Depth of cut, 3-32″; surface speed 109 feet per minute; table feed, 10¼″ per minute.

Total width of cut, top and sides, 9½″; length, 12″. Cutters—2 inserted tooth side milling, 9½″ diameter; teeth of high speed steel; 1 milling, with nicked teeth, 3″ diameter, 6⅛″ long, tool steel.

This is a good example of the combination of tool steel cutters with cutters of high speed steel, as it will be noted,

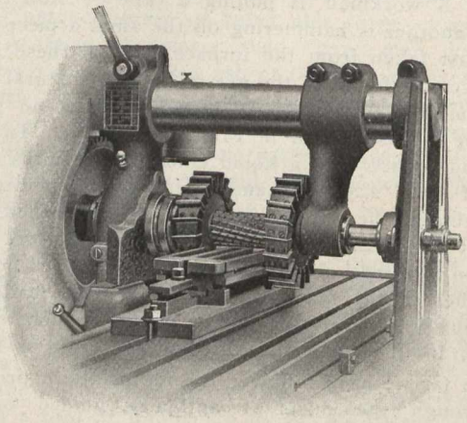

Fig. 1.—Rough Milling the bottom and sides of a Vise Bed.

that while the side mills are running at a comparatively high speed, the speed of the milling cutter is about right for tool steel.

There are two cuts in this operation: Roughing—depth of cut, ⅛″; surface speed, 50 feet per minute; table feed 5″ per minute. Finishing—depth of cut .010″; surface speed 172 feet per minute; table feed, 3¼″ per minute. Width of cut, 8½″; length, 6″.

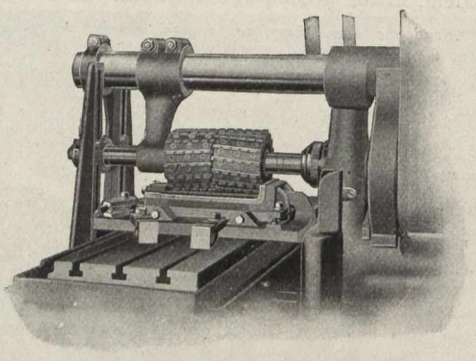

Fig. 2.—Milling the top of a Vise Bed.

The cutter used is an interlocking milling cutter with inserted teeth, nicked, tool steel; diameter, 6″; length, 8½″.

Depth of cut, .020″; surface speed, 156 feet per minute; table feed, 5⅝″ per minute. Cut, top and sides, width, 12 1-16″; length, 12″. Cutters—2 inserted tooth side milling, 9½″ diameter, teeth of high speed steel; 1 milling with spiral teeth, 3″ diameter, tool steel.

There are also two cuts in this operation as follows:—

Roughing.—Depth of cut, 1-16″; surface speed, 105 feet per minute; table feed, 7⅜″ per minute. Finishing.—Depth of cut, .010″; surface speed 89 feet per minute; table feed, 3 5-16″ per minute.

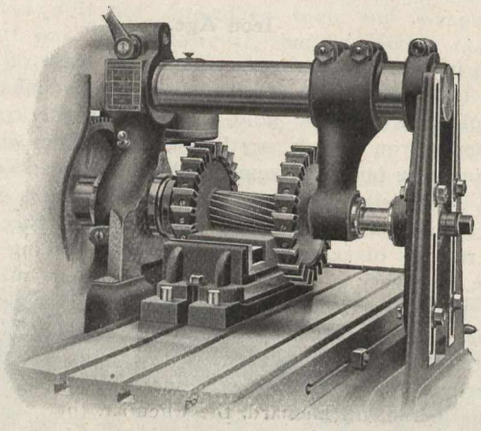

Fig. 3.—Finish Milling the top and sides of a Vise.

Total width of cut, 8″; length, 4⅛″.

Cutters—4 side milling, 6″ diameter. Roughing cutters, high speed steel; Finishing, tool steel.

Attention might be called to one feature in connection with this operation, namely, that the cutters have sharp

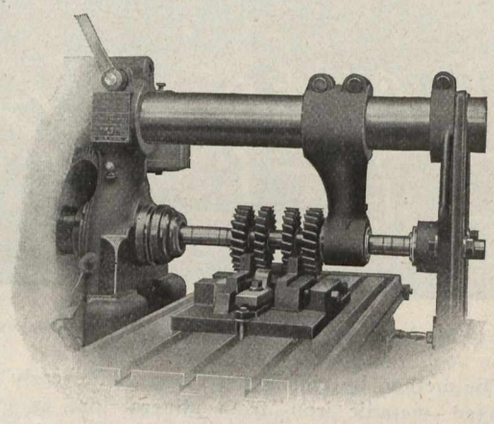

Fig. 4.—Milling the bottom of a Vise Slide.

corners and to insure accuracy of the finished product, they must necessarily be run at a speed that will maintain the sharpness of the corners. If run at a higher speed, the corners would soon become rounded and impair the efficiency of the cutters.

ROBB-ARMSTRONG CORLISS ENGINES

SLOW AND MEDIUM SPEED.

The Robb-Armstrong Corliss engine is designed on the lines of standard Corliss engines of the modern, heavy duty type, the stroke being rather short, giving a compact frame, free from the vibration, which always takes place in the older design of long stroke, girder frame. As shown by the cut, the frame is supported the whole length on the foundation; the crosshead guides and main bearing seats being bored in a special machine at one operation, making them in perfect alignment. The length of stroke is so proportioned that the revolutions of the engines may be anywhere from 90 to 150, and the speeds of pistons and reciprocating parts do not exceed 450 to 600 feet per minute, which is very desirable for use in factories, sawmills, etc., where continuous service is required with the minimum amount of attention.

The special feature of this type of engine is the Armstrong-Corliss valve gear, which is much more simple in construction than the ordinary releasing gear, and will operate successfully at any speed up to 200 revolutions per minute.

The valve gear, shown in the outline sketch, is the invention of Mr. E. J. Armstrong, M.E., the essential feature of it being that there are no springs, dash pots, or disengaging parts, which are usual in the ordinary Corliss valve gear. By the introduction of two small links, A and B, between the wrist plate and bell cranks, the steam valves are caused to open and close quickly, and remain stationary during the remainder of the stroke, the action being almost precisely the same as with the releasing gear invented by George H. Corliss, the advantage being that as this valve gear is positively driven, and does not depend on springs or dash pots for closing, it may be operated at much higher speed than the releasing valve gear.