Gauge Pipe Lines.—Inspect pressure gauge lines. Renew one or both if necessary.</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—18 Clean or Renew Oil Strainer.—Remove oil pan. Clean or renew strainer if necessary. If motor oil needs changing do so on this operation.</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—19 Renew Oil Gauge Glass.—Remove Gauge glass retainer ring and install new glass.</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L—20 Lubricate Speedometer Chain or Cable.—Remove speedometer chain or cable. Cover with grease, replace and connect.</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td>$\frac{1}{2}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)

April, 1926
<table>
<thead>
<tr>
<th>Operation Description</th>
<th>Hudson Hours</th>
<th>Hudson Price</th>
<th>Essex 4 Hours</th>
<th>Essex 4 Price</th>
<th>Essex 6 Hours</th>
<th>Essex 6 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>M—1 Overhaul Motor</td>
<td>65</td>
<td>.55</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remove motor from frame. Make necessary replacements, repairs or adjustments to place motor in first class condition. Clean and paint motor.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—2 Tune Motor</td>
<td>1 1/4</td>
<td>1 1/4</td>
<td>1 1/2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adjust ignition points (.018). Clean or renew if necessary. Clean spark plugs and set gaps (.025).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—4 Renew Valve Springs</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remove all valve springs. Install new springs, washers and retainers where necessary.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—5 Scrape Carbon</td>
<td>3</td>
<td>3 3/4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—6 Grind Valves, Clean Carbon, Adjust Tappets, Clean Carburetor</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Includes operation M—2. If any valve tappet screws should be replaced do so on this operation. Take play out of rocker arms, on Essex “4”. Worn valve stem guides can also be changed on this operation. For each new valve guide installed add 1/4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—6b Reface or Reseat Valves by Machine</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>To be used only when separate workman refaces or reseats valves by machine. Time given to be deducted from operation M—6 when separate workman does this operation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—7 Renew Complete Set of Valves, Valve Stem Guides and Grind Valves</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For renewing individual valve stem guides use operations M—6 and M—6a.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—7a Grind Valves When Cylinder Head has Been Removed for Other Operations</td>
<td>5</td>
<td>3 1/2</td>
<td>4 1/4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Includes operation M—2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—8 Adjust Tappets</td>
<td>3/4</td>
<td>1</td>
<td>3/4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adjust tappets to proper clearance. Remove play from rocker arms on Essex 4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—9 Overhaul Tappets</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Make necessary replacements, repairs or adjustments to eliminate noise and place tappets in first class condition. Replace rocker arms on Essex 4 if necessary. When used in conjunction with operation M—6 add to time given in M—6.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Readjust eccentric to take up slack in timing chain. Adjust ignition timing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
### M—MOTOR—Continued

<table>
<thead>
<tr>
<th>Operation Description</th>
<th>Hudson Hrs.</th>
<th>Hudson Price</th>
<th>Essex 4 Hrs.</th>
<th>Essex 4 Price</th>
<th>Essex 6 Hrs.</th>
<th>Essex 6 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M—11</strong> Reset Valve Timing Chain.—Remove chain. Set crank cam and distributor position. Install new chain, if necessary. Adjust ignition timing. For removing Master Link add</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note:—Do not use this operation when operation M—18 appears on shop order.</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M—11a</strong> Renew Valve Timing Chain or Chain Sprockets.—For use when main bearings are being adjusted. Adjust ignition timing. Note:—Use this operation when timing chain cover has been removed for other operations.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M—11b</strong> Renew Valve Timing Chain Adjusting Eccentric.—Remove and reinstall generator. Replace eccentric. Includes operation M—11.</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M—12</strong> Renew Timing Gears.—Remove old gears and install new.</td>
<td>8</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M—12a</strong> Renew Timing Gears When Timing Gear Cover has Been Removed for Other Operations.</td>
<td>4½</td>
<td>4½</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M—13</strong> Adjust all Connecting Rod Bearings.—Remove oil pan. Remove shims necessary to fit bearing properly on crankshaft. Bearings to be tested for fit if necessary. Reinstall pan and fill with motor oil. Includes operation M—2.</td>
<td>4</td>
<td>3½</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M—13a</strong> Adjust all Connecting Rod Bearings When Oil Pan is Removed for Other Operations.</td>
<td>3</td>
<td>2½</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M—14</strong> Renew One Connecting Rod Bearing and Adjust all Others.—Drain motor oil. Remove oil pan and clean thoroughly. Renew one bearing, adjust all others. Reinstall and fill oil pan with motor oil. Includes operation M—2. For renewing each additional connecting rod bearing add</td>
<td>6½</td>
<td>5½</td>
<td>5½</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M—15</strong> Renew All Piston Pins and Piston Rings.—Renew all piston pins, piston rings and piston pin bushings. Includes operations M—13a and M—2. Note:—Cylinder block is not removed for this operation. When cylinder block is removed for work on Hudson and Essex “4” Models add</td>
<td>11</td>
<td>8½</td>
<td>7½</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2½</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M—15a</strong> Renew One Piston Pin.—Adjust bearing on connecting rod in which pin is installed. For installing each additional piston pin and adjusting connecting rod bearing add Note:—Cylinder block is not removed for this operation. When cylinder block is removed for this work on Hudson and Essex “4” models add</td>
<td>6½</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
## M—MOTOR—Continued

<table>
<thead>
<tr>
<th>Operation</th>
<th>Hudson Hrs.</th>
<th>Price</th>
<th>Essex 4 Hrs.</th>
<th>Price</th>
<th>Essex 6 Hrs.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>M—16 Renew Piston Pins When Pistons are Out of Motor.</td>
<td>2</td>
<td></td>
<td>1 1/2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>M—17 Renew Piston Rings on One Piston.—Remove and reinstall cylinder head and oil pan. Adjust connecting rod bearing. For installing ring on each additional piston and adjusting connecting rod bearing add</td>
<td>3 1/2</td>
<td></td>
<td>3 1/2</td>
<td></td>
<td>3 1/2</td>
<td></td>
</tr>
<tr>
<td>Note:—Cylinder block is not removed for this operation. When cylinder block is removed for this work on Hudson and Essex &quot;4&quot; Models add</td>
<td>1/2</td>
<td></td>
<td>1/2</td>
<td></td>
<td>1/2</td>
<td></td>
</tr>
<tr>
<td>M—17a Renew All Pistons, Piston Pins and Piston Rings.—Remove and reinstall cylinder head and oil pan. Adjust all connecting rod bearings. Charge extra for cylinder grinding or honing. Note:—Cylinder block is not removed for this operation. When cylinder block is removed for this work on Hudson and Essex &quot;4&quot; Models add</td>
<td>12</td>
<td></td>
<td>8 1/2</td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>M—17b Renew One Piston and Piston Pin.—Fit new rings to the piston if necessary. Remove and reinstall cylinder head and oil pan. Adjust connecting rod bearing. For renewing each additional piston, piston pin and adjusting connecting rod bearing add</td>
<td>8 1/2</td>
<td></td>
<td>8</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Charge extra for cylinder grinding or honing. Note:—Cylinder block is not removed for this operation. When cylinder block is removed for this work on Hudson and Essex &quot;4&quot; Models add</td>
<td>1/2</td>
<td></td>
<td>1/2</td>
<td></td>
<td>1/2</td>
<td></td>
</tr>
<tr>
<td>M—17c Re grind or Hone Cylinder Block.—Remove cylinder block on Hudson and Essex 4 and re grind. Fit pistons, pins and rings. Charge extra for honing or grinding. (Cylinders are honed on Essex 6 without removing motor from frame).</td>
<td>15</td>
<td></td>
<td>11</td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>M—18 Adjust All Main Bearings.—(Motor with chain front end.) Remove necessary shims to fit bearings properly to crankshaft. Bearings should not be tightened so that starter will not turn motor. This operation is done without removing motor from frame. Includes operation M—2.</td>
<td>7</td>
<td></td>
<td>6 1/2</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>M—18a Same as M—18.—(For gear front end motor).</td>
<td>7</td>
<td></td>
<td>6 1/2</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>M—18b Adjust Main Bearings and Connecting Rod Bearings.—(Motor with chain front end.) Remove necessary shims to fit bearings properly to crankshaft. Bearings should not be tightened so that starter will not turn motor. This operation is done without removing motor from frame. Includes operation M—2.</td>
<td>10</td>
<td></td>
<td>9</td>
<td></td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

*Printed in U. S. A.*

April, 1926
### M—MOTOR—Continued

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>HUDSON</th>
<th></th>
<th>ESSEX 4</th>
<th></th>
<th>ESSEX 6</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M—30</td>
<td><strong>Renew Cylinder Head Gasket.</strong>—Remove cylinder head. Scrape carbon and adjust ignition timing.</td>
<td>2</td>
<td></td>
<td>2 1/2</td>
<td></td>
<td>1 3/4</td>
<td></td>
</tr>
<tr>
<td>M—31</td>
<td><strong>Renew Oil Pan or Gasket.</strong>—Renew gaskets, clean oil pan. Change motor oil.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—32</td>
<td><strong>Tighten Motor Bolts.</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M—33</td>
<td><strong>Clean and Paint Motor.</strong>—Wash all parts of motor and cowl with kerosene. Paint with black motor paint.</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
### Universal Joints and Drive Shaft

<table>
<thead>
<tr>
<th>Work Description</th>
<th>Hudson Hrs.</th>
<th>Hudson Price</th>
<th>Essex 4 Hrs.</th>
<th>Essex 4 Price</th>
<th>Essex 6 Hrs.</th>
<th>Essex 6 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>O—1 Overhaul Universal and Drive Shaft Assembly.—Renew all parts necessary and</td>
<td>3 1/2</td>
<td></td>
<td>3 1/2</td>
<td>3 1/2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line up universal joint with propeller shaft arrows.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O—2 Renew Universal Yoke, Dust Cover and Felt Washer.—Remove drive shaft, renew</td>
<td>2 1/2</td>
<td></td>
<td>2 1/2</td>
<td>2 1/2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yoke, dust washer, and replace outer shield. Line up universal joint with propeller</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>shaft arrows. Lubricate thoroughly.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O—3 Renew Front or Rear Universal Joint Complete.—Lubricate both joints. Line up</td>
<td>2</td>
<td></td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>universal joint with propeller shaft arrows.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O—4 Renew Drive Shaft Assembly.—Disconnect rear universal flange and install new</td>
<td>2</td>
<td></td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>drive shaft assembly. Lubricate both universal joints. Line up universal joints</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with propeller shaft arrows.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O—5 Renew Universal Joint and Drive Shaft Assembly.—Lubricate both universal</td>
<td>2</td>
<td></td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>joints. Line up universal joints with propeller shaft arrows.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926
## R—RADIATOR AND COOLING SYSTEM

<table>
<thead>
<tr>
<th></th>
<th><strong>Hudson</strong></th>
<th></th>
<th><strong>Essex 4</strong></th>
<th></th>
<th><strong>Essex 6</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R—1</strong></td>
<td><strong>Renew Radiator Core.</strong> — Remove shell and assemble new core. Change hose connections, if necessary.</td>
<td>2½</td>
<td>2½</td>
<td>2½</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—2</strong></td>
<td><strong>Renew Radiator Cap and Motometer.</strong></td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—3</strong></td>
<td><strong>Renew Top Radiator Hose.</strong></td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—4</strong></td>
<td><strong>Renew Bottom Radiator Hose.</strong></td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—4a</strong></td>
<td><strong>Renew Bottom Radiator Hose.</strong> (Old type.)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—5</strong></td>
<td><strong>Flush out Radiator and Water Jackets.</strong></td>
<td>1½</td>
<td>1½</td>
<td>1½</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—6</strong></td>
<td><strong>Adjust or Renew Shutter Control Rods.</strong></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—7</strong></td>
<td><strong>Renew Radiator Bolts.</strong></td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—8</strong></td>
<td><strong>Overhaul, Renew or Adjust Fan Assembly.</strong> — Replace fan. Repair or replace necessary parts. Adjust to remove rattle and play.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—9</strong></td>
<td><strong>Renew Fan Belt.</strong></td>
<td>¼</td>
<td>¼</td>
<td>¼</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—10</strong></td>
<td><strong>Overhaul Water Pump.</strong> — Repair or replace necessary parts.</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—11</strong></td>
<td><strong>Repack Water Pump.</strong> — One or more glands.</td>
<td>½</td>
<td>½</td>
<td>½</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—12</strong></td>
<td><strong>Solder Radiator.</strong> — Flat surfaces only. (This does not include any radiator core sections.)</td>
<td>2½</td>
<td>2½</td>
<td>2½</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>R—13</strong></td>
<td><strong>Remove and Replace Shutters.</strong></td>
<td>1½</td>
<td>1½</td>
<td>1½</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Printed in U. S. A.)
April, 1926