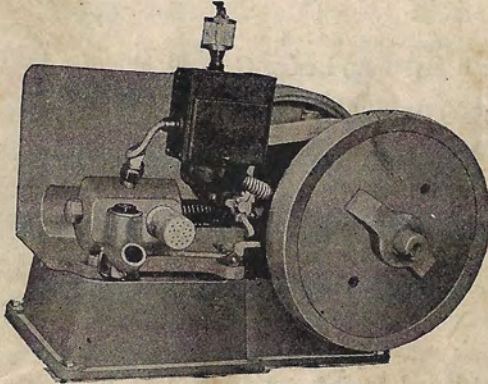


Occasional

**INSTRUCTION AND REPAIR
—BOOK—**

FOR THE

**TYPE X
Cushman Engines**



TYPE X

Equipped with Battery or Wico Magneto Ignition

EFFECTIVE JANUARY 1, 1930

**CUSHMAN MOTOR WORKS
LINCOLN, NEBRASKA**

No. 152A-3M—1-1-30-N.

Made in U. S. A.

IMPORTANT INSTRUCTIONS FOR ORDERING PARTS

Give engine **number, model and type.**

Give catalog number and name of each part ordered.

Specify how shipment is to be made.

Repairs are handled on cash basis.

All collection charges are paid by this Company on orders for more than \$1.00 net.

Send cash with order and save C. O. D. charges.

Parcel Post C. O. D. shipments are insured. When damage or loss occurs, so indicate on the carrier's receipt before signing. Return receipt to us and we will file claim for your account.

RETURN GOODS

Any parts returned to factory for repair, duplication, exchange or credit, must be **PREPAID.**

Don't forget to mark your name and address on returned shipments.

PRICES

Prices are subject to change without notice.

All parts are sold **F. O. B. factory.**

Instructions for the Care and Operation

OF THE TYPE X CUSHMAN ENGINES

BEFORE STARTING ENGINE

Read these instructions over carefully so that you may know your engine and be familiar with its operation.

Fill the gasoline tank in the base with good clean gasoline. Fill the sight feed oiler with Gargoyle Mobiloil A or with an oil similar to this grade and weight. Turn down the two grease cups on the main bearing and the one on the connecting rod bearing. Fill the soft oiler on the cam shaft bearing with the same kind of oil as used in the sight feed oiler. Inspect the connections on the battery box, on the battery and timer to see that they are all tight. The governor tension screw nut should be adjusted so that it will hold the throttle open.

Fill the hopper up to about two or three inches from the top with clean water.

TO START ENGINE

Open mixer needle valve about $\frac{3}{4}$ of a turn. Retard the spark on the battery equipped engine by moving the timer lever toward the hopper as far as possible. Close the battery switch on battery box. Slip starting crank over crank shaft projection with the little pawl in the starting crank in the key seat of the crank shaft. Crank engine over briskly with right hand, at the same time hold left hand over the air opening in the mixer valve. The engine should start on the second or third revolution. Slip starting crank off by pulling outward. Advance timer lever by pushing it toward the crank shaft. Turn on sight feed oiler by lifting the little lever on top to a vertical position. Be sure the oiler is working properly and dropping NOT MORE THAN FIVE DROPS PER MINUTE. Adjust by means of the knurled nut just beneath the lever. Now adjust the needle valve to a position where engine runs smooth and exhaust is clear. This will probably require closing the needle valve slightly from the original setting. Set the governor tension screw to get speed desired.

Engines equipped with Wico magneto should be started by following the general instructions above. Set the timing cam handle so that the pin in the end of the stud is in that portion of the quadrant marked

with the letter "S". There is not an exact location for this pin setting. Perhaps it will be some little distance past the letter "S", which can be readily determined by starting the engine a few times. After the engine is started advance the spark by moving the cam timing handle over until pin is in that section of the quadrant marked with letter "R". Be careful not to advance the spark too far or the engine will knock slightly. The best position will be determined by the speed at which the engine is running and by the load you are pulling.

The engine can be run satisfactorily from 500 to 750 R.P.M. as conditions may require. It may be necessary to retard the spark somewhat under the maximum advanced position, especially when the engine is pulling heavy loads at low speeds. This can be determined by retarding the spark lever until the engine runs smooth without a knock. Do not retard the spark more than necessary as it will cause the engine to heat excessively.

TO STOP ENGINE

Open battery switch and turn off sight feed oiler.

The magneto equipped engine is stopped by swinging the timing cam handle away from the flywheel or toward the letter "S" as far as it will go. This will disengage the trip mechanism of the magneto and cause a discontinuance of spark.

SPARK PLUGS

The engines are equipped with standard $\frac{1}{2}$ -inch spark plugs. DO NOT USE A SPARK PLUG WITH EXTENSION. In order to obtain the most efficient results the spark plug points should be set as follows: for battery ignition .025 to .030 inch; for magneto ignition .020 inch.

Spark plugs and the setting of the points is very important. See that you get the right kind of a spark plug and that the points are set properly before starting the engine.

TIMING

Timing of the engine is very simple if the operator will give it a little thought before starting to make adjustments. Turn the flywheel in a clockwise rotation when facing the governor side of the engine, until the piston is at the lower end or the beginning of the compression stroke of the piston. When the gears are in this position you will find a punch mark on the web of the crank shaft and a tooth on the cam shaft gear that is in contact with crank shaft gear. The best method of inserting the cam shaft gear at the proper position is to turn the flywheel about $\frac{1}{4}$ revolution to the right where you will find the

punch mark more readily on the crank shaft web next to the crank shaft gear and in line with key seat under gear. Then mesh the proper tooth on the cam shaft gear with the crank shaft gear and roll it to the left in its proper position in the cam shaft bracket. The push rod adjusting screw should be adjusted so that the exhaust valve will just start to open 36° before dead center. The timer points should be adjusted so that they will fire on dead center with the lever fully retarded. The fibre washer under the head of the contact point in the timer block will enable you to make any adjustments necessary at this point.

The Wico magneto is a fixed spark and the advance and retard is taken care of by the cam lever. The adjustment of the advance in spark is taken care of by the adjustment of the sleeve on the eccentric strap.

The Wico magneto is manufactured by the Wico Electric Company at Springfield, Mass. A complete instruction sheet covering this magneto is enclosed with the instructions.

COOLING

The hopper type of engine should be filled with water up to two or three inches from the top. Boiling is normal under rated load.

Where there is danger of freezing the hopper should be either drained when the engine is not in operation or an anti-freeze solution added in sufficient quantity to prevent freezing.

OPERATING SUGGESTIONS

The engine is equipped with a mixing valve which is somewhat different than the ordinary carburetor. The mixing valve measures the fuel taken from the gasoline tank on the suction stroke of the piston. In order to accomplish this all connections from the gasoline tank to the mixing valve must be air tight. The only adjustment necessary is the occasional adjustment of the needle valve as outlined in the starting instructions or adding more tension to air valve spring by stretching slightly.

Low grade fuel and improper oiling will cause excessive carbon deposit. The exhaust valve may become stuck in the valve guide due to gummy oil and carbon. It may be loosened or resealed by turning with pliers after applying kerosene to the stem. If this procedure does not remedy the trouble, the valves should be removed, cleaned and ground into seat. Remove carbon from cylinder head and see that holes in muffler are not clogged up.

DIRECTIONS FOR OPERATING COMBINATION MIXING VALVE FOR USE OF GASOLINE, KEROSENE OR DISTILLATE

When desired for use with the heavier fuels the Type X engines are furnished with the KEROSENE attachment. It is simple and positive, and operates without any sacrifices of power.

The operation of this mixer is the same as one which operates on gasoline only, excepting that it has a reservoir for holding a small supply of gasoline on which to run the motor until IT IS THOROUGHLY HEATED UP before switching over to kerosene or distillate. The main fuel supply tank (not shown) is located in the sub-base of the engine. After putting a supply of the desired fuel in the main tank, fill the reservoir on the mixer with gasoline to within $\frac{3}{4}$ inch of the top. Close needle valve in mixer. Open needle valve in reservoir about $\frac{3}{4}$ of one turn. Close air intake by placing hand over air opening in mixer and crank engine over 1 or 2 times until a charge of gasoline is drawn into the engine. Be careful not to flood the engine, which would make it difficult to start. Crank engine over until it starts and run it on gasoline until it is thoroughly heated up. While running on gasoline, open needle valve in mixer about one full turn, THEN close needle valve in reservoir and adjust mixer needle valve to best running position. BE SURE ABOUT THIS for if you close needle valve in reservoir first the engine will stop. Engine must be running when the switch is made to kerosene or distillate.

If engine is to be run on gasoline only, after putting a supply of gasoline in main tank shut needle valve in reservoir and set mixer needle valve as per instructions given elsewhere.

Don't try to start on kerosene or distillate, or to run on those fuels unless engine is first thoroughly heated up on gasoline, as IT CAN'T BE DONE.

The use of kerosene or distillate causes any engine to have a slight "ping" or knock which does no harm. It also necessitates more frequent cleaning of carbon and grinding of valves than does gasoline.



**Kerosene
Attachment**

Price List of Repair Parts

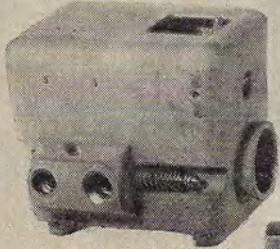
for the

TYPE X CUSHMAN ENGINES

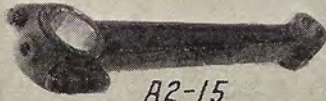
IMPORTANT NOTICE

Give engine NUMBER, MODEL and TYPE
when ordering parts

Part No.	Description	No. Used	Price Each
8-4R	Connecting rod bushing, upper half CE.....	1	\$.50
9-4R	Connecting rod bushing, lower half CE.....	1	.50
6-5	Crank shaft	1	9.00
A6-5	Crank shaft with gear.....	1	11.00
A41-7	Sprocket 9 tooth on hub, bore 1 $\frac{3}{8}$ ".....	1	3.00
2-15R	Connecting rod with upper bushing.....	1	3.50
A2-15	Connecting rod assembly.....	1	5.00
13-16R	Connecting rod bushing P. E.....	1	.50
5-18	Connecting rod shims $\frac{1}{32}$ ".....	4	.02
6-18	Connecting rod shims $\frac{1}{64}$ ".....	4	.02
7-18	Main bearing shims.....	4	.05
8-18	Cam shaft bearing shims.....	2	.02
A8-19R	Cylinder with exhaust valve for mixer A1-602 before No. 6573	1	20.00
A9-19R	Cylinder with exhaust valve, after No. 6573.....	1	20.00
20	Exhaust valve	1	1.00
3-21	Governor tension spring.....	1	.05
8-21	Exhaust valve spring.....	1	.20
21-21	Timer springs	2	.05
22-21	Magneto drive spring.....	1	.25
23-21	Magneto return spring.....	1	.20
33-21	Mixer air valve spring.....	1	.10
46-21	Intake valve spring.....	1	.10
2-26	Governor tension nut.....	1	.15
10-27	Flywheel key, governor side.....	1	.05
11-27	Flywheel key, pulley side.....	1	.05
1-31	Intake valve plug.....	1	.50
1-35	Governor weight	2	.25
A3-36	Governor collar	1	1.00
1-37	Governor shoe	1	.10
1-38	Governor arm	1	.75



A9-19R



A2-15



8-4R



5-46

9-4R



22-57

X4-1



13-16R



9-330



A2-125



1-31



8-21



5-18



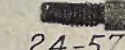
7-60



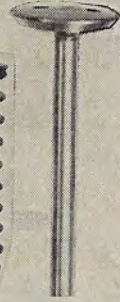
7-44R



4-45



24-57



20



6-5



9-355



1-355



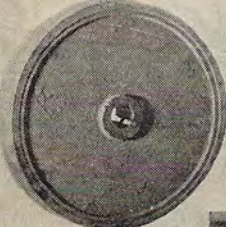
2-355



3-355



10-355



3-113



A5-185



A4-113



11-27



10-27



A6-84



A8-84

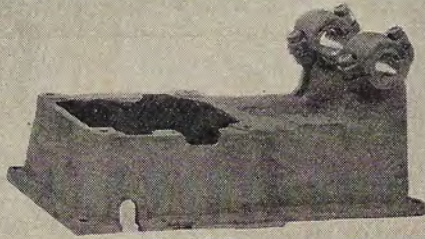
Part No.	Description	No. Used	Price Each
7-44R	Piston	1	3.00
7-44A	Piston .0025 oversize	1	3.00
7-44B	Piston .005 oversize	1	3.00
A7-44	Piston and connecting rod assembled.....	1	8.75
4-45	Piston rings $3\frac{1}{4} \times \frac{3}{16}$ ".....	3	.40
4-45A	Piston rings .0025 oversize.....	3	.40
4-45B	Piston rings .005 oversize.....	3	.40
5-46	Piston wrist pin.....	1	.50
2-56	Push rod	1	.60
8-57	Governor tension screw.....	1	.15
22-57	Connecting rod bolt $\frac{5}{16} \times 1\frac{3}{4}$ ".....	2	.10
23-57	Governor arm stud.....	1	.10
24-57	Wrist pin set screw.....	1	.10
25-57	Push rod adjusting screw.....	1	.10
3-58	Cam shaft—magneto ignition.....	1	2.00
9-58	Cam shaft—battery ignition.....	1	1.50
1-60	Cam shaft gear	1	1.50
7-60	Crank shaft gear.....	1	1.50
A6-62	Timer assembly	1	1.00
2-63	Timer fibre block.....	1	.25
2-66	Timer point	1	.10
1-67	Contact point (in cam).....	1	.10
A4-70	Oil cup	1	1.50
4-70A	Oil cup body glass.....	1	.50
4-70B	Oil cup feed glass.....	1	.20
4-70C	Oil cup feed shank with glass.....	1	.75
A2-73	Spark plug	1	.75
4-74	Gas tube $5\frac{1}{4}$ ".....	1	.50
26-77	Timing eccentric pin	1	.05
A3-78R	Battery box only	1	2.50
2A3-78	Battery box complete	1	12.00
79	Battery box switch	1	.50
A1-84	Gasoline tank before No. 6401.....	1	2.50
A6-84	Gasoline tank after No. 6401.....	1	2.50
A8-84	Gasoline tank	1	2.50
A5-88	H. T. cable with terminal.....	1	.20
A6-88	Magneto cable—screw terminal.....	1	.25
A7-88	Magneto cable—slip terminal.....	1	.25
A13-89	L. T. cable with terminals.....	1	.60
8-93	Coil	1	4.00
A7-96	Gas tank cap.....	1	.15
3-98	Filler pipe	1	.75
1-100	Gas tank clamp.....	2	.10
3-113	Flywheel, pulley side.....	1	10.00
A4-113	Flywheel, governor side.....	1	12.00
A1-123R	Main bearing cap with babbitt.....	2	1.00
A2-125	Intake valve assembled.....	1	2.00
5-130	Base	1	15.00



AI-123R



7-18



5-130



XI-44



I-184



X5-7



X13-91



X13-43



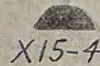
X13-23



X13-42



I-60



X15-4



9-58



3-58



I-67



AI-352R



AI-353R



10-184



8-18



20-184



2-56



X4-15



25-57



I-35



I-37



I-38



A3-36



2-26



8-57



3-21



23-57



XI-4



I-562



I-563



A2-373



X13-44



AII-158



3-98



A7-96



35-330



I-566

4-74

Part No.	Description	No. Used	Price Each
A10-143	Magneto bracket with stud.....	1	2.00
A11-158	Muffler	1	.50
1-184	Hard oiler—main bearing.....	1	.25
10-184	Hard oiler—connecting rod.....	1	.30
20-184	Oil cup—cam shaft bearing.....	1	.25
21-184	Oil cup—rocker arm.....	1	.25
30-184	Oil cup—eccentric strap.....	1	.25
A5-185	Starter crank	1	1.00
9-330	Intake valve gasket.....	1	.05
35-330	Filler pipe gasket.....	1	.10
A3-344	Magneto, Wico Type EK.....	1	18.00
1-351	Shield	1	.60
A1-352R	Cam shaft bracket with cap.....	1	3.25
A1-353R	Cam shaft bracket cap with babbitt.....	1	.30
1-355	Belt pulley 4"x4".....	1	1.50
2-355	Belt pulley 5"x4".....		2.00
3-355	Belt pulley 6"x4".....		3.00
4-355	Belt pulley 6"x6".....		5.00
9-355	Belt pulley 3"x4".....		2.50
10-355	Belt pulley 8"x4".....		6.00
1-370	Crank housing	1	3.75
2-371	Crank housing bar.....	1	.10
A2-373	Gas tube check valve.....	1	.75
1-425	Eccentric strap, Wico.....	1	1.00
1-426	Magneto trip sleeve—Wico.....	1	.60
1-427	Magneto trip rod—Wico.....	1	.25
1-428	Magneto trip rod washer, large.....	3	.10
7-428	Exhaust valve washer.....	1	.02
17-428	Timer point washer.....	1	.02
18-428	Magneto trip rod washer, small.....	1	.10
1-431	Rocker arm stud.....	1	.50
1-432	Rocker arm—Wico	1	1.50
1-433	Timing eccentric—Wico	1	1.50
12-481	Mixer valve body.....	1	2.50
1A12-481	Mixer valve assembly.....	1	3.50
A4-482	Mixer body cap assembly.....	1	.50
A2-483	Mixer air valve.....	1	.50
2-484	Mixer needle valve	1	.25
2-485	Mixer needle valve packing nut.....	1	.15
2-488	Mixer throttle disk.....	1	.20
2-489	Mixer throttle stem.....	1	.30
4-490	Mixer throttle lever.....	1	.25
1-562	Gas tube elbow—Dole.....	1	.20
1-563	Gas tube St. El.—Dole.....	1	.20
1-566	Gas tube nut—Dole.....	2	.10
A1-602	Mixer valve complete before No. 6573.....	1	3.50
2-602	Air valve	1	.50
3-602	Body only	1	1.50



8-93



A3-78R



79



2-63



A6-62



2-66



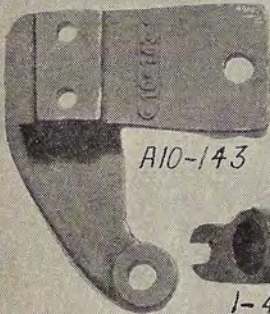
21-21



A13-89



X1-20 X14-1 X4-2



A10-143



30-184

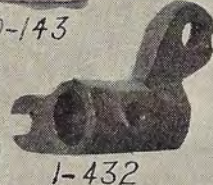


21-184

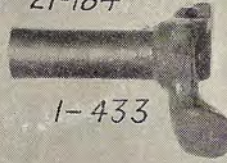
A6-88



A3-344



1-432



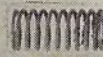
1-433



1-431



1-425



23-21



22-21



1-426



18-428



1-428



1-427

X4-29



2-489



2-484



A2-483



A4-482



33-21



2-488



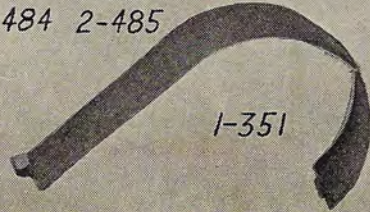
4-490



2-485



1A12-481



1-351



A4-70

Part No.	Description	No. Used	Price Each
4-602	Needle valve clip.....	1	.05
5-602	Needle valve	1	.50
6-602	Needle valve lock nut.....	1	.20
7-602	Needle valve pack nut.....	1	.30
8-602	Throttle disk	1	.05
9-602	Air valve spring.....	1	.10
10-602	Throttle shaft	1	.20
11-602	Throttle lever	1	.20
12-602	Body cap	1	.50
13-602	Throttle lever screw.....	1	.05

REPAIRS FOR TYPE L 17 DETROIT COIL

R11-12	Lower spring and point.....	1	\$.75
R12-12	Upper spring and point.....	1	1.00
R13-12	Vibrator adjusting nut.....	1	.15

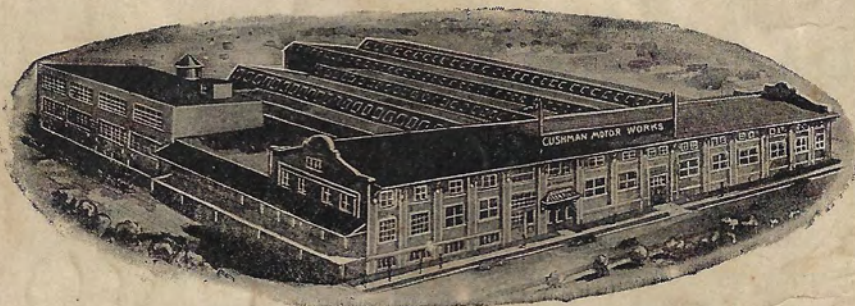
MISCELLANEOUS PARTS

X1-3	Filler pipe screws $\frac{1}{4}$ "x $\frac{3}{4}$ ".....	2	\$.05
X1-4	Cam bracket cap screw $\frac{1}{4}$ "x $\frac{7}{8}$ ".....	2	.05
X1-15	Cam bracket screw $\frac{1}{16}$ "x $\frac{7}{8}$ ".....	3	.05
X1-20	Timer lever screw $\frac{1}{16}$ ".....	1	.05
X1-40	Magneto bracket screw $\frac{7}{16}$ "x $1\frac{1}{2}$ ".....	1	.10
X1-44	Cylinder cap screw $\frac{1}{2}$ "x $1\frac{1}{4}$ ".....	3	.10
X2-11	Filler pipe screws $14-20$ "x $\frac{1}{2}$ ".....	2	.05
X2-17	Timing eccentric lock screw $\frac{5}{8}$ ".....	1	.02
X3-6	Timer spring screws $8-32$ "x $\frac{3}{8}$ ".....	1	.05
X4-1	Connecting rod bolt nut $\frac{5}{16}$ ".....	2	.05
X4-2	Timer lever screw nut.....	1	.05
X4-15	Push rod adjusting screw lock nut.....	1	.05
X4-29	Magneto trip rod lock nut.....	1	.05
X5-7	Main bearing bolts and nut $\frac{1}{16}$ "x $1\frac{3}{4}$ ".....	4	.10
X7-1	Cam bracket screw lock washer $\frac{1}{16}$ ".....	3	.02
X7-8	Magneto bracket screw lock screw $\frac{7}{16}$ ".....	1	.02
X8-2	Connecting rod bolt cotter $\frac{1}{16}$ "x $\frac{5}{8}$ ".....	2	.02
X8-11	Exhaust valve cotter $\frac{3}{32}$ "x $\frac{3}{4}$ ".....	1	.02
X9-11	Belt pulley set screw $\frac{3}{8}$ "x $\frac{5}{8}$ ".....	1	.05
X9-12	Fly wheel set screw $\frac{1}{2}$ "x 1 ".....	1	.10
X9-13	Fly wheel set screw $\frac{1}{2}$ "x $1\frac{1}{4}$ ".....	1	.10
X10-14	Gas tank clamp bolt.....	2	.05
X11-4	Governor weight rivet.....	2	.05
X13-23	Oiler pipe $\frac{1}{4}$ "x $5\frac{1}{2}$ ".....	1	.15
X13-25	Hopper drain plug $\frac{3}{4}$ ".....	1	.15
X13-30	Cam bracket oiler coupling—housing.....	1	.15
X13-42	Main bearing oiler nipple—shield.....	2	.15
X13-43	Cam bearing oiler nipple—housing.....	1	.15

Part No.	Description	No. Used	Price Each
X13-44	Gas tank T 1/8".....	1	.15
X13-91	Main bearing oiler nipple—housing.....	2	.15
X14-1	Timer lever screw washer 1/4".....	1	.02
X15-2	Crank shaft gear key.....	1	.05
X15-4	Cam gear key	1	.05
X17-1	Cylinder expansion plug 1 1/8".....	1	.05
X17-3	Cylinder expansion plug 1 3/8".....	1	.05
X20-1	Cylinder stud 1/4"x1 1/2".....	1	.10



**Our Big Modern Factory at Lincoln,
Nebraska, in which
CUSHMAN ENGINES
are Built**



Factory and General Offices

Cushman Motor Works
LINCOLN, NEBRASKA