TM 5-4358

WAR DEPARTMENT TECHNICAL MANUAL

MALL CHAIN AND CIRCULAR SAW SHARPENERS TRIPOD-MOUNTED

(MALL TOOL COMPANY)

This is a reprint of TM 5-4358, undated, Instructions for Operating Mall Tripod-Mounted Chain Saw Sharpeners Model 17600

WAR DEPARTMENT • JUNE 1945

WAR DEPARTMENT TECHNICAL MANUAL

TM 5-4358

MALL CHAIN AND CIRCULAR SAW SHARPENERS

TRIPOD-MOUNTED

(MALL TOOL COMPANY)

WAR DEPARTMENT • *JUNE 1945*

United States Government Printing Office
Washington : 1952

WAR DEPARTMENT

WASHINGTON 25, D. C., *27 June 1945*

TM 5–4358 is published for the information and guidance of all concerned.

[AG 300.7 (29 Aug 45)]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL
Chief of Staff

OFFICIAL:
J. A. ULIO
Major General
The Adjutant General

DISTRIBUTION:

Active Army:

Tech Svc (1); Tech Svc Bd (1); AFF (3); OS Maj Comd (2); MDW (2); Log Comd (2); A (5); Brig 5 (1); Regt 5 (1); FT (1); Sch 5 (50); USMA (2); PMS & T 5 (1); Gen Dep (2) except Columbus (10); Dep 5 (10); POE (3); OSD (3); Engr Dist (1); Mil Dist (1); T/O & E's: 5–157A (2); 5–267A (2); 5–279 (2); 5–357 (2); 5–367 (2); 5–387A (1); 5–621T.

NG: One copy to T/O & E units only as listed above.

ORC: One copy to T/O & E units only as listed above.

For explanation of distribution formula, see SR 310–90–1.

INDEX

	Page
Setting up machine	1
Setting the chain for sharpening	2
Adjustment for hook angle	3
Sharpening the saw	4
Grinding the tops of teeth	4-5
Sharpening circular, combination or rip saws	6
Operating instructions for gasoline engine	7-10
Carrying machine	11
Parts list for saw sharpener	12
Parts list for gasoline engine	13-14

INSTRUCTIONS FOR OPERATING

Mall
REG. U.S. PAT. OFF.

TRIPOD MOUNTED · GASOLINE ENGINE CHAIN SAW SHARPENERS

MODEL 17600

SETTING UP MACHINE

A MALLSAW chain cuts faster and wears itself less if kept sharp. Sharpen it as soon as it starts to get dull and avoid the necessity of grinding much metal off the teeth. Keep your sharpener set up in a convenient and well lighted place.

Many operators find it advisable to point the teeth of their MALL chain saws with a file at least twice a day when cutting on production. This can be done quickly in the woods. However, about every other day, the chain should be sharpened on a sharpener to get all the teeth alike again. By doing this, the operator will continue to keep the teeth of the chains in good condition.

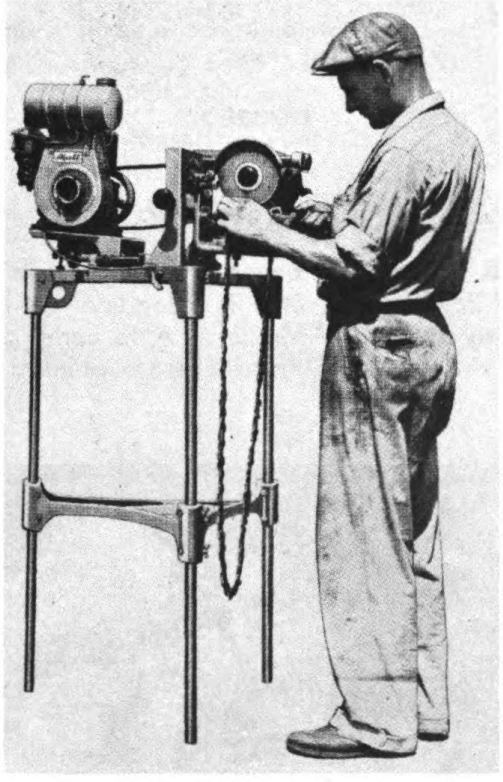


FIGURE 1

This machine is arranged to operate on a bench or on its own legs. In order to assemble the machine onto its legs, first slip the legs through the holes in the triangular shaped tool rack and lock in place. Stand in erect position and set machine on top, slipping legs into their sockets and locking.

Check to see that the engine, if a gasoline engine driven machine, is properly filled with gasoline and oil. (See gasoline engine instructions).

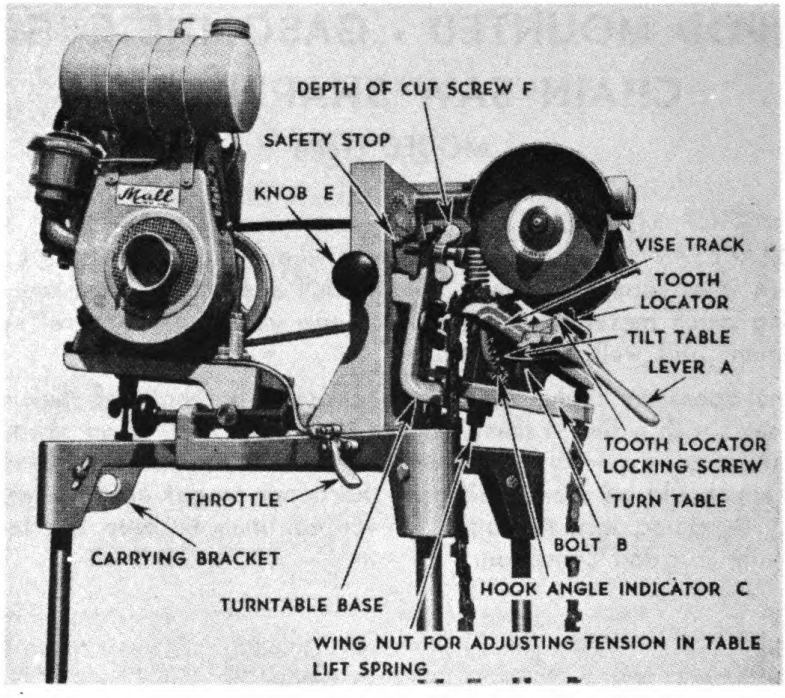


FIGURE 2

SETTING THE CHAIN FOR SHARPENING

After the chain has been removed from the chain saw, lay it into groove as shown in Figures 2 and 3, after lever A has been pushed down, thus opening the vise. Allow lever A to come up, thus clamping the chain in the vise. Be sure the teeth are pointed in the direction shown in Fig. 3.

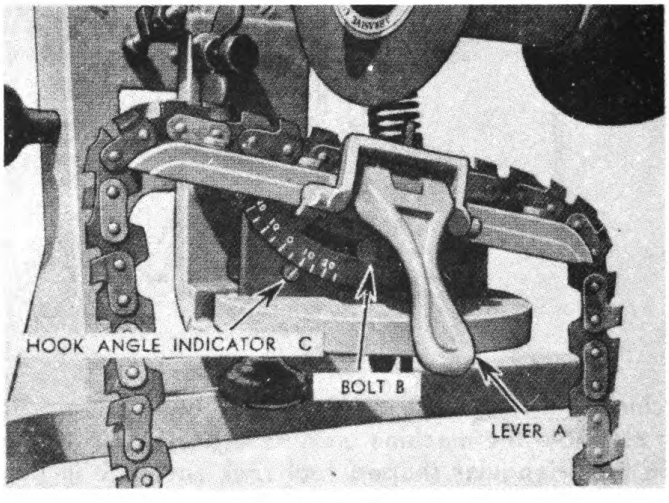


FIGURE 3

Adjust the tension on spring S until the table and chain lift easily but stay down when the hands are removed. Keep safety stop in position shown in Fig. 4, when adjusting and removing chains. When ready to grind, flip the safety stop towards the operator to allow chain to be lifted up to the wheel.

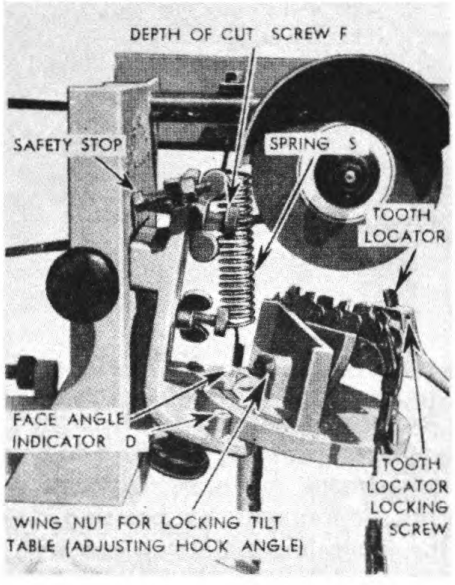


FIGURE 4

ADJUSTMENT FOR HOOK ANGLE

Adjust hook angle by loosening wing nut, Fig. 4, on bolt B and rocking table to proper angle. This angle is indicated at C, Fig. 3, and is generally 5, 10, or 15 degrees. If unknown, it may be determined by adjusting until the grinding wheel fits to the unsharpened tooth.

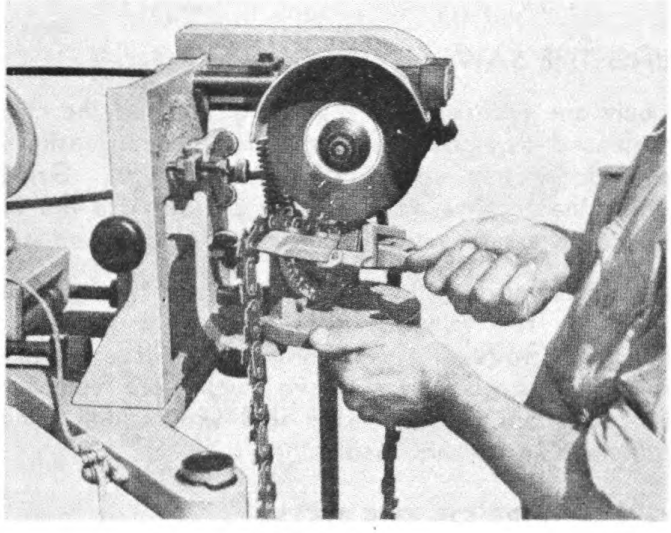


FIGURE 5

The various face angles are obtained by rotating the turn table to different positions and the angles are shown by indicator D, Fig. 4. These angles should be determined from the chain before sharpening. They may vary between 0 and 35 degrees.

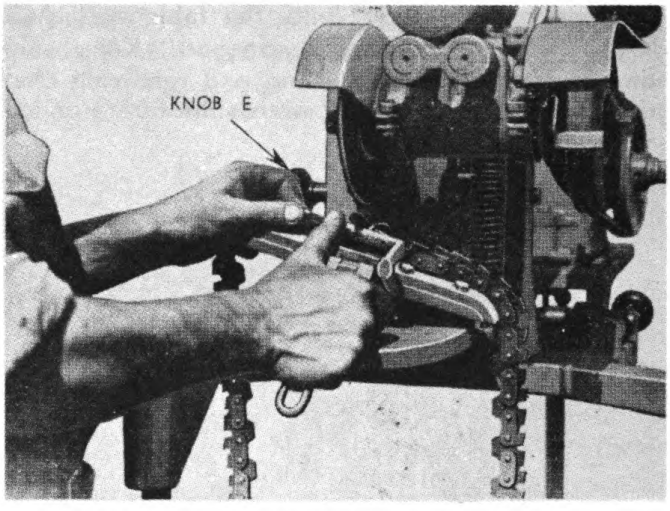


FIGURE 6

The amount to be ground off the teeth is then adjusted by turning knob E until the proper amount is ground off to sharpen the tooth. Before making this adjustment, be sure the tooth is located properly in the vise. To do this, loosen vise by pressing down lever A with the right wrist, push the tooth locator into place with right thumb, Fig. 6, and pull tooth up against locator, MAKING SURE THAT TOOTH IS DOWN ON ITS TRACK. Do not start to lift table until tooth locator is out of way of grinding wheel.

An extra tooth locator is furnished with each machine. In case of accident this may be easily replaced by loosening the tooth locator locking screw, Fig. 4. This screw is deeply recessed, but can be easily loosened with the small Allen wrench furnished with each machine.

The depth of cut (into the tooth throat) is set by adjusting screw F.

SHARPENING THE SAW

Sharpen only one type of tooth as you go around the chain. When the vise is released by right wrist, the left hand can easily and quickly render the chain to the next tooth of same type. Grind off only enough to give the tooth a good cutting edge. Use the index finger of the left hand to assure yourself that chain is down on its track.

This operation is very fast. With a little practice, you can sharpen a chain in a very few minutes. REMEMBER, it is much better to sharpen your chain frequently, removing only a little metal each time, than to wait longer and have to remove much more from a badly worn tooth. Also, no chain saw will work well with a dull chain. A dull chain is inefficient and wears fast.

GRINDING THE TOPS OF THE TEETH

Frequently it becomes advisable to grind the tops of the teeth due to wear of top cutting edge. If this is done, the life of the chain will be greatly increased due to removing the necessity of grinding off large amounts from tooth face to get a good cutting edge.

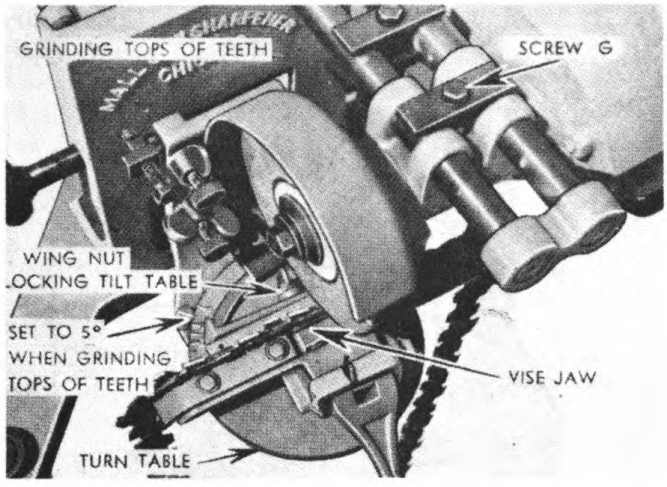


FIGURE 7

Remove both grinding wheels and put the wide one in place of the narrow one. Suitable spacers and collars are provided. Set the turn table to 5 degrees on the left indicator as shown in Fig. 7. Loosen the wing nut that locks the tilt table and rock the tilt table until the top of the tooth is parallel to the face of the grinding wheel. Tighten nut.

Loosen screw G and slide spindle on the two parallel bars until the curvature of the wheel, as seen from the side, fits the top of angle of tooth being ground. Lock in place.

This will vary the tension of the drive belt. It may be brought into proper tension by adjusting the two knobs under the motor. When adjusting these, work them together, not allowing one to get ahead of the other and cause binding.

Set the depth of cut screw F, Fig. 4, so that when the chain is brought up against the wheel, the top of the tooth will just clean up the worn part.

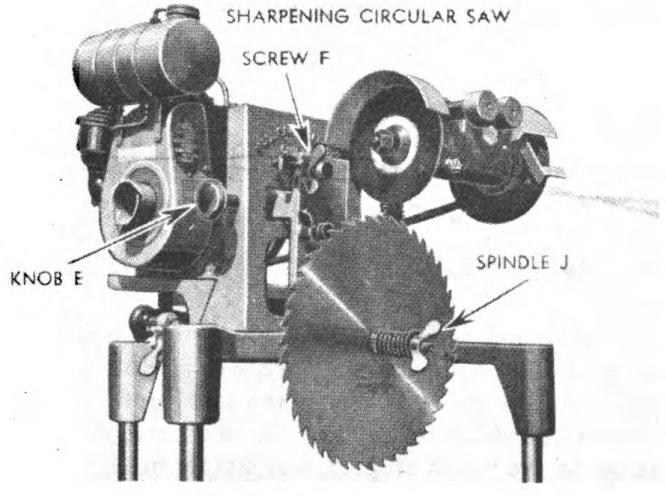


FIGURE 8

Grind all of one type of tooth at one setting, being careful to bring the table up against the stop with the same tension each time.

Readjust for each type of tooth.

In grinding the rakers (center teeth), remove enough metal so that they are about 1/32 inch lower than side cutters. Care should be exercised to make all of each kind of teeth the same height.

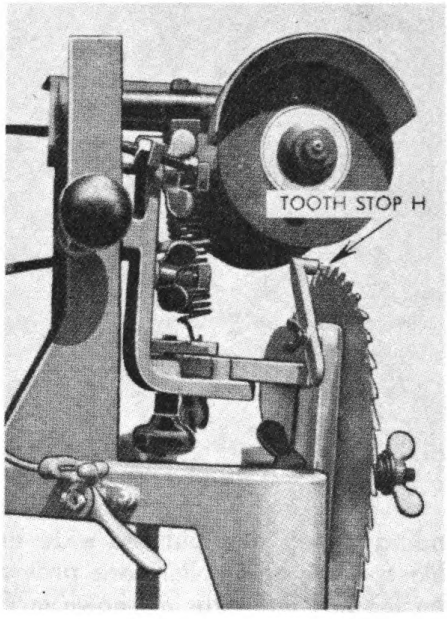


FIGURE 9

SHARPENING CIRCULAR, COMBINATION OR RIP SAWS

Remove the chain saw sharpener turntable by loosening knob below and install circular saw turntable in its place. Fig. 8. Set face angle indicator D at 0 degrees so as to get a square face on the teeth.

Adjust the height of the saw support spindle J so that the top of the saw protrudes about 1 1/2" above the top of support castings. Remove front handle, washer, spring and cone. Assemble saw in place with the teeth pointed in the direction shown, centering cone in saw hole.

With grinding wheel stopped, adjust knob E until the face angle of the unground tooth fits the contour or outline of the grinding wheel. The depth that the wheel goes into the saw is adjusted by screw F. Set tooth stop H as shown in Fig. 9, locating on the tooth next to the one being ground. Rotate the saw in the reverse to cutting direction as you sharpen, always locating on an unsharpened tooth.

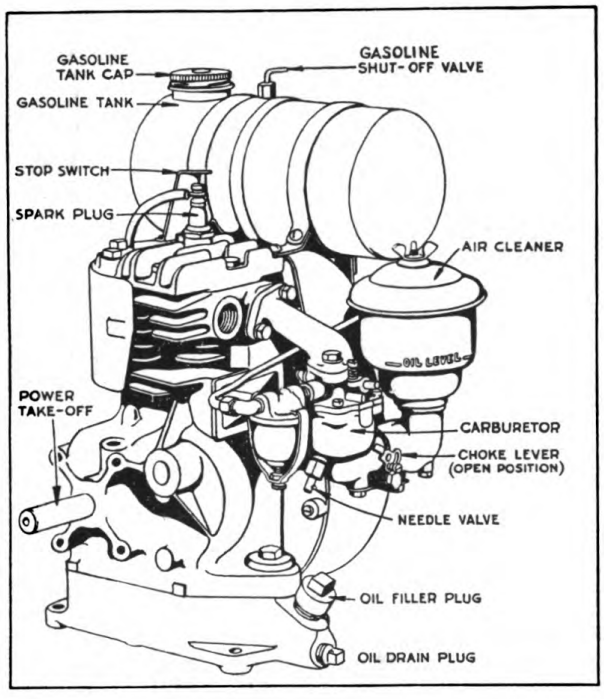
With your left hand, hold the saw tooth firmly against the tooth stop as the next tooth is being ground. Follow all the way around in this manner, until you are ready to grind the last tooth where you have no unground tooth on which to locate. In this case, do not pull locating tooth quite up to the tooth stop H, but simply hold the saw to properly grind last tooth by eye.

The cone in the saw center serves to keep it centered and the spring holds it in place.

A special gumming wheel can be furnished to shape out the tooth throats when necessary.

READ THESE INSTRUCTIONS CAREFULLY BEFORE OPERATING THIS GASOLINE ENGINE FOR THE FIRST TIME

MALL MODEL 3544DG



GASOLINE ENGINE

Guessing how to run it may cause you unnecessary inconvenience, aggravation or failure to receive the fine service that is built into it.

Each MALL unit is carefully tested and adjusted at the factory before packing for shipment, and if correctly operated will perform beyond your expectations.

IMPORTANT: Always use good, clean oil S.A.E. No. 20. Add oil frequently—Change oil regularly.

STARTING AND OPERATING THE 1½ H.P. GASOLINE ENGINE

BEFORE STARTING THE ENGINE

Fill the crankcase with Mobiloil Arctic or any other high grade oil not heavier than S.A.E. No. 20. A HEAVIER OIL MUST NOT BE USED. at filler opening. CAUTION: BE SURE OIL RESERVOIR IS FULL TO POINT OF OVERFLOWING BEFORE REPLACING OIL FILLER CAP. Reservoir holds 1-½ pints. Fill the gas tank with a good grade of CLEAN regular gasoline. Tank holds 1 quart. Do not mix oil with gasoline.

HOW TO START

Turn choke valve lever, located in air cleaner elbow, to horizontal position. Wind the starting rope, clockwise, around the starter pulley, with knot at the end, in notch of pulley. Pull on the starter rope quickly. As engine warms up, gradually open choke valve until it operates smoothly. Operate the choke the same as you do on your automobile. A hot engine does not require as much choking as a cold one.

FAILURE OF ENGINE TO START

If engine fails to start after a reasonable number of trials do not make any adjustments uutil you have studied the instructions referred to in the SERVICING REFERENCE CHART. (Page 10).

HOW TO STOP

Close choke valve in air cleaner elbow.

GENERAL DATA

You will find your gas engine substantially built. It is made of high grade materials by skilled workmen, in a factory fully equipped with the most modern machinery. Before it was shipped, it received many tests and careful inspections.

Your engine will give you better service if you do not tinker with it. This does not mean, however, that it does not require a certain amount of attention. Give it the right kind of fuel, oil and care. Keep it clean both inside and out. You will be well repaid in trouble-free, satisfactory service.

If you should experience any difficulty, follow the instructions referred to in the SERVICING REFERENCE CHART. If you cannot easily remedy it, consult your dealer or get in touch with us direct.

OPERATING REQUIREMENTS

A gasoline engine to operate properly must have all parts in correct adjustment to provide good ignition, carburetion, compression and cooling. And of equal importance, the oil and gasoline used must be CLEAN and of the recommended grades. The following instructions fully explain the simple adjustments and offer operating recommendations that will assure you complete satisfaction. We urge you to carefully observe them.

KEEP THE ENGINE CLEAN

It will pay you to keep your engine clean both inside and outside. See that no dirt or water enters engine when filling with oil or gasoline. As a precautionary measure always wipe off the gasoline cap and oil filler plug, as well as around them before refilling. Dirt in the engine or gasoline tank will cause trouble and even serious damage.

OIL BATH AIR CLEANER

The air cleaner is to protect the engine from dust and dirt. No engine can stand up under the grinding action that takes place when dust and dirt particles are drawn into the engine through the carburetor. CLEAN THE AIR CLEANER FREQUENTLY BY REMOVING IT AND WASHING IN KEROSENE. Test it to see if it is clogged by blowing through it or noticing if engine performs better with it off. If clogged, the filter should be replaced. KEEP OIL LEVEL UP TO THE BEADING.

USE THE RIGHT KIND OF OIL

Correct lubrication is important. We recommend the use of MOBILOIL "ARCTIC" or other high grade oil with similar characteristics having a low carbon residue and a body not heavier than S.A.E. No. 20. A HEAVIER OIL WHICH MIGHT BE SATISFACTORY IN A TRACTOR OR FOR LUBRICATING FARM MACHINERY MUST NOT BE USED. Do not mix oil with the gasoline. This 4 cycle engine is provided with an independent efficient pump lubrication system. There are no external parts which require separate oiling.

ADD OIL REGULARLY

An engine which is run without oil will be ruined within a few minutes. To avoid the possibility of such an occurrence and the resulting expense, always fill the oil reservoir at the blue plug to the top of the filler plug opening after each five hours of engine operation. Capacity of oil reservoir is 1-1/2 pints.

CHANGE OIL FREQUENTLY

After every twenty-five hours of engine operation, the oil should be completely drained from the crankcase. Do not remove engine from its mounting base. Remove the drain plug located in either end of base. We do not recommend flushing out with kerosene. Replace the drain plug, refill with fresh oil and replace the blue filler plug.

In the normal running of any engine, small particles of metal from the cylinder walls, pistons and bearings will gradually work into the oil. Sludge, a gummy mass, forms which clogs up the oil passages. If the oil is not changed regularly, these foreign particles cause increased friction and a grinding action which shortens the life of the engine. Fresh oil also assists in cooling, for old oil gradually becomes thick and loses its cooling as well as its lubricating qualities.

USE CLEAN GASOLINE

A good grade of CLEAN, FRESH, regular gasoline is recommended. Too high test gasoline may form vapor-lock in gas line when engine gets hot. This interrupts the flow of gasoline and causes engine to stop. Be sure that the small vent hole in the gasoline tank cap is not clogged up, for air must enter the tank to allow the gasoline to flow to the carburetor. Test by blowing through top of cap.

AVOID GUMMY GASOLINE

If you experience trouble with a gummy, sticky substance with a peculiar sharp obnoxious smell, change to another grade of gasoline. This gum comes from the gasoline and clogs carburetor, gas line, gasoline tank, check valve, etc. You can check your gasoline by evaporating a half pint in an open dish. If a quantity of gum remains, try another kind that is clean and fresh.

You can avoid most trouble from gum if you will keep the tank full when you are not using the engine. If you use it only occasionally, drain tank completely and refill when engine is used again. The reason for this is that evaporation of stale gasoline causes most gum deposits.

TO CLEAN THE FUEL LINES

Disconnect the gasoline line at the carburetor and also at the gas tank. Blow through the gas line to clear. Remove the gas tank feed pipe which is screwed into the gas tank proper. At its base you will find a screen which may be clogged. To determine whether this pipe itself is clear, blow through the pipe from the screen end. There is a check ball at the base of this pipe which must be free. Check ball must close air passage when blowing through opposite end of pipe. When replacing gas pipe in tank, be sure to place gasket between gas tank and gas pipe nut. IMPORTANT: If you find a gummy varnish-like substance, alcohol or acetone will dissolve it.

CORRECT USE OF THE CHOKE

The correct carburetor setting gives the engine the best mixture to run on when it is hot. For starting, it is necessary to choke the carburetor to get a rich mixture, because cold gasoline does not vaporize readily. A warm or hot engine requires very little choking. Until you become familiar with your engine, however, you may make the mistake of not choking the carburetor enough or you may choke it too much. If engine fails to start after cranking three or four times with the choke closed, try cranking two or three times with the choke part way open and then all the way open. Use engine choke the same as you use an automobile choke.

TO PRIME THE ENGINE

The engine may fail to start for the reason that either the carburetor is incorrectly adjusted or dirty, or the fuel line or gas pipe check valve in the gasoline tank is dirty or clogged, or you are out of gasoline. To determine the cause, prime the engine by removing the spark plug and pour a half teaspoonful of gasoline into the spark plug opening. Replace the spark plug and crank the engine. If it fires for three or four revolutions and stops, the difficulty is definitely in the fuel system. If engine will not fire at all, check the ignition system.

TO ADJUST THE CARBURETOR

The carburetor on the No. 3544-DG engine is of the suction type. The gasoline is regulated by a needle valve. At any set speed the throttle is automatically controlled by the governor.

To adjust the carburetor, completely close needle valve by turning to right or clockwise as far as possible. Do not screw up too tight or use force when closing needle valve, or the seat, or taper of needle valve may be damaged. From closed position, open needle valve one complete turn. After the engine has been started and warmed up with the choke wide open, make final adjustment by turning the needle valve to the point at which engine operates most smoothly with full load. This setting will also take care of starting with use of the choke. When starting cold engine, if it is necessary to keep choke partially closed several minutes before engine runs smoothly, carburetor setting is too lean and needle valve should be opened a notch or two—turn to left. If carburetor throttle acts sluggish or engine does not govern smoothly, it is usually caused by a dirty or gummy throttle.

SERVICING REFERENCE CHART

ENGINE FAILS TO START

- Out of gasoline
- Out of oil
- Dirt or gum in fuel system
- Incorrect use of choke
- Carburetor out of adjustment
- Spark plug dirty
- Ignition cable grounded
- Magneto
- Poor compression
- Starter clutch

ENGINE STOPS

- Out of gasoline
- Out of oil
- Dirt or gum in fuel system
- Engine overheated
- Engine overloaded

ENGINE OVERHEATS

- Out of oil
- Oil needs changing
- Oil too heavy
- Carburetor out of adjustment
- Poor spark
- Carbon
- Overloaded

ENGINE LACKS POWER

- Air cleaner clogged
- Lack of oil
- Add or change oil
- Carburetor out of adjustment
- Engine not up to speed
- Poor spark
- Poor compression
- Carbon
- Muffler clogged
- Exhaust tubing
- Overloaded

CARE OF UNIVERSAL ELECTRIC MOTOR

Twice a year, the gear housing should be relubricated. Remove four screws and separate the gear housing. Clean out the old grease and fill about two-thirds full of Sturoco "OHMP" grease or equivalent. The ball bearings have sealed lubrication and require no further lubrication. Reassemble and the motor is ready for use.

CARE OF AIR MOTOR

Daily, or every 5 or 6 chains sharpened, remove the blue oil plug on the motor and fill (about one fluid ounce or one tablespoon full) oil reservoir with light oil (S.A.E. 10). Before making air hose connection, be sure all dirt is blown out of hose.

CARRYING MACHINE

This machine is easily carried by using the legs as carriers. After removing them from their sockets, slip two of them under the main frame and through the brackets provided.

PARTS LIST

TRIPOD MODEL SAW SHARPENER

1 No. 17550 MALL Saw Sharpener, complete, assembly consisting of:

1 No 17559 Tripod and base assembly
3 No. 18811A Locking bolt
3 No. 17604-A Wing nut
3 No. 17548 Locking bolt sleeve
1 No. 17581 Adjustable motor base
1 No. 17604-A Wing nut
1 No. 17595 Stroke adjustment screw
1 No. 17584 Motor base pivot shaft
2 No. 17585 Set collar
2 No. 17583 Belt adj. and knob assembly
2 No. 17586 Knurled lock nut
2 No. 17587 Snap ring
1 No. 17556 Pivot base
4 No. 102046 3/8-16x1 1/2 Hex.Hd. cap screw
4 No. 103223 3/8 SAE lockwasher
4 No. 103082 3/8-16 Hex. nut full
1 No. 15828-A Name plate
2 No. 103508 No. 2x1/4 drive screw
2 No. 17638 Carrying bracket
1 No. 17599 Turntable base adj. bar and knob
1 No. 17601 Set Collar
1 No. 17637 Back-lash spring

1 No. 17619 Turntable base and hold-down assembly, consisting of:

1 No. 17557 Turntable base
1 No. 17594 Turntable base stop stud
1 No. 105083 3/16"x5/8" Groove pin type I
2 No. 105102 1/4x1/2 Groove pin
1 No. 102048 3/8"-16x2" H.H. cap screw
1 No. 103102 3/8-16 Hex. jam nut
1 No. 17633 Friction block
1 No. 103874 3/8-16x3/8 Headless set screw
2 No. 17595 Stroke adjusting screw
2 No. 17604-A Wing nut
2 No. 17597 Grinding wheel guide bar

1 No. 17590 Grinding spindle, consisting of:

1 No. 17561 Spindle housing
2 No. 20641 204-T-D bearing
1 No. 17564 Grinder spindle
1 No. 17563 Spindle flinger washer
1 No. 11519 Clamping washer
1 No. 17565 Spacer
1 No. 103614 5/64" x 7/16" ID x 1"OD wr. iron washer
1 No. 17636 3/8"-16 left hd. hex. nut—full
1 No. 17566 Housing groove snap ring
1 No. 17562 Pulley wheel
2 No. 103956 1/4"-20 x 1/2" holl. hex. set screw
1 No. 11519 Clamp washer
1 No. 103614 5/16" x 7/16"ID x x 1"OD iron washer
1 No. 103082 3/8" x 16 hex. nut full
1 No. 17567 Wheel guard
1 No. 17605 Wheel and belt guard assembly
1 No. 17613 Steady rest and arm assembly
1 No. 104465 3/8"-16 x 1 1/2" carriage bolt
1 No. 103102 3/8"-16 hex. nut jam
2 No. 17588 Locking strap
1 No. 17604A Wing nut
1 No. 19337 Stud
1 No. 17558 Yoke
1 No. 17589 Locking strap
1 No. 17596 Hex. hd. cap screw (special)
1 No. 103223 3/8" SAE lockwasher
1 No. 17592 Tension spring
1 No. 17614 Adjustment stud
1 No. 17604-A Wing nut

1 No. 17560A Turntable and tilt table, consisting of:

1 No. 17552A Turntable
2 No. 105144 3/8" x 3/4" groove pin type I
1 No. 17551A Tilt table
2 No. 19677A Vise track
4 No. 19678 Spacer
4 No. 102002 1/4"-20 x 3/4" hex. hd. cap screw
4 No. 103642 .065 thick x ID 17/16" x 5/8"OD 1/4" riveting buff
1 No. 104445 5/16"-18 x 1 1/2" carriage bolt
1 No. 103673 5/16" std. flat washer
1 No. 103779 Wing nut 5/16"-18
1 No. 17573 Vise jaw
2 No. 17569 Compression spring
1 No. 17574 Bumper plate
4 No. 100874 10-32" x 3/8" F. hd. machine screw
1 No. 17576 Vise jaw repelling screw

1 No. 17580 Handle and camp pad, complete assembly

1 No. 17570A Tooth locator assembly, consisting of:

1 No. 17553A Tooth locator bracket
1 No. 17578A Tooth locator
1 No. 101113 8-32 x 1/2" Holl. hex. set screw
1 No. 100084 6-32 1" rd. hd. mach. screw
1 No. 17572 Tooth locator torsion spring
1 No. 17568 Pin for tooth locator bracket
1 No. 105032 3/32" x 1/2" type 1 groove pin
1 No. 17579 Pin for handle
1 No. 105032 3/32" x 1/2" type 1 groove pin
1 No. 17589 Locking strap
1 No. 17593 Locking bolt and knob assem.
1 No. 17631 Belt
1 No. 18702 Tool rack
6 No. 18805A Locking bolt
3 No. 18806 Locking pin
6 No. 17604A Wing nut
6 No. 17545 Locking bolt sleeve
3 No. 18352A Leg assembly
2 No. 16139 Grinding wheel—1/8" thick
2 No. 15139 Grinding wheel—1/8" thick
No. 17720 Saw sharpener accessories
1 No. 12907-B 6" P.D. pulley
No. 104375 Woodruff key

PARTS LIST FOR

MALL 1 1/2 H.P. GASOLINE ENGINE

Part No.	Description
111	Washer
112	Washer
144K	Slotted nut and cotter pin
150	Shakeproof washer
3880	Tool bracket and handle assembly includes:
	9575 Stud
	3869 Nut
	1775 Wrench
	3867 Handle
3913	Handle stud
7100B	Drive nut
10643	Anti-creep springs (3 req.)
11274-A	Base assembly
11572-D	Spacer
11572-E	Handle and gas control bracket
11572-F	Cap screw (2 req.)
15328	Base plate assembly
15532	Spacer
15672	Spacer
15673	Motor adapter
21110	Venturi
21119	Air cleaner elbow
21129	Lower carburetor body
21130	Carburetor intake elbow
21277	Cam gear
21283	Top compression ring—std.
21310	Breather valve body
21362	Cylinder head
21376	Top compression ring—.010" OS
21377	Top compression ring—.020" OS
21440	Control lever
22031	Clutch lock
22032	Needle valve packing washer
22036	Carburetor throttle valve
22050	Carburetor choke valve
22062	Choke lever washer
22082	Connecting rod screw head lock
22206	Cylinder shield
22216	Breather cover
22217	Oil spray shield
22221	Valve cover plate
22238	Cylinder mounting washer
22243	Cylinder mounting washer

Part No.	Description
22279	Carburetor elbow brace
22353	Valve cover washer
22368	Control lever washer
23059	Gas shut-off ever
23068	Speed adjusting nut
23114	Float hinge pin
23125	Throttle stop pin
23184	Valve spring retainer
23187	Valve spring retainer pin
23222	Carburetor nozzle
23227	Needle valve packing nut
23228	Idler needle valve
23230	Throttle shaft bushing
23270	Choke lever screw
23292	Air cleaner bolt
23386	Intake valve
23443	Dowel pin
23444	Valve cover stud
23571	Control lever swivel
23580	Control lever bushing
23663	Exhaust valve
26018	Contact bracket spring
26021	Valve spring
26026	Piston pin lock
26048	Control casing
26119	Throttle adjusting spring
26157	Idler valve spring
26172	Pump plunger spring
26228	Choke spring
26229	Choke lever spring
26267	Throttle control spring
26330	Breather retainer spring
26383	Crankshaft
26391	Throttle link
26393	Governor spring
27043	Base gasket
27044	Cylinder mounting gasket
27045	Carburetor elbow gasket
29667	Magneto point assembly
29671	Magneto armature
29693	Spark plug with gasket
29806	Spark plug gasket
29835	Magneto flywheel
29861	Condenser

29878 Starter rope
37346 Rivet—1/8 x 1/4" tubular
38852 Washer
61756 Center compression ring—std.
61757 Oil ring—std.
61760 Flywheel key
61768 Center compression ring—010" OS
61769 Center compression ring—020" OS
61770 Center compression ring—030" OS
61771 Oil ring—010" OS
61772 Oil ring—020" OS
61773 Oil ring—030" OS
61967 Throttle stop
62536 Return spring cup
62577 Flywheel washer
62641 Speed adjuster plate
62693 Rope starter pulley
62835 Magneto dust cover
62842 Dust cover spacer
62851 Gas tank strap
62862 Stop switch
62876 Gas filter screen
62891 Spark plug and filler cap wrench
63426 Casing locknut
63773 Piston pin—std.
63785 Cam shaft
63788 Valve tappet
63816 Piston pin—.005" OS
63965 Oil pump plunger
65431 Control lever base
65469 Control lever assembly
65704 Contact point plunger
65794 Armature wrapper
65968 Breather valve disc
66432 Washer
67016 Control wire—42" long
67307 Magneto plate gasket .015"
67527 Valve cover gasket
67537 Cylinder head gasket
67597 Magneto plate gasket—.005"
67607 Magneto plate gasket—.009"
68122 Cam shaft plug
68477 Gas filter gasket
68487 Gas filter bowl
68507 Felt washer
68857 Carburetor body gasket
68877 Inlet valve seat gasket
68887 Needle valve packing
68897 Venturi gasket
68957 Air cleaner gasket
68987 Carburetor gasket
69221 Gas tank cap
69345 Oil filler cap
89115 Connecting rod
89128 Oil pump assembly
89167 Mageto plate and bearing
89190 Gasoline line—13" long
89241 Governor blade assembly
89244 Magneto assembly
89283 Piston assembly—.010" OS
89284 Piston—.010" OS
89285 Piston assembly—.020" OS
89286 Piston—.020" OS
89287 Piston assembly—020" OS
89288 Piston—.030" OS
89289 Piston assembly—std.
89290 Piston—std.
89307 Oil return valve
89383 Base (cast iron)
89386 Blower housing
89401 Cylinder
89660 Oil seal
89677 Crankshaft bearing
89734 Carburetor assembly
89735 Upper carburetor body assembly
89736 Carburetor throttle shaft
90029 Screw—4-36 x 1/4"rd. hd.
90066 Screw——8-32 x 1/4" rd. hd.
90067 Screw—8.32 x 5/16" rd. hd.
90077 Swivel screw
90079 Screw—10-32 x 3/8" rd. hd.
90081 Screw—10-32 x 5/8" rd. hd.
90083 Screw—10-32 x 5/8" rd. hd.
90200 Screw—8-32 x 1/2" fill. hd.
90202 Screw—10-32 x 1/2" fill. hd.
90313 Nut—8-32 hex.
90355 Nut—10-32 hex.
90369 Lockwasher
90528 Screw—1/4-28 x 3/4" hex. head
90699 Lockwasher—1/4"
90832 Lockwasher—1/4" std.
90847 Nut—1/4-28 hex.
90916 Screw—1/4-20 x 1/2" rd. hd.
91070 Lockwasher (shakeproof No. 8)
91084 Oil drain plug—3/8"
91199 Lockwasher—No. 8 std.
91324 Washer
91419 Screw—1/4-20 x 5/8"hex. hd.
91456 Screw—1/4-20 x 1" hex. hd.
91539 Key—3/16" sq.
91608 Flywheel mounting nut
91711 Cylinder head screw (short)
91712 Cylinder head screw (long)
91741 Screw—3/4-24 x 1/2" hex. hd.
91753 Screw—8-32 x 1/4" rd. hd.
91811 Muffler elbow locknut
91833 Dust cover stud
91838 Muffler elbow—45°
91920 Screw—8-32 x 5/8" fill. hd.
92017 Swivel screw
92067 Wing nut—10-32
92089 Carburetor mounting screw
92125 Screw—1/4-20 x 1/2" hex. hd.
92208 Connecting rod screw
92211 Lockwasher (shakeproof)
92227 Lockwasher (shakeproof)
92228 Screw—1/4-20 x 5/8" flat head
92235 Screw—3/8-24 x 1 1/4" slot. hd.
92236 Screw—3/8-24 x 2" hex. hd.
92278 Nut—1/4-20 hex.
92285 Cotter pin—No. 18 x 1/4"
92287 Screw—10-32 x 1/4" rd. hd.
92290 Lockwasher—No. 10
92291 Shut-off valve retaiing nut
92294 Lockwasher—3/32"
92305 Washer
92306 Screw—1/4-28 x 5/8"hex. hd.
92451 Screw—1/4-20 x 7/8" hex. hd.
99158 Ball bearing
99176 Ball bearing oil seal
99180 Gasoline tank assembly
99193 Muffler
99288 Ignition cable
99621 Needle adjusting valve

99622 Carburetor float
99630 Air cleaner assembly
99634 Upper carburetor body
99636 Inlet valve and seat
99665 Gas filter yoke
99679 Choke lever assembly
99700 Choke shaft and lever
99714 Gasoline filter
99874 Speed adjuster
99879 Gas filter cover assembly
102025 Long cap screw
102221 Cap screw
10309 5/16 x 18 hex. nut
103222 Lockwasher

U. S. GOVERNMENT PRINTING OFFICE : O—1952