May 14, 1940.

W. J. LOFSTEDT

2,200,628

PLATE SHAVING MACHINE

Filed Oct. 4, 1938

4 Sheets-Sheet 1

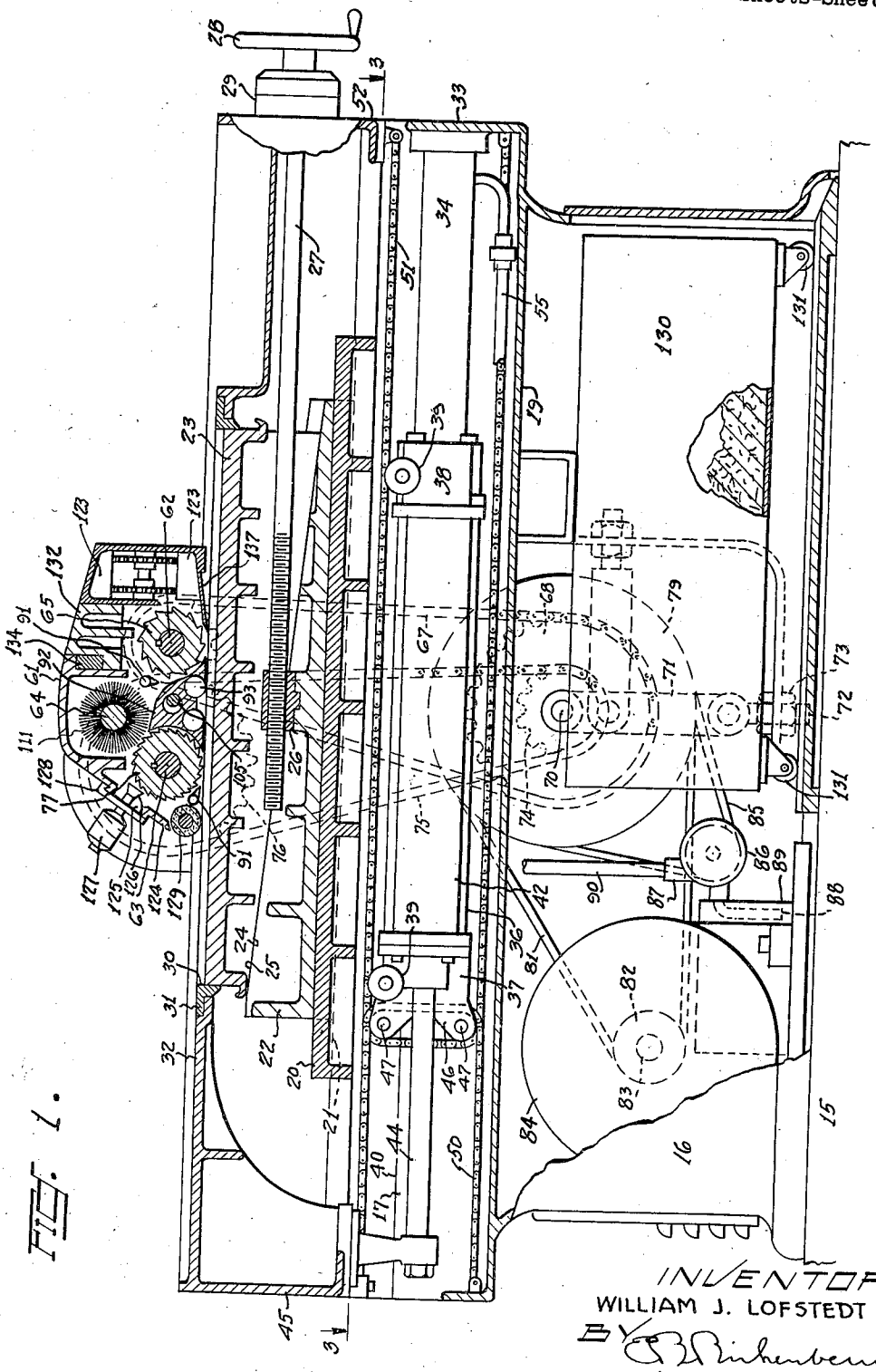


FIG. 1.

INVENTOR
WILLIAM J. LOFSTEDT
BY C. B. Richenberg
ATTORNEY

May 14, 1940. W. J. LOFSTEDT 2,200,628

PLATE SHAVING MACHINE

Filed Oct. 4, 1938 4 Sheets-Sheet 2

FIG. 2.

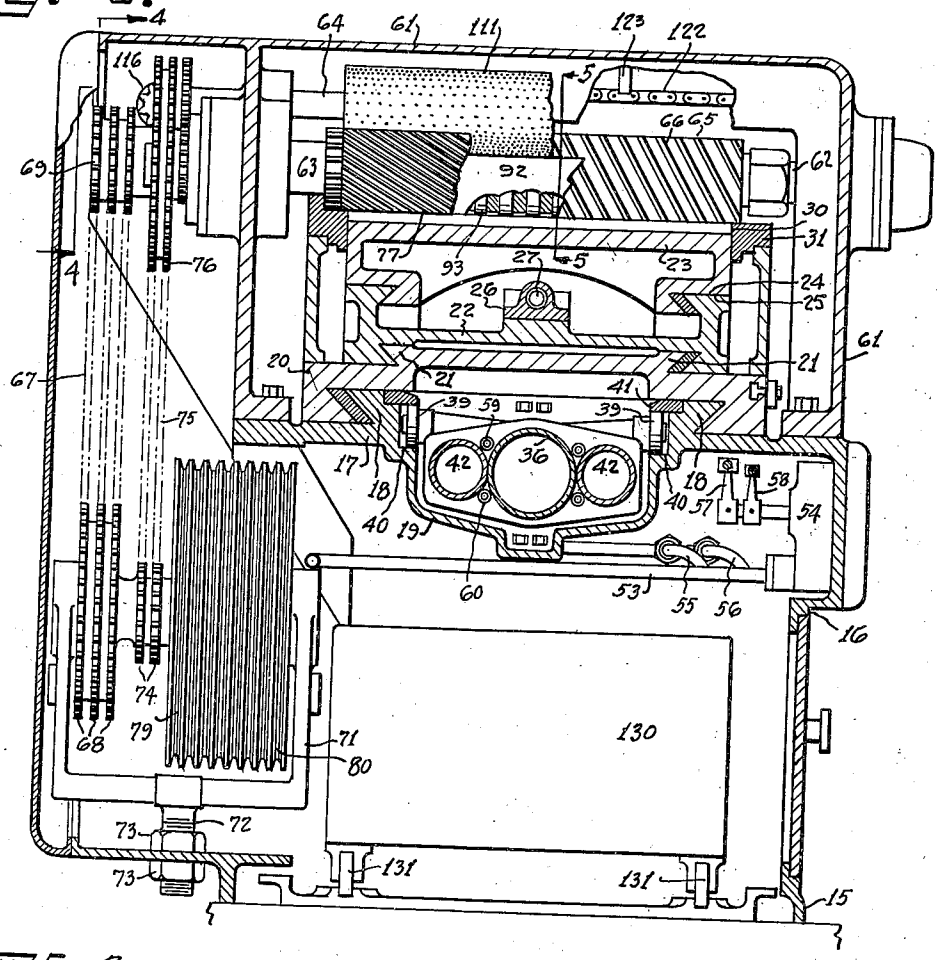
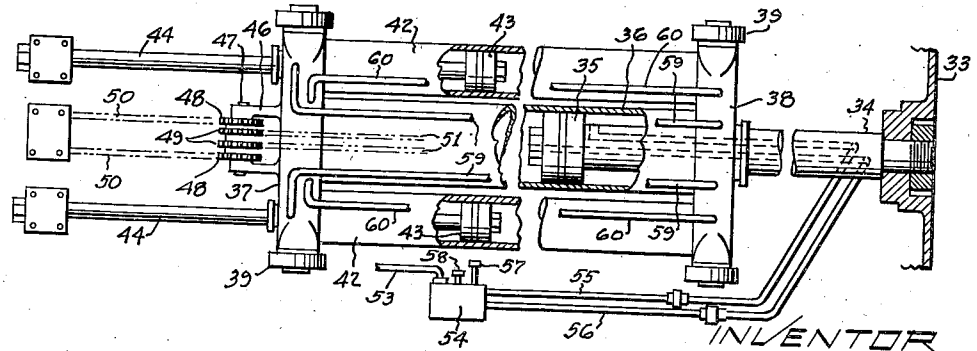


FIG. 3.



INVENTOR
WILLIAM J. LOFSTEDT
BY E. B. Rinkenbach
ATTORNEY

May 14, 1940. W. J. LOFSTEDT 2,200,628

PLATE SHAVING MACHINE

Filed Oct. 4, 1938 4 Sheets-Sheet 3

FIG. 4.

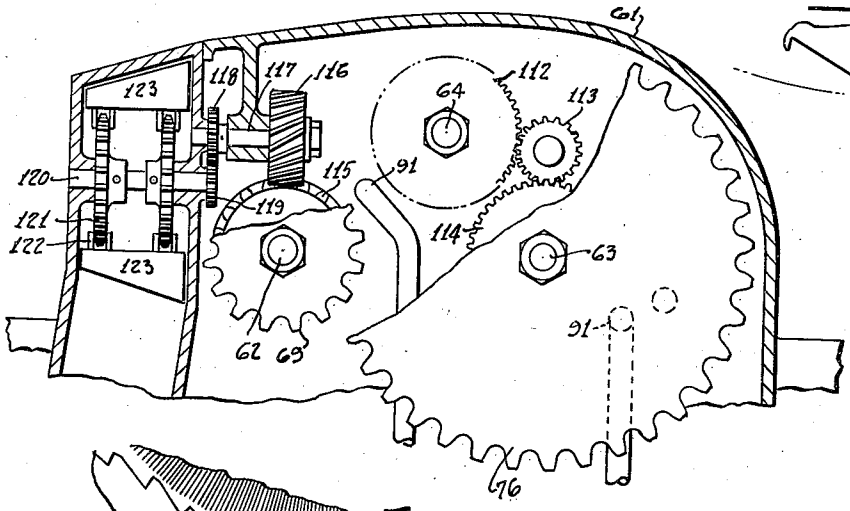


FIG. 7.

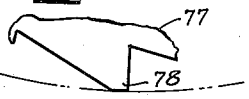


FIG. 5.

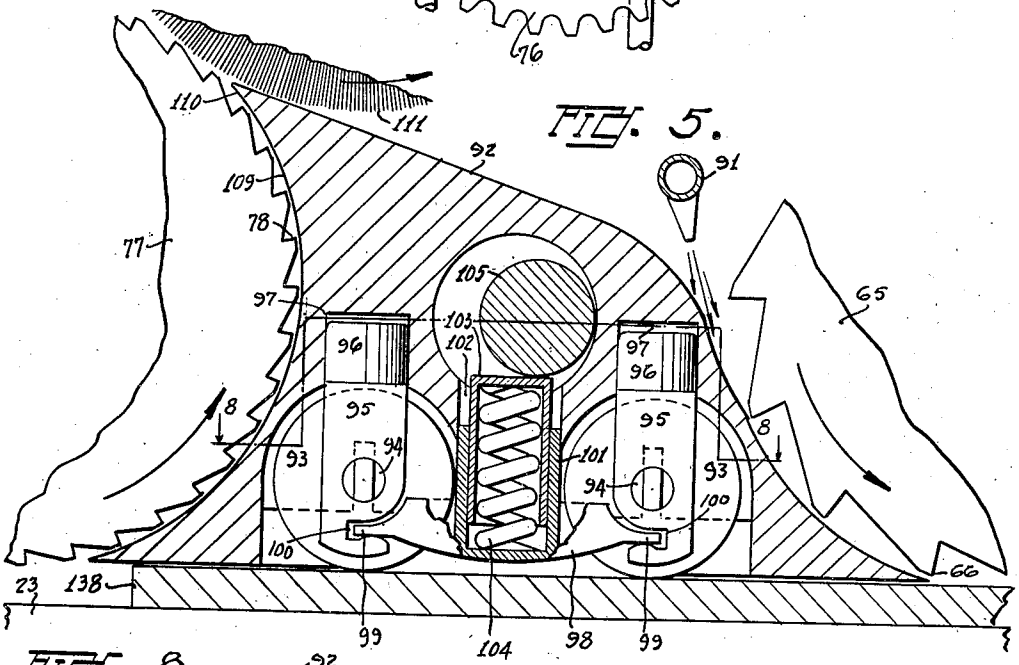


FIG. 8.

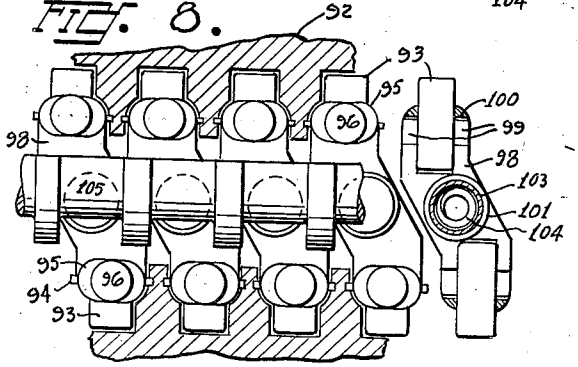
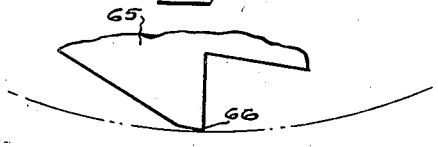


FIG. 6.



INVENTOR
WILLIAM J. LOFSTEDT
BY C. B. Richenbaum
ATTORNEY

May 14, 1940. W. J. LOFSTEDT 2,200,628

PLATE SHAVING MACHINE

Filed Oct. 4, 1938 4 Sheets-Sheet 4

FIG. 9.

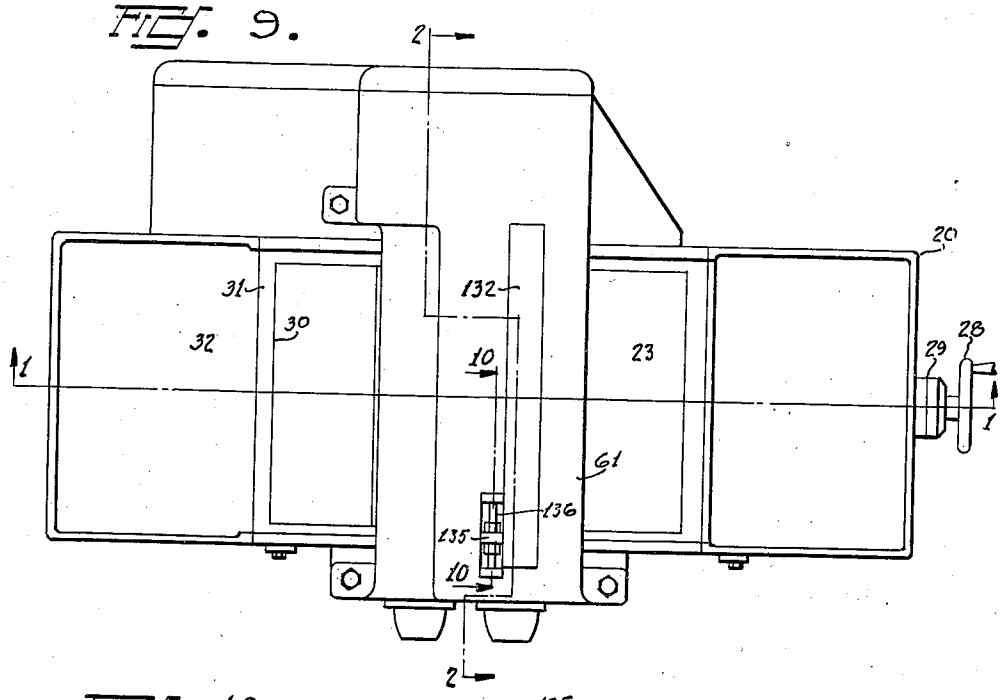


FIG. 10.

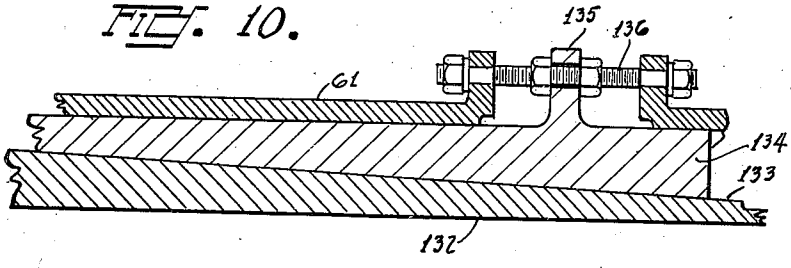


FIG. 11.

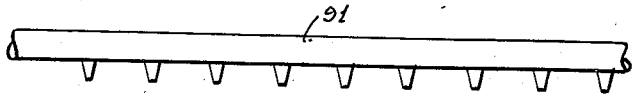
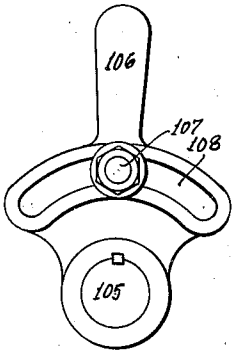


FIG. 12.



INVENTOR
WILLIAM J. LOFSTEDT
BY C. B. Richenberg.
ATTORNEY

Patented May 14, 1940 2,200,628

UNITED STATES PATENT OFFICE

2,200,628

PLATE SHAVING MACHINE

William J. Lofstedt, Portland, Oreg.

Application October 4, 1938, Serial No. 233,267

7 Claims. (Cl. 90—11)

This invention relates generally to the art of printing, and particularly to a plate shaving machine.

The main object of this invention is the construction of a machine which will satisfactorily shave printing plates and to be especially adapted for the shaving of very thin plates.

The second object of this invention is the construction of a plate shaving machine employing a combination of roughing and finishing cutters which will increase the speed of operation, produce a smoother surface and tend to level out the plate to a flat surface.

The third object is the construction of a plate shaving machine, the use of which will overcome many of the difficulties ordinarily rising from the plate shaving operations themselves.

The fourth object is the construction of the class described having an improved form of hold-down mechanism.

The fifth object is the construction of the class described having an improved form of operating mechanism for the table thereof.

These and other objects are accomplished in the manner set forth in the following specification as illustrated in the accompanying drawings, in which:

Fig. 1 is a longitudinal vertical section through the machine.

Fig. 2 is a vertical section taken along the line 2—2 in Fig. 9.

Fig. 3 is a section taken along the line 3—3 in Fig. 1.

Fig. 4 is a section taken along the line 4—4 in Fig. 2.

Fig. 5 is an enlarged fragmentary section taken along the line 5—5 in Fig. 2.

Fig. 6 is a fragmentary enlarged view of the roughing cutter tooth.

Fig. 7 is a fragmentary enlarged view of a finishing cutter tooth.

Fig. 8 is a fragmentary broken plan section taken along the line 8—8 in Fig. 5.

Fig. 9 is a plan of the entire machine.

Fig. 10 is a fragmentary section taken along the line 10—10 in Fig. 9.

Fig. 11 is a side elevation of a portion of a spray pipe.

Fig. 12 is a side elevation of an operating lever for the eccentric shaft.

Similar numerals refer to similar parts throughout the several views.

Referring in detail to the drawings, there is shown a base 15 upon which is disposed the pedestal 16 of the machine. Upon the pedestal 16 is mounted a bed 17 on the upper side of which are formed a pair of dovetail guides 18 which are joined by the downwardly extending housing 19.

On the guides 18 is mounted the slide 20 which in turn has a dovetail guide 21 formed thereon. On the guide 21 is mounted the dovetail wedge 22 which supports the table 23 whose underside 24 is inclined and rests upon the inclined top 25 of the wedge 22. To the wedge 22 is secured a nut 26 which receives the table elevating screw 27 which is manually operated by the hand wheel 28, preferably through a reduction gearing of any suitable type contained within the casing 29. The screw 27 journals on the slide 20. The table 23 is vertically movable within the rectangular opening 30 formed within the frame 31 which is secured to the top 32 of the machine.

To the end 33 of the pedestal 16 is a piston rod 34 on the end of which is secured a piston 35 which is mounted within the central cylinder 36. The cylinder 36 is supported between the ends 37 and 38 of a carriage whose wheels 39 ride upon the tracks 40 formed in the sides of the housing 19. Cover plates 41 are secured to the guides 18 on the top sides of the wheels 39. Between the ends 37 and 38 are also mounted the smaller cylinders 42 in each of which is disposed a piston 43 to which is connected a rod 44. The two rods 44 are secured to the end 45 of the slide 20 of which the top 32 forms a part.

Projecting from the ends 37 are the brackets 46 which support the shafts 47 on which are mounted the sprocket wheels 48 and 49. Around the sprocket wheels 48 are passed the chains 50 one end of which is secured to the pedestal 16 and the other end of which is secured to the end 45 of the slide 20.

Around the sprocket wheels 49 are passed the chains 51, one end of each of which is secured to the end 33 of the pedestal 16, whereas the other ends of the chains 51 are secured to the ends 52 of the slide 20. Fluid pressure is delivered from a convenient source through a pipe 53 to a control valve 54 through which fluid may be admitted to either of the pipes 55 or 56 under the control of the levers 57 and 58.

The pipe 55 communicates with one side of the piston 35 whereas the pipe 56 communicates with the opposite side of the piston 35. One end of the cylinder 36 communicates by means of the pipes 59 with the opposite ends of the cylinders 42. The pipes 60 connect the cylinders 36 and 42 in a reverse direction, the purpose of the mechanism shown in Fig. 3 being simply to provide a hy-

draulic means for operating the slide 20 without requiring excess movement on the part of the actuator.

Mounted on the bed 17 is a cutter housing 61 within which journal the roughing cutter shaft 62, the finishing cutter shaft 63 and the brush shaft 64. Mounted on the roughing cutter shaft 62 is a roughing cutter 65 having spiral cutting edges 66, the shape of which will be seen in Fig. 6.

Rotation is supplied to the shaft 62 by means of the chain 67 which passes around the sprocket wheels 68 and 69. The sprocket wheels 69 are secured on the shaft 62. The sprocket wheels 68 are secured on the shaft 70 which is supported by the standards 71 on the threaded post 72 which is held in position by the nuts 73. On the shaft 70 are also mounted the sprocket wheels 74 whose chain 75 passes around the sprocket wheels 76 on the finishing cutter shaft 63. On the shaft 63 is mounted a finishing cutter 77 whose cutting edges 78 are concentric with the shaft 63. The form of the finishing cutter tooth is shown in Fig. 7.

On the shaft 70 are mounted the multiple drive sheaves 79 and 80. The sheaves 79 carry the V-belts 81 which pass around the sheaves 82 on the shaft 83 of the motor 84. The sheaves 80 are provided with a belt 85 which passes around the sheave 86 by means of which the pump 87 is driven. The pump 87 is provided with an intake pipe 88 which communicates with a reservoir 89. A discharge pipe 90 is used to convey the lubricant to the spray pipes 91.

Between the cutters 65 and 77 is disposed a housing 92 for the hold-down rollers 93 whose shafts 94 are supported in the vertically slidable members 95 whose upper ends 96 are disposed within the openings 97 formed within the housing 92. The yoke 98 is disposed between the members 95 and has its ends 99 projecting into the slots 100 which are formed within the members 95. The yoke 98 is provided with an upturned shank 101 which is slidable within the opening 102 in the housing 92.

Mounted in the shank 101 is a sleeve 103. A spring 104 serves to urge the members 103 and 98 apart. The upper end of the member 103 bears against the eccentric shaft 105 whose position is determined by means of the hand lever 106 and fixed by means of the bolt 107 which occupies an arcuate slot 108 in the lever 106. It can be seen in Fig. 8 that there are a plurality of rollers 93 and a plurality of eccentrics 105 by means of which the pressure on the rollers 93 may be varied at will.

It is noted that the housing 92 has its side 109 curved to conform with the finishing cutter 77 and that this curvature extends well up to the point 110 which is just below the brush 111. The brush 111 is mounted on the shaft 64 which has secured thereon a gear 112 which meshes with the idler pinion 113 which in turn meshes with the gear 114 on the finishing cutter shaft 63.

On the roughing cutter shaft 62 is mounted a spiral gear 115 which meshes with a spiral pinion 116 which is secured on the shaft 117. On the shaft 117 is secured a gear 118 which meshes with the gear 119 on the shaft 120 which carries the conveyor drive sprockets 121 whose chains 122 carry the flights 123.

Over the finishing cutter 77 is placed the inclined hood 124 having a slot 125 formed horizontally through same. In the slot 125 is disposed the grinding wheel 126 by means of which the finishing cutter may be maintained in the desired condition. A motor 127 is mounted on the plate 128 which is slidable along the slot 125. A roller 129 of felt or other suitable material is mounted on the outer side of the finishing cutter 77.

There is also provided a chip box 130 which is mounted on the casters 131.

It will be noted that the roughing cutter shaft 62 is supported on the vertically movable slide 132 which is mounted in the cutter housing 61. The slide 132 is provided with an inclined face 133 which is separated from the housing 61 by the wedge 134 having an outwardly extending lug 135 through which extends the bolt 136 by means of which the lateral position of the wedge 134 may be varied and consequently the vertical position of the roughing cutter 65 may be varied.

It is desirable to provide a plate 137 which extends from the underside of the roughing cutter 65 along the underside of the conveyor chains 122. There is illustrated a printing plate 138 which may be of any of the kinds used in the printing art.

The operation of the machine is as follows:

Assuming that the printing plate 138 is to be shaved to a predetermined thickness, it is placed face down upon the table 23 which by means of the hand wheel 28 is moved to provide the required clearance under the finishing cutter 77. The roughing cutter 65 is then adjusted by means of the bolt 136 to bring the thickness of the plate to a dimension which can be handled by the finishing cutter 77.

It will be noted that the roughing cutter 65 is driven at a higher speed than is the finishing cutter 77 and that the roughing cutter 65 has its cutting edges formed at a smaller spiral than are the cutting edges of the finishing cutter 77. It will also be noted that the work engaging face of the finishing cutter 77 is concentric with its axis providing thereby a combined cutting and burnishing and holding down action which results in a perfectly smooth and uniformly finished surface on the back of the printing plate 138 when the work is completed. The plate 138 having been placed upon the table 23 is placed in the corner to which it would naturally be moved by the cutting action. As the button 57 is depressed, it causes the slide 20 to move to the left as viewed in Fig. 1 and causes the plate 138 to move first beneath the cutter 65 where the major portion of its exterior metal is removed and thence to pass under the hold-down rollers 93 and thence under the finishing cutter 77 where the shaving operation is completed.

It will be observed that as the work progresses, the larger chips are thrown by the roughing cutter 65 toward the conveyor chains 122 and that the brush 111 will remove from the finishing cutter 77 the particles which adhere thereto and throw them upon the roughing cutter 65 from whence they are delivered to the conveyor chain 122.

In most cases it is desirable to keep a supply of lubricant playing upon the cutters 65 and 77. Should the finishing cutter 77 become dull it is only necessary to place the grinding wheel 126 in position and slide it longitudinally as the cutter 77 is revolved.

The function of the roller 129 is merely to hold the plate 138 down as it leaves the finishing cutter 77.

It must be understood that while I have illustrated certain details of construction in connection with this invention that the exact nature

thereof is of little importance. For example, there may be employed any type of drive mechanism for the cutters or for operating the table 23, or any suitable type of control valve mechanism for the hydraulic actuator may be used without departing from the spirit of this invention.

I claim:

1. A plate shaving machine having in combination a vertically adjustable table having side and end stops thereon, means for moving said table horizontally, a finishing cutter disposed above said table, a roughing cutter adjustably disposed above said table and means for varying the relative vertical positions of said cutters.

2. A plate shaving machine described in claim 1 together with a grinding wheel associated with said finishing cutter and having means for slidably moving said wheel in parallelism with the axis of the finishing cutter.

3. The plate shaving machine described in claim 1 together with a revolvable brush adapted to engage the cutting face of said finishing cutter and sweep materials therefrom toward said roughing cutter.

4. The plate shaving machine described in claim 1 together with a plurality of spring urged rollers adapted to bear upon a plate as said plate passes between said cutters.

5. A plate shaving machine as described in claim 1 together with a conveyor disposed along the discharge side of said roughing cutter adapted to move chips laterally therefrom.

6. A plate shaving machine having in combination a pedestal, a horizontal bed disposed on said pedestal, a vertically adjustable and horizontally movable table mounted on said bed, said table having side and end stops thereon, a horizontal finishing cutter mounted across said table, a revolvable brush associated with said finishing cutter, a roughing cutter adjustably mounted with relation to said finishing cutter and a plurality of hold-down rollers disposed between said cutters, said cutters being characterized by having the edges of both cutters spirally formed and by having the cutting face of the finishing cutter concentric with the axis thereof and set at a lesser spiral angle than are the cutting edges of the roughened cutters.

7. The plate shaving machine described in claim 6, together with means for supplying lubricant to the cutter thereof.

WILLIAM J. LOFSTEDT.