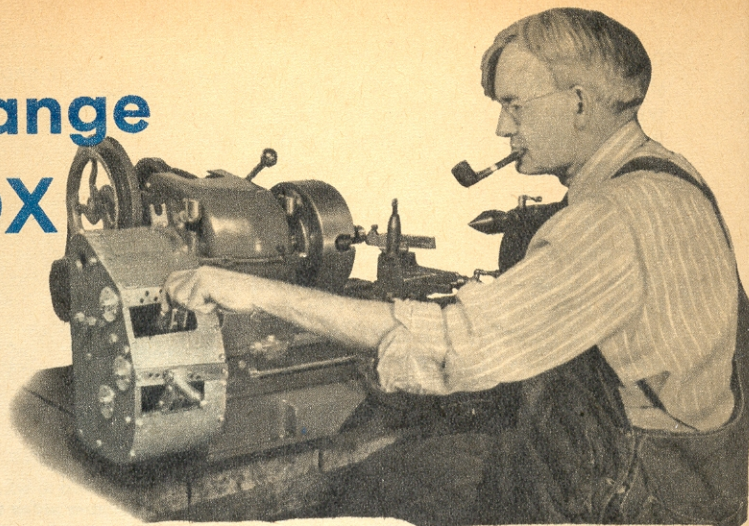


# Quick-Change GEAR BOX

**A lathe attachment  
that will enable you  
to choose any one of  
56 feeds instantly.**

BY B. F. LAWRENCE

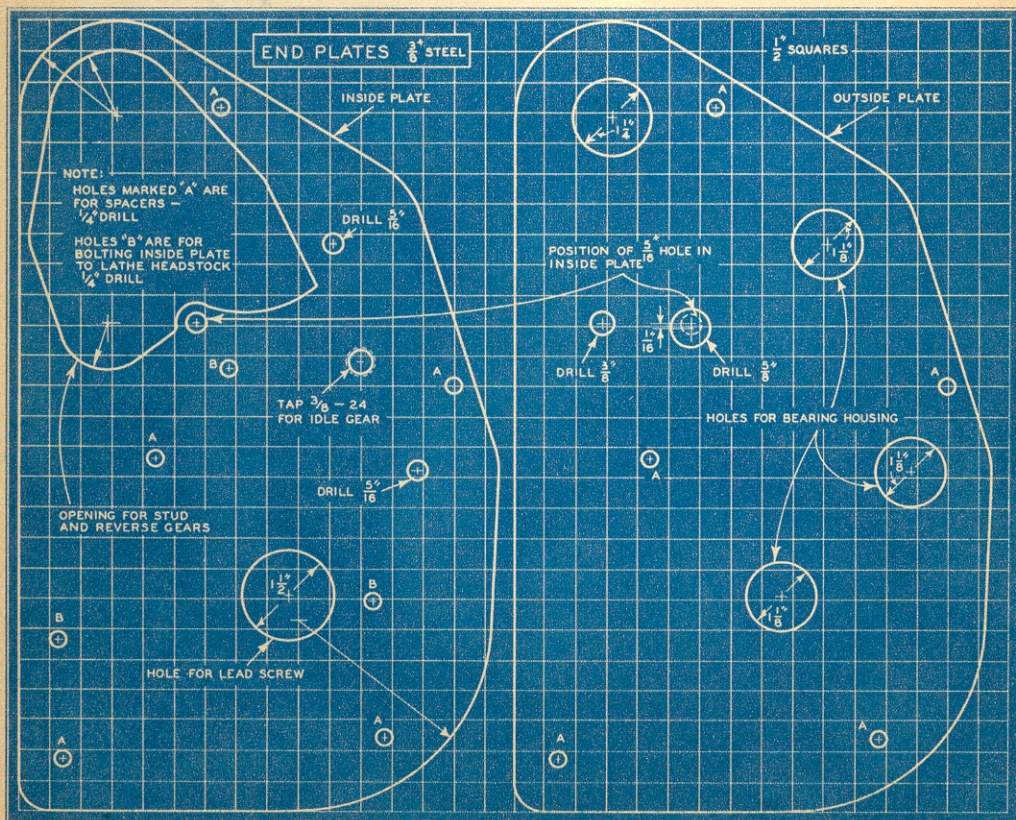


ONE of the most useful attachments for the popular priced small lathe is a quick-change gear box. It is easily constructed and, with slight changes, will fit most of the small lathes now on the market.

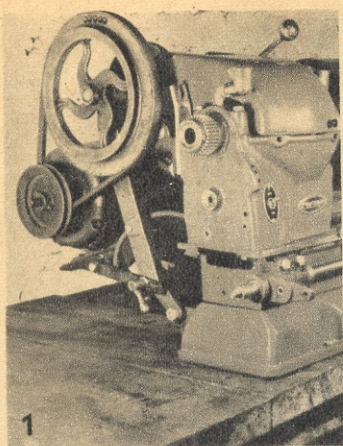
At a first glance, this project may appear a bit complicated but in reality is

very simple. Careful study of the drawings and photographs should make the construction clear. Castings are not required and all work can be done on the lathe itself.

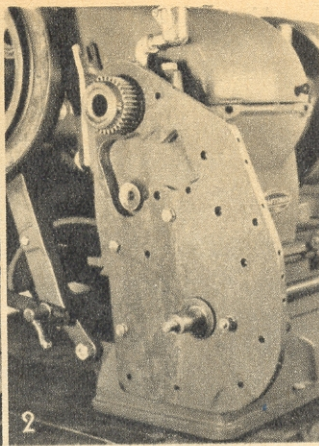
In addition to your regular threading gears, you will need seven more 32 tooth gears and six compound stud gears.



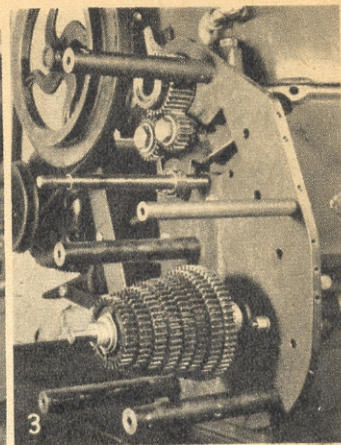




Original threading gears and cover are first removed.



Inner plate of gear box is held secure with four bolts.



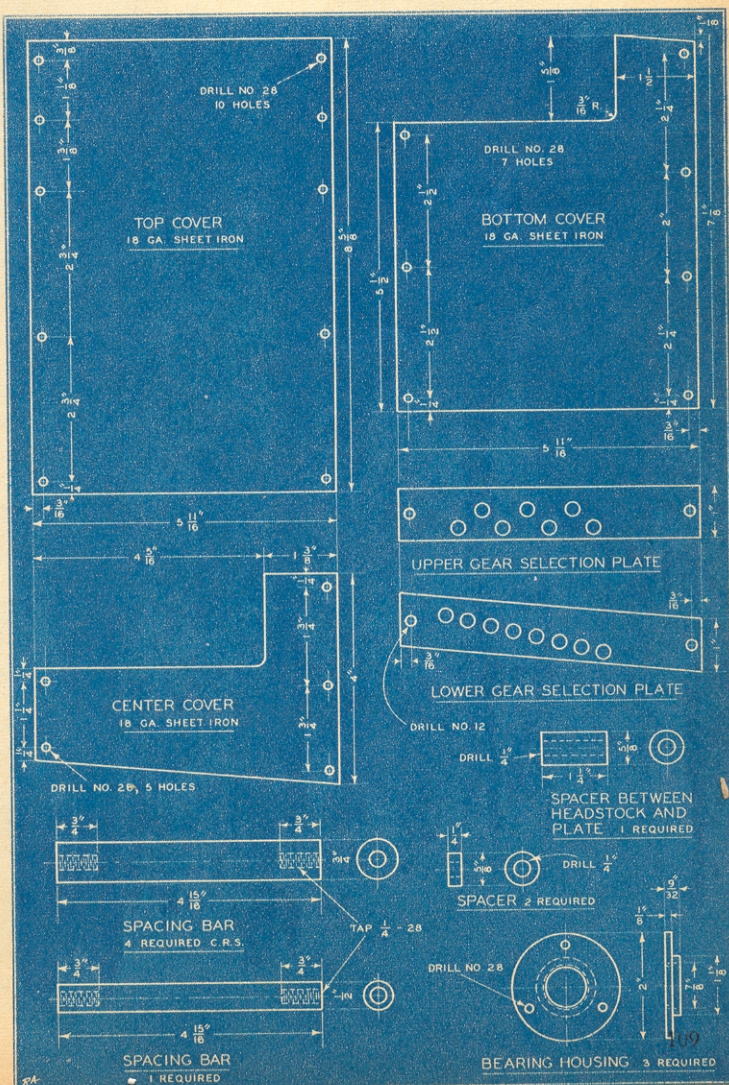
Eight gears are mounted on the lead screw shaft.

Bronze bushings may be used throughout instead of the No. 3 ball bearings.

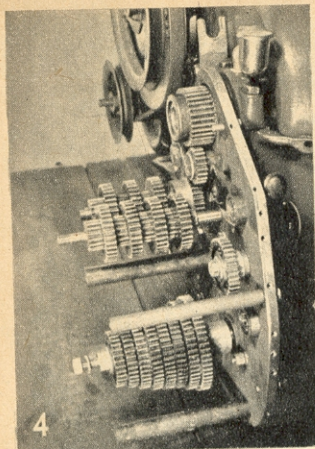
The two end plates are cut from  $\frac{3}{8}$  in. thick steel. Four  $\frac{1}{4}$  in. bolts tapped into the headstock hold one plate securely to the lathe while five steel spacers tie the two plates together.

The stud, on which the reverse lever pivots, is fitted with either a ball bearing or bronze bushing to carry the stud extension shaft. Turn this shaft as shown on the drawing and then press a 32 tooth gear on the large end. The other end carries three compound gears, one of which is keyed as shown. On another shaft are four, free running, compound gears set directly in front and in mesh with these gears. Note that one end of this shaft is turned eccentric, while the other end is fitted with an eccentric bushing. This arrangement is followed throughout and makes possible proper align-

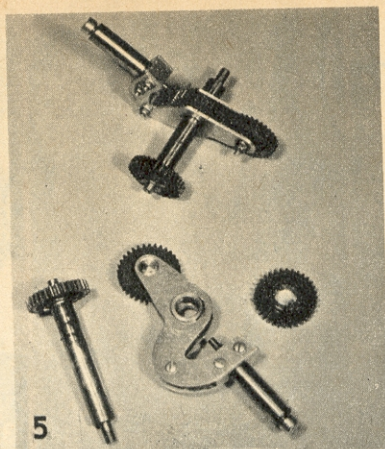
October, 1946



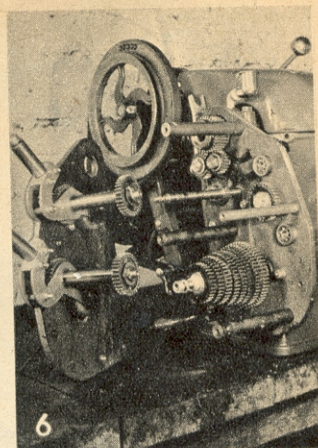




4 After all the gears are in place, add the outside cover plate.



5 The two built-up selector handles are of very simple yet rugged construction.



6 Five spacer bars hold assembly together. Note selector handles.

ment of the gears. It will be necessary to turn an extension shaft for the lead screw upon which are keyed a 32, 36, 40, 44, 46, 48, 52 and a 56 tooth gear. The lead screw is not altered as this shaft merely slides over the key on the end.

Next, turn the sliding gear shafts from  $\frac{3}{4}$  in. diameter cold rolled steel. Mill the  $\frac{3}{16}$  in. keyways and then key a 32 tooth gear onto the end of each. The remainder of the key slot serves to drive the sliding gears. The lower shaft is driven by the upper one through a bushing bolted to the inner plate.

The sliding handles consist of two  $\frac{1}{8}$  in. thick side members bolted at the back to a  $\frac{1}{2}$  in. steel block into which the plunger assembly is pressed. The opposite end is bolted to an eccentric bushing on which the pick-up gear turns. Bronze

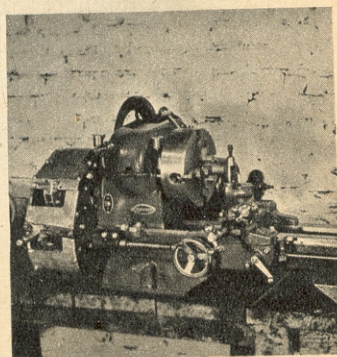
bushings carry each assembly on its shaft.

Bolt the two gear selection plates in place and locate the holes for the plunger by placing the pick-up gear in mesh with each gear with about three thicknesses of paper between them. Drill through the handle with a  $\frac{1}{4}$  in. drill at each position. The holes in the upper plate are numbered 1 to 7 from right to left. The lower ones are lettered A to H from left to right.

Cut the cover plates from sheet iron and fasten in place with 10-32 screws or bolts. The feed chart may be stamped directly on the top cover plate or on a separate piece, riveted on.

The chart below is for lathes having 8 threads per inch on the lead screw. If other than 8 threads—12 we'll say—just use 12 at the first number in the second

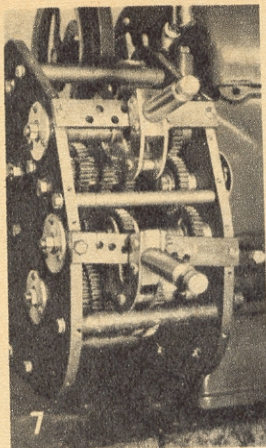
THREADS PER SPINDLE REVOLUTION								
	A	B	C	D	E	F	G	H
1	4	4.5	5	5.5	5.75	6	6.5	7
2	8	9	10	11	11.5	12	13	14
3	16	18	20	22	23	24	26	28
4	32	36	40	44	46	48	52	56
5	64	72	80	88	92	96	104	112
6	128	144	160	176	184	192	208	224
7	256	288	320	352	368	384	416	448



Unit on an Atlas. Feeds can be changed without stopping lathe.

*Mechanix Illustrated*





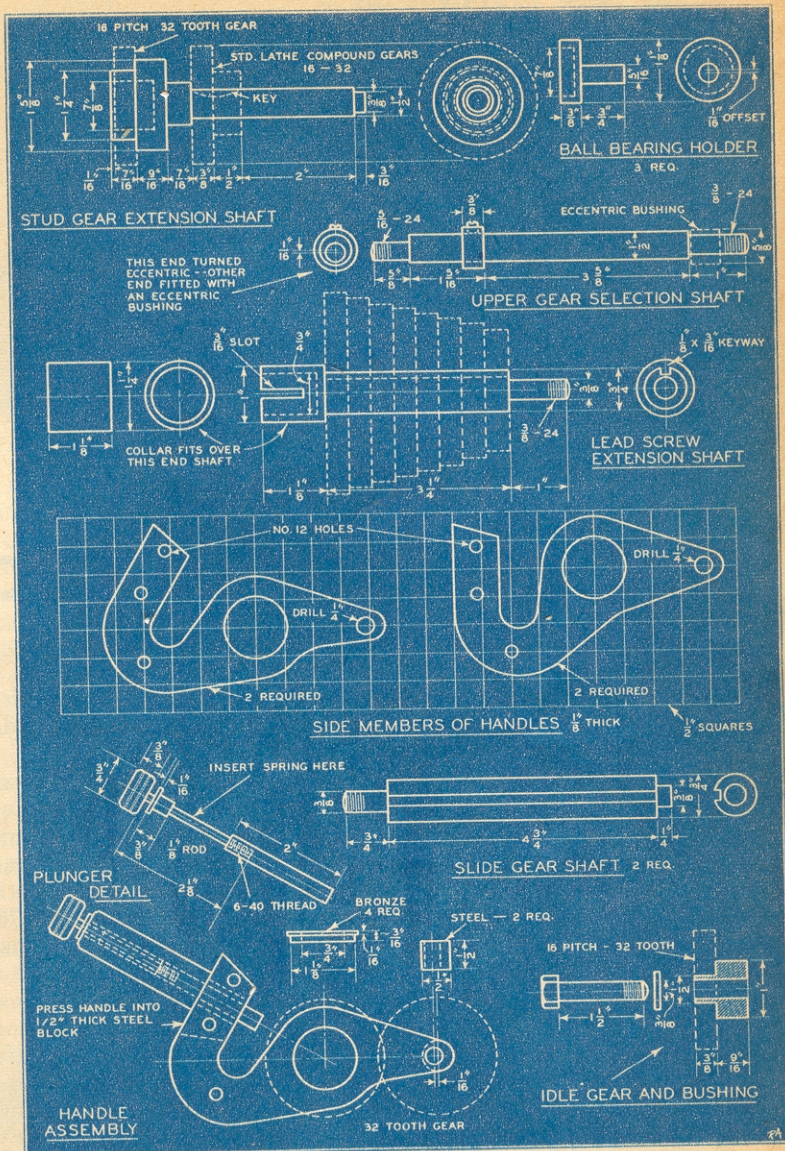
The completed gear box with cover plates removed.

row followed by the next seven numbers following the 12 on this chart. Half each of these numbers for the top row and double for each row below.

The chart in the lower right hand corner of this page shows the feed in thousands per spindle revolution, and greatly facilitates coil winding.

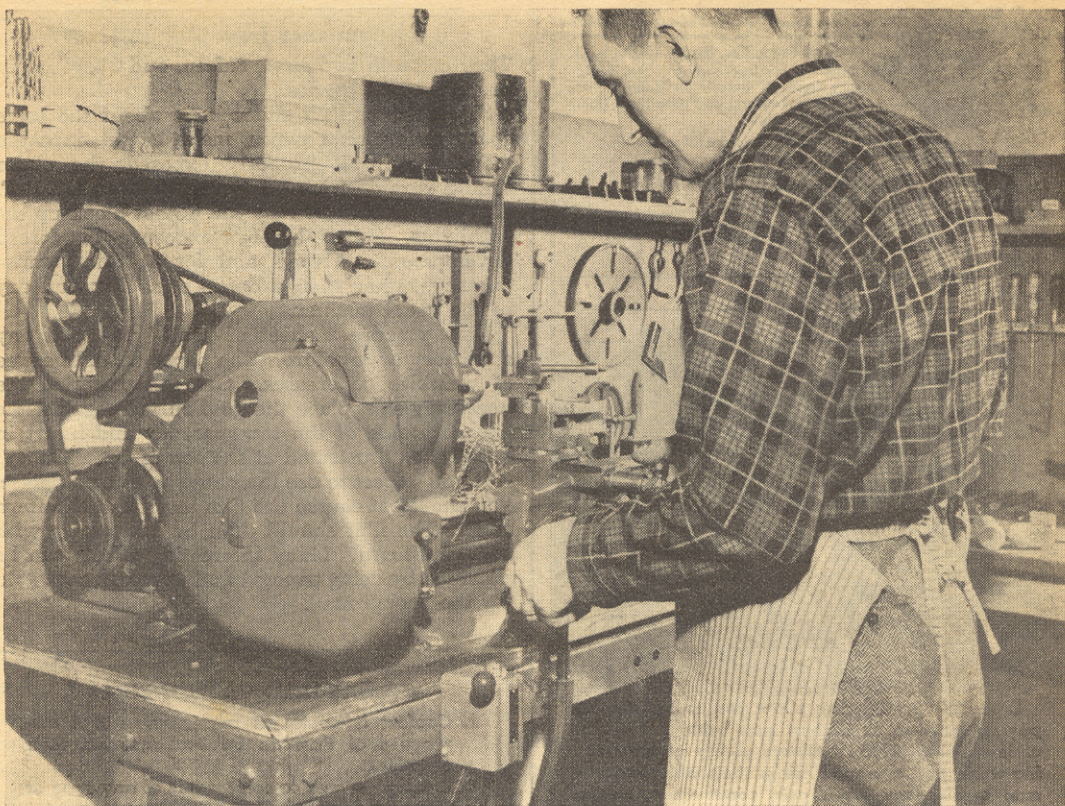
The original gear box was designed and built for a 10-inch Atlas lathe (shown in the photos) and compares favorably with the commercial units now on the market selling for slightly less than one hundred dollars.

The gears comprising the major part of the box are standard equipment and can be purchased from the lathe manufacturer. All stock is easily obtainable from any metal supply house, large hardware store or machine shop.



FEED PER SPINDLE REVOLUTION								
	A	B	C	D	E	F	G	H
1	.250	.222	.200	.182	.174	.167	.154	.143
2	.125	.111	.100	.191	.087	.083	.077	.071
3	.0625	.055	.050	.045	.043	.042	.038	.036
4	.031	.028	.025	.023	.022	.021	.019	.018
5	.0156	.014	.0125	.0114	.0108	.0104	.0096	.0089
6	.0078	.007	.0063	.0057	.0054	.0052	.0048	.0045
7	.0039	.0035	.0032	.0028	.0027	.0026	.0024	.0022





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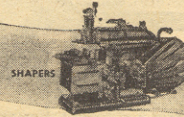
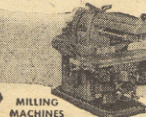
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