Feb. 6, 1951 R. ABERLE 2,540,227

POWER CORNER CUTTER

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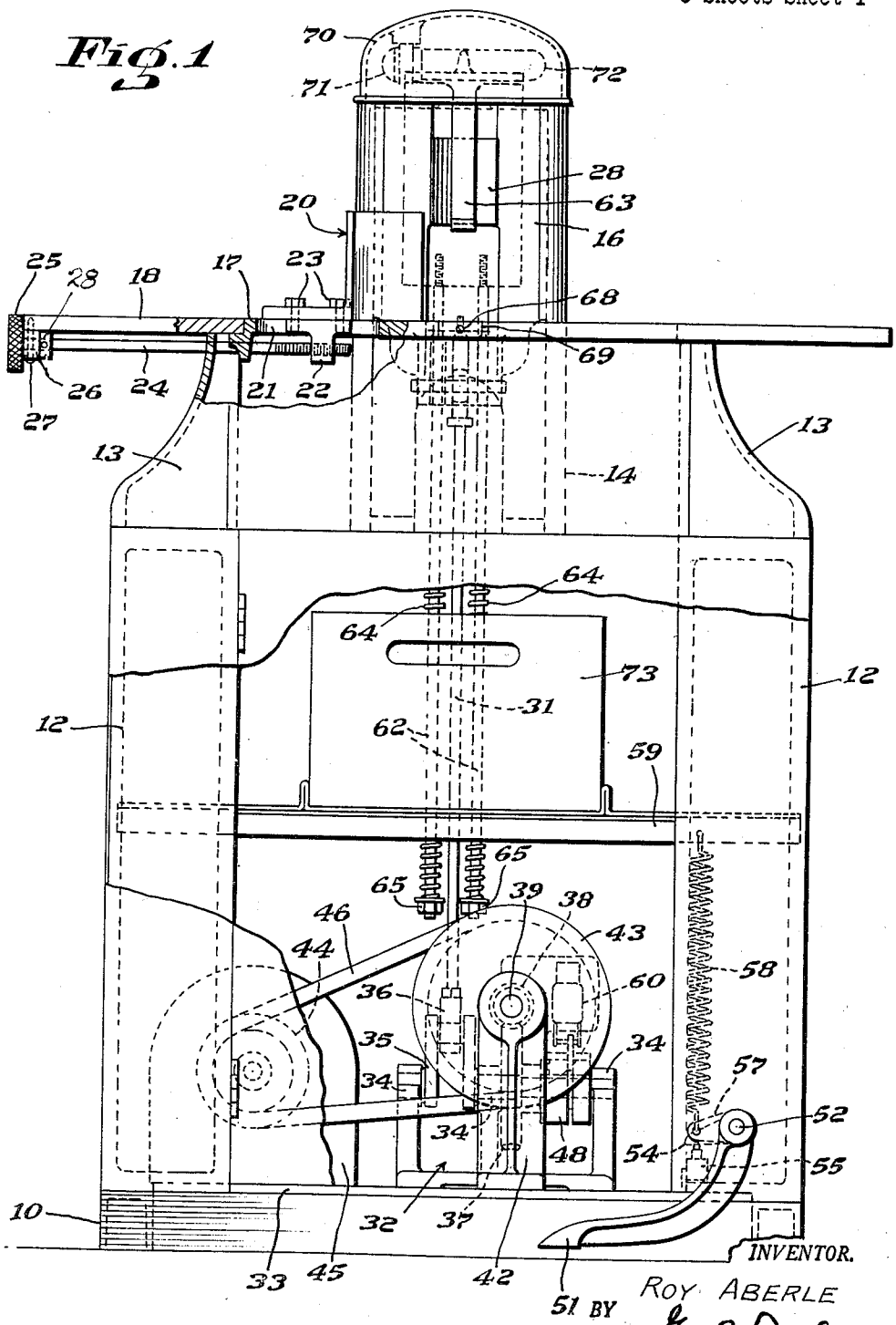
Fig. 1



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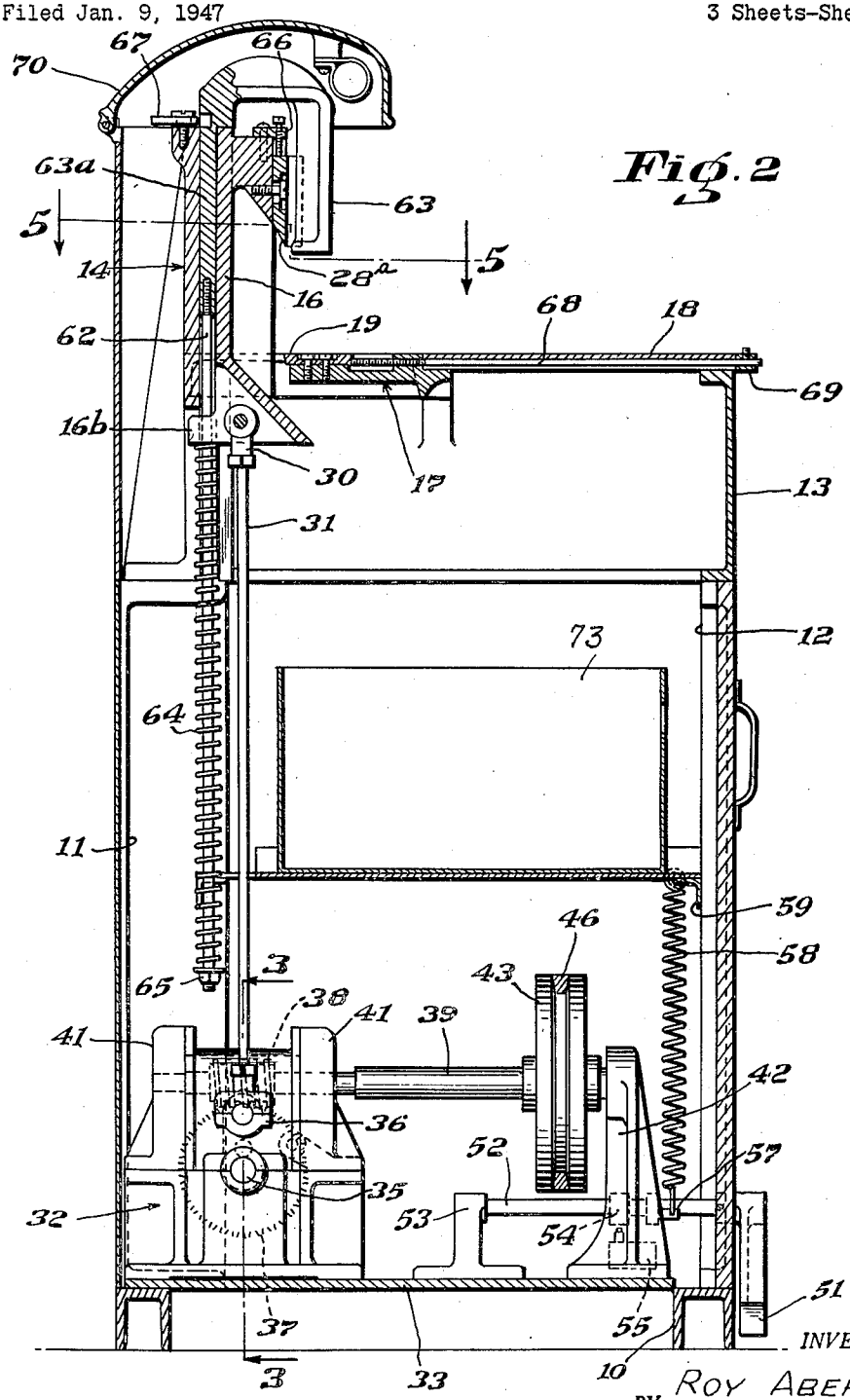

Fig. 2

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Fig. 3

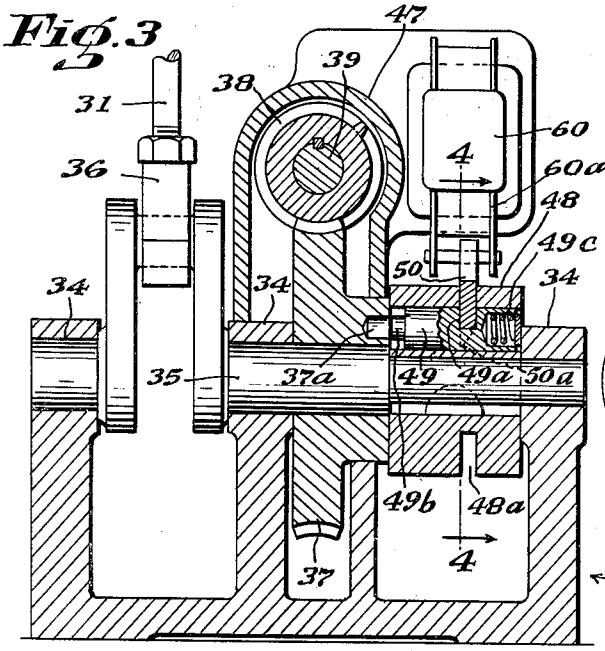


Fig. 4

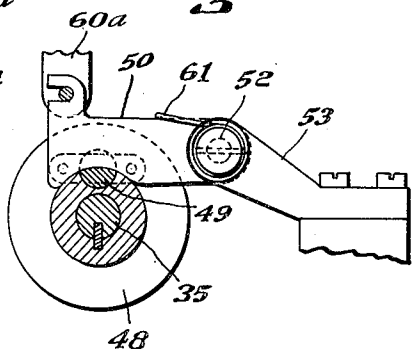
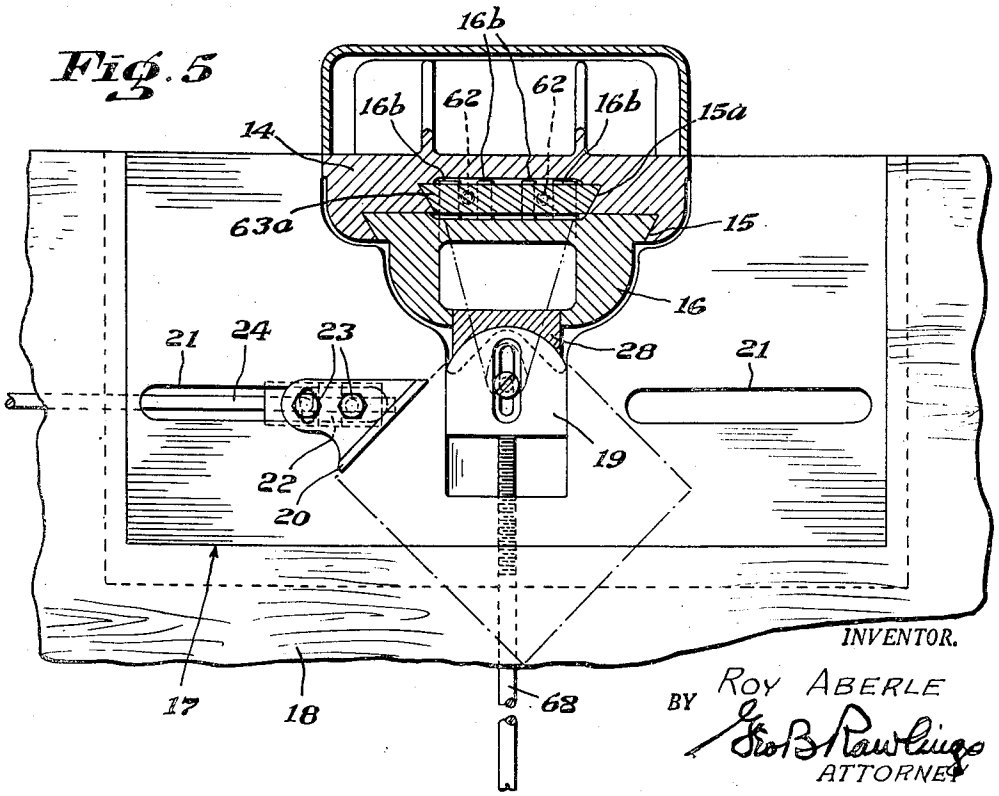


Fig. 5



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UNITED STATES PATENT OFFICE

2,540,227

POWER CORNER CUTTER

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Application January 9, 1947, Serial No. 721,044

6 Claims. (Cl. 164—51)

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My present invention relates to cutting machines, particularly to machines for cutting or punching holes, slots, or shapes in paper, and more particularly to machines for cutting or trimming the corners of sheets of paper to any desired contour or radius.

An object of the invention is an improved machine for cutting or punching holes, slots, or irregular shapes in a pile of sheets of paper or like material.

Another object is an improved machine for cutting or trimming the corners of a stack of sheets to any desired contour or radius.

A further object is the provision of a simple, durable, and compact mechanism for the binding and cutting heads in a machine of this character.

A further object is an accurate and easy adjusting means for the binding and cutting heads.

A still further object is the provision of means for confining the cut off chips resulting from the operation of the machine within a given space for ready removal.

Other objects and novel features of the construction and operation of the parts comprising my machine will appear as the description of the invention progresses.

In the accompanying drawings illustrating a preferred embodiment of my invention:

Figure 1 is a front elevation; partly broken away.

Figure 2 is a side elevation, partly in section.

Figure 3 is an enlarged sectional elevation taken on the line 3—3 of Fig. 2, and looking in the direction of the arrows.

Figure 4 is a sectional view, taken on the line 4—4 of Fig. 3, and looking in the direction of the arrows, and

Figure 5 is a sectional plan view, taken on the line 5—5 of Fig. 2, and looking in the direction of the arrows.

Referring to the drawings there is shown a base 10, preferably of cast iron, and of any suitable dimensions, having secured thereto and extending upwardly therefrom, rear pedestal legs 11 and front pedestal legs 12. Mounted on the top of the legs 11 and 12 and bolted thereto is an apron 13.

The base 10, legs 11 and 12, and apron 13 constitute an open structure to be later closed with suitable side plates and door. However, these have not been shown, nor will they be referred to further, as they are not of the essence of the present invention. Bolted to the rear legs 11 is a frame 14 having formed therein a slideway 15 in which is mounted for reciprocation a cutter slide 16.

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Also formed in the frame 14, in the rear of the slideway 15 and lying parallel to such slideway 15 (see Fig. 5) is a clamp slideway 15a in which is slidably mounted the clamp member or binder slide 63a which carries the clamp or binder foot 63.

A cast iron table section 17 is mounted on and secured to the top of the apron 13 and is surrounded by a wood table 18. Secured to the table section 17, in any suitable manner, is a stationary cutting die 19 (see Fig. 5). Secured to the cast iron table section 17, are right and left hand side gauges 20. For clearness of illustration, the left one only of such gauges is shown in the drawings.

The gauge mechanism consists of slots 21 formed in the table 17 in which slide corner gauge clamps 22, one only of which is shown. Each side gauge 20 is secured to the top of its gauge clamp 22 by bolt 23. Threading into a boss on the lower face of each clamp 22 is the inner end of a shaft 24 having secured to its outer end a gauge adjusting knob 25. Each shaft 24 is mounted in a bearing or guide 26 (see Fig. 1) secured to the under side of table 18 by screws 27 and prevented from longitudinal movement with respect to said table by adjusting set screw collar 28. By rotating the shaft 24, the gauge 20 may be positioned as desired.

Cutter slide 16 slides within slideway 15 and carries a cutting knife 28a (see Fig. 2). At the lower end of cutter slide 16 is located a transverse connecting rod pin on which is mounted a link bearing 30 secured to the upper end of a connecting rod 31.

Connecting rod 31 extends downwardly to a reduction driving unit 32 (see Figs. 1 and 2) mounted on plate 33 which is secured to base 10. Mounted on and forming part of the reduction driving unit 32 and spaced apart from each other are crankshaft bearings 34 (see Fig. 3) in which is rotatably mounted a crankshaft 35. On the crank portion of the crankshaft 35 is rotatably mounted a connecting rod bearing 36 secured to the lower end of connecting rod 31.

On the crankshaft 35 adjacent the middle bearing 34 is rotatably mounted a worm gear 37 which meshes with and is driven by a worm 38. Worm 38 is secured to a worm shaft 39 which is rotatably mounted in suitable bearings in a bracket 41 (see Fig. 1) forming part of the reduction unit 32 and in a bracket 42 secured to plate 33.

On worm shaft 39, adjacent bracket 42, is secured a combined flywheel and belt pulley 43, which is in alignment with a driving pulley 44 mounted on the shaft of a continuously operated

motor 45, secured to plate 33. Over pulleys 43 and 44 runs a V-belt 46 by means of which the flywheel and belt pulleys are rotated. Worm 38 is preferably enclosed in a housing or cover 47.

Keyed to the crankshaft 35 is a clutch member 48 which contains an engaging pin 49 (see Fig. 3) held under tension by spring 49c and controlled by a tripping lever 50 which in turn is controlled by a foot pedal 51. The foot pedal 51 is secured to a treadle shaft 52 rotatably mounted at one end in a bearing 53, and at its other end in a bearing formed in the right front leg 12. Secured to the treadle shaft 52 is a switch contact 54 which controls the contact of a micro-switch 55 secured to bracket 42.

On treadle shaft 52 is a spring anchor 57 to which is secured the lower end of a switch release spring 58, the upper end thereof being secured to the front shelf bracket 59.

The engaging pin 49 is slidable in the clutch member 48 parallel to the crankshaft 35, and has on the end adjacent the worm gear 37 a cylindrical reduced portion 49b (see Fig. 3) which is adapted to engage in a hole 37a in the hub of the worm gear 37. The engaging pin 49 is provided with a transverse groove 49a in which fits the lower edge of the tripping lever 50.

Also, the clutch member 48 is provided with a circumferential groove 48a of the same width as the groove 49a in the engaging pin 49, and of a depth that will ensure the lower edge of the tripping lever 50 engaging with the engaging pin 49.

The engaging end of the tripping lever 50 is beveled, as indicated at 50a in Fig. 3, and the travel of the reduced portion 49b of the engaging pin 49 is sufficient to permit locking the worm gear 37 to the clutch member 48, but not sufficient to move the transverse groove 49a of such engaging pin 49 completely out of register with the groove 48a in the clutch member 48. Therefore, the beveled end 50a of the tripping lever 50 will always be able to move the engaging pin 49 back to its normal or inoperative position, as shown in Fig. 3.

The tripping lever 50 is swivelly connected to the lower end of the plunger 60a of a solenoid 60 (see Fig. 4) and a spring 61, mounted on the treadle shaft 52, constantly urges the free end of the tripping lever 50 downwardly in the groove 48a of the clutch member 48.

The switch 55 controls the electrical circuit through the solenoid 60 from any convenient electrical source. By energizing the solenoid 60, the trip lever 50 is raised out of engagement with clutch pin 49, thereby releasing such pin 49 so that the spring tension applied to the pin 49 by the spring 49c will force such pin 49 to the left, as viewed in Fig. 3, and the reduced end 49a of such pin will engage in the hole 37a provided in the hub of the free running worm gear 37, thereby causing crankshaft 35 to rotate in unison with said worm gear.

By de-energizing the solenoid 60, the clutch trip lever 50 is released and is forced into the groove 48a of the clutch member 48 by spring 61, Fig. 4.

As the clutch member 48 revolves, the beveled end 50a of the tripping lever 50 will move into the groove 49a in the engaging pin 49, thus forcing said pin to the right, as viewed in Fig. 3, withdrawing the reduced portion 49a thereof from the hole 37a in the hub of the worm gear 37, and freeing the said worm gear 37 from the clutch member 48, and stopping the rotation of the crankshaft 35 with the crank portion thereof in its uppermost position, as viewed in Fig. 3. There is thus caused a single stroke movement of the cutter slide 16, knife 28 and binder slide 63a.

The rotation of the crankshaft 35, through the connecting rod 31, provides movement through one revolution of the crankshaft to the cutter slide 16, which carries the cutter knife 28a in one-half the crankshaft stroke downward to a position just passing the top edge of the stationary die 19 and then returning the knife to its uppermost position upon completion of the crankshaft revolution.

Located behind the cutting slide 16 and slidably mounted in the slideway 15a formed in the cutter head slide 14, and free to slide therein is a member 63a carrying the binder 63. Extending downwardly from member 63a is a pair of rods 62 which are arranged parallel to each other and threaded at their lower ends to receive nuts 65 against which the lower ends of a pair of long coil springs 64 react.

Formed integral with the cutter head 16, and extending rearwardly therefrom, as shown in Fig. 2, are projections 16b against which the upper ends of coil springs 64 react and between which the rods 62 are located. The long springs 64 provide a very substantial resilient operative connection between the cutter slide 16 and the slide 63a as will be understood.

In the preliminary movement of the cutter slide 16 downwardly the projections 16b acting through the springs 64 will force the binder 63 downwardly and such binder will engage with and yieldingly hold the stack of paper to be cut in advance of the engagement of the paper by the cutter 28a. The cutter will continue downwardly through the stack of paper and on completion of the cutting stroke both the cutter and the binder will move upwardly simultaneously.

At the upper end of the cutter slide 16 (see Fig. 2) is arranged a latch 67 which is manually set to render binder 63 inactive for the purpose of gaining access to the cutter knife 28a. For example, when it is desired to set or interchange knives, the latch 67 is swung into a notch (Fig. 2) provided in the back of the binder slide 63a and upon lowering of the cutter slide the binder slide remains in its upmost position. Upon lowering the cutter slide 16 the knife 28a will be exposed for removal, or for setting with respect to the die 19, the die being snubbed in set position by back up screw 68 and locked in place by set screw in part 69. After setting the knife and die, the cutter slide 16 is returned to its upper position either by power or manual manipulation of the flywheel 43 and the latch 67 withdrawn from the binder head notch.

Pivotally mounted at the upper end of the cutter slide 16 is a hood 70. This hood contains light socket 71 and light bulb 72. By swinging the hood 70 on its pivotal mounting, access to the locking device 67 is obtained.

Within the cutter slide 16 an opening is provided in the form (more or less) of a chute to receive cut chips as sheared by the cutter knife 28a. These chips are led downwardly and are deposited in a chip box 73 located within the confines of the frame work of the machine and removable at will.

The machine has been described in detail, and the terms "knife" and "die" have been used, as the machine is particuluarly adapted to cut round corners on piles of sheets of paper. However, this

represents but one application of my invention, and by modifications well within the scope of the invention the machine may be adapted to cut holes, either round or other shape, slots, etc., without departing from the spirit and scope of the invention as defined by the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A trimming machine comprising a frame, a horizontal table on the frame including means for supporting a fixed cutting die, the frame having a vertical portion rearwardly of and extending upwardly beyond the table and cutting die, said vertical portion of the frame having a vertical guideway therein rearwardly of and open to its front face and a second and relatively narrower vertical guideway therein rearwardly of and open to the first guideway, a cutter head mounted in one of said guideways and having a forwardly projecting portion adapted to carry a cutter for cooperating with the die, a slide mounted in the other guideway and carrying a work-engaging foot, and power operated means for moving the cutter head and slide downwardly in the guideways including means for advancing the foot resiliently into engagement with the work in advance of the engagement of the cutter with the work.

2. The machine defined in claim 1 in which the slide is disposed rearwardly of the cutter head and is provided with a forwardly and downwardly extending portion disposed over and forwardly of the top portion of the cutter head.

3. The machine defined in claim 1 in which the cutter head is disposed forwardly of the slide and is formed with a downwardly extending chute for receiving and directing cutting chips downwardly to a chamber beneath the table.

4. The machine defined in claim 1 in which the last named means includes a power operated rod connected to and extending downwardly from the cutter head and two compression springs operative between the cutter head and slide and located at opposite sides of and parallel with the rod for forcing the slide downwardly resiliently by the cutter head.

5. A trimming machine comprising a frame, a horizontal table on the frame including means for supporting a fixed cutting die, a cutter head and a slide mounted for vertical movement on the frame, the cutter head being adapted to carry a cutter for cooperating with said die and the slide having a work-engaging foot, power operated means including a rod attached to and extending downwardly from the cutter head, a rod attached to and extending downwardly from the slide parallel with the first named rod, and a compression spring on the second named rod disposed between the cutter head and a stop on the bottom end of the second named rod for resiliently effecting downward movement of the slide from the cutter head.

6. A trimming machine comprising a frame, a horizontal table on the frame including means for supporting a fixed cutting die, a cutter head and a slide mounted for vertical movement on the frame, the cutter head being adapted to carry a cutter for cooperating with said die and the slide having a work-engaging foot, power operated means including a rod attached to and extending downwardly from the cutter head, a compression spring operative between the cutter head and slide for operating the slide resiliently downward from the cutter head, one-revolution clutch means for effecting downward movement of the rod and cutter head, and a solenoid operated trip mechanism for effecting operation of the clutch means.

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