June 10, 1952 E. J. HORGAN 2,600,165

PLATEN FOR USE WITH PERFORATING AND CUTTING MACHINES

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Fig. 1.

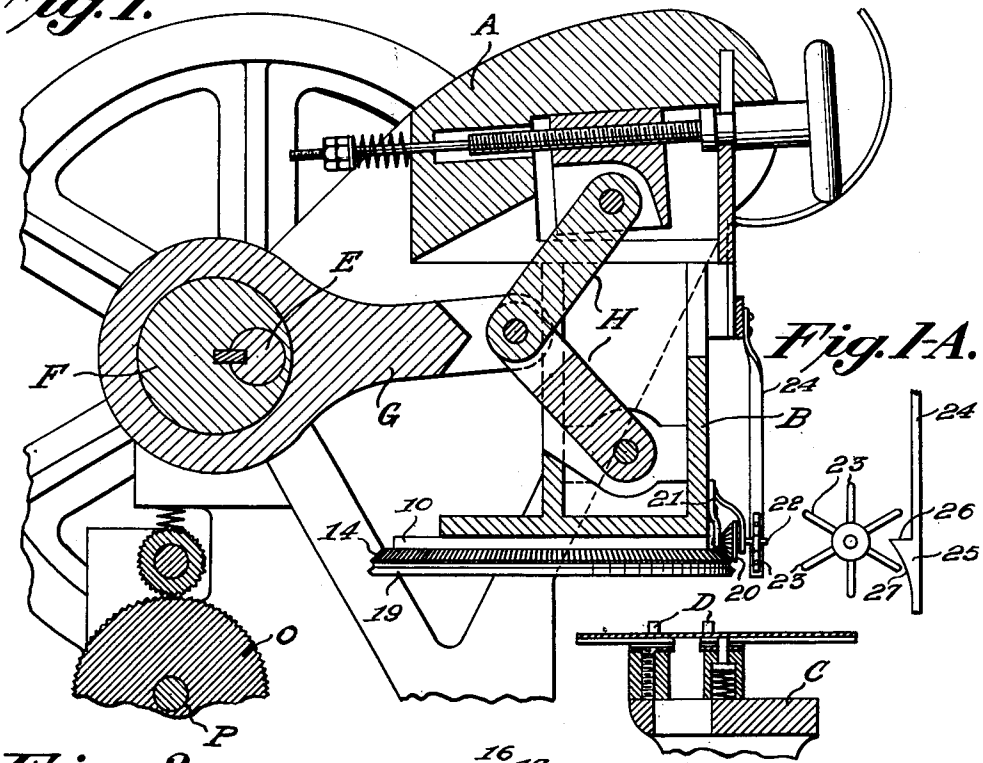
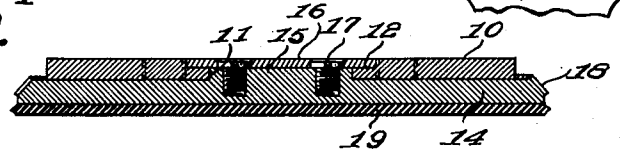


Fig. 1-A.

Fig. 2.



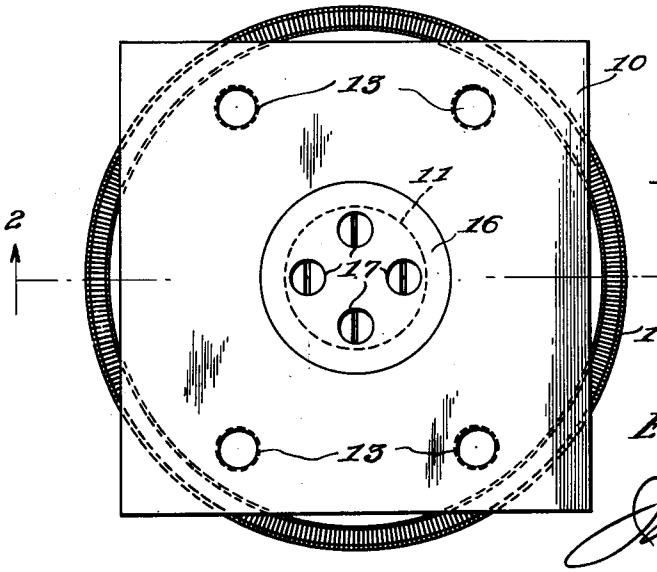


Fig. 3.

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Fig. 4.

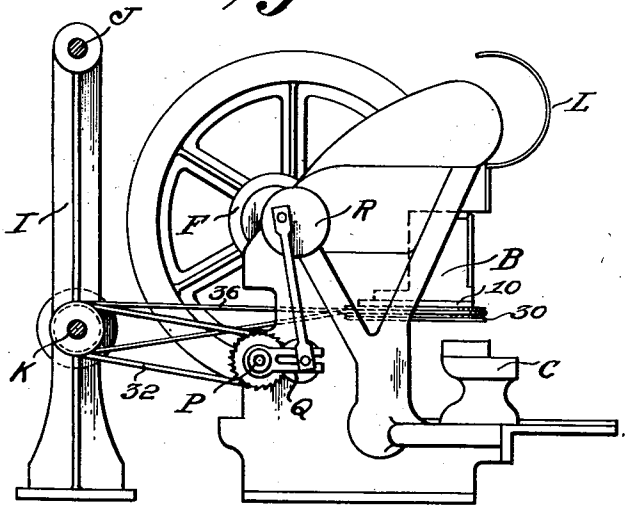


Fig. 7.

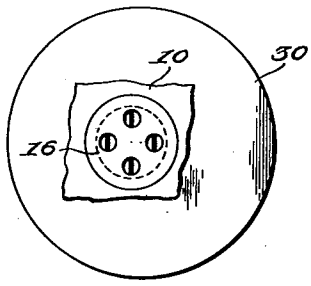


Fig. 5.

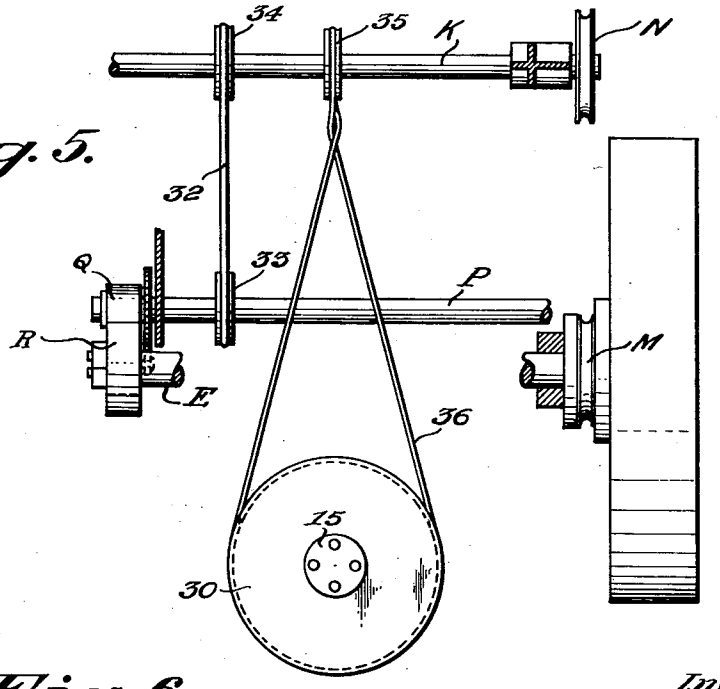
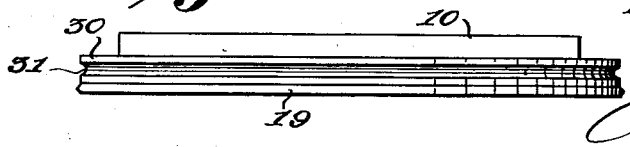


Fig. 6.



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Fig. 8.

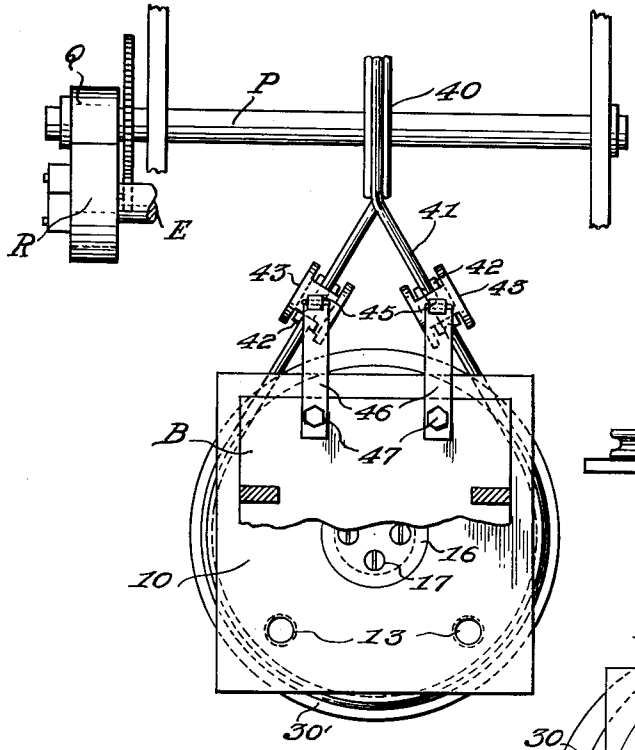


Fig. 11.

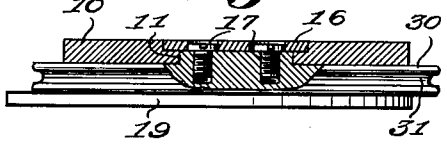


Fig. 12.

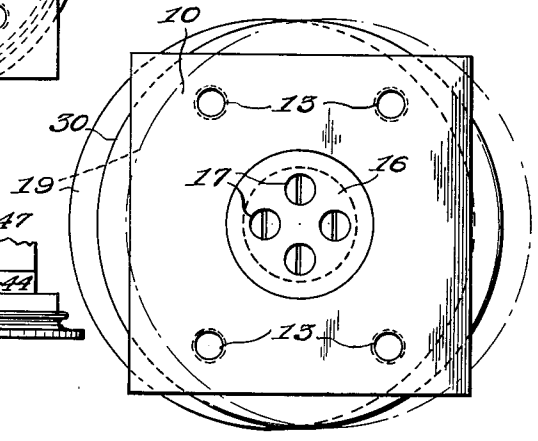


Fig. 9.

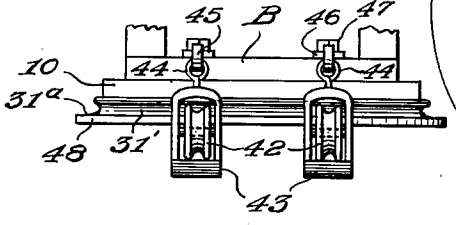
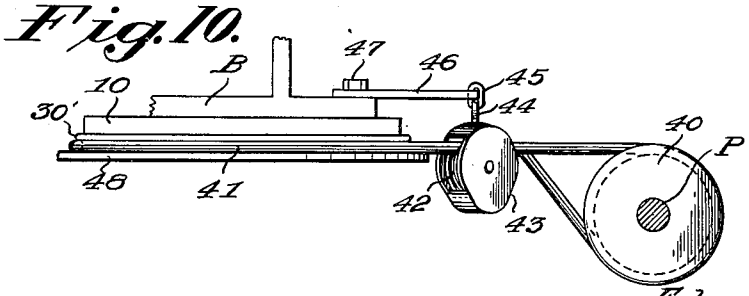


Fig. 10.



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UNITED STATES PATENT OFFICE

2,600,165

PLATEN FOR USE WITH PERFORATING AND CUTTING MACHINES

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Application January 6, 1949, Serial No. 69,538

6 Claims. (Cl. 164—102)

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This invention relates to an improved platen for use with perforating and cutting machines.

Perforating and cutting machines to which the present invention is adapted, generally comprise a platen or block and a cooperating die in the form of punches or knives with relative movement between the platen and die, the platen receiving the impact of the die.

These machines, and particularly the perforating machines, such, for example, as is disclosed in the patent to Knight, No. 1,584,230, include a horizontally disposed plane-faced platen as an impact block for tubular hollow punches, and, in this particular machine, the platen is vertically reciprocated relative to the punches, which have a horizontal adjustment only.

In machines of this type, the vertical axes of the punches remain constant for any fixed horizontal adjustment of the punch-supporting anvil, and accordingly the punches strike the platen repeatedly at the same points.

This action of the punches has heretofore been recognized as being unduly injurious to the platen, even though same be covered with a replaceable mat, for the reason that the constant impacts of the punches at the same points soon result in the formation of recesses in the platen or mat and which occasions imperfect perforating of the material.

This objection has heretofore been substantially overcome by the use of a strip of paper, which is constantly drawn from a supply roll across the platen and onto a wind-up roll, as is disclosed in the Knight patent referred to.

While the use of paper moving constantly over the platen avoids any substantial damage to the platen or mat, it adds materially to the cost of operation, since a relatively large amount of paper is used in each day's operation of a machine.

The present invention is disclosed, by way of example, as operatively associated with the Knight perforating machine, and a primary object of the invention is to provide for the elimination of the paper while avoiding substantial damage to the platen.

A further and more specific object of the invention is to provide an improved platen for use with a vertically reciprocable plunger, and wherein the platen is slowly rotated about a vertical axis, whereby the vertical axes of the punches intersect the platen at different points in each successive impact of the punches with the platen.

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Other objects and advantages of the invention will become apparent in the course of the following detailed description, taken in connection with the accompanying drawings, wherein

Figure 1 is a vertical sectional view through the upper portions of a perforating machine and showing the application of the present invention thereto, the figure corresponding to Fig. 3 of the patent referred to.

Fig. 1–A is an enlarged detail elevational view as observed from the right of Fig. 1.

Fig. 2 is a diametrical vertical section of the platen as observed in the plane of line 2—2 on Fig. 3.

Fig. 3 is a top plan view of the platen, Figs. 2 and 3 being substantially enlarged.

Fig. 4 is a side elevational view corresponding to Fig. 4 of said platent and disclosing a modified and preferred form of the present invention.

Fig. 5 is an enlarged fragmental plan view particularly illustrating the drive for the platen.

Fig. 6 is an enlarged side elevational view of the platen shown in Fig. 4.

Fig. 7 is a top plan view of a platen similar to that of Fig. 5 and wherein same is eccentrically mounted.

Fig. 8 is a plan view similar to Fig. 5, but disclosing a modified and preferred drive arrangement for the platen.

Fig. 9 is a rear elevational view of the platen structure of Fig. 8 with the drive belt omitted.

Fig. 10 is a right side elevational view of the platen structure of Fig. 8.

Fig. 11 is a view partly in side elevation and partly in transverse section showing a modified form of mounting for the platen.

Fig. 12 is a top plan view of the structure illustrated in Fig. 11.

Referring now in detail to the drawings, only such parts of the perforating machine will be described as is necessary to a clear understanding of the present invention, and for the sake of clarity of disclosure, the machine parts which are old, as in said patent, are designated by letters while the elements of the invention per se are designated by numerals.

The machine generally comprises a frame A in which is disposed a vertically reciprocable plunger B to the lower end of which is connected the platen. Supported on the frame for horizontal adjustment is an anvil C which supports the punches D disposed beneath the platen.

A horizontal drive shaft E is journalled in the frame and is provided with an eccentric F which effects vertical reciprocation of the plunger by

means of link G and toggle members H, in the manner clearly set forth in said patent.

The machine includes an adjunct for use with the paper, and same comprises a vertical frame I having an upper shaft J for supporting the paper supply roll, and a lower shaft K for supporting the paper wind-up roll, the paper extending over the guide L, together with a lower guide roll (not shown) and beneath the platen. The shaft K is driven by means of a belt running over pulleys M and N on the drive wheel and shaft, respectively.

The machine further includes a corrugated feed roll O fixed to a shaft P and which shaft is driven by means of a ratchet Q from a disk R on the shaft E.

It is believed that sufficient of the machine is above described for a clear understanding of the present invention. It is to be observed that the plunger B moves vertically as does the platen carried thereby, and that a strip of paper is fed continuously beneath the platen to avoid injury thereto by the punches D.

The present invention comprises an improved platen as a substitution for the platen in the patent, and wherein such platen includes a horizontally rotatable element to avoid injury by the punches without the use of paper, as in the patent. Furthermore, the invention comprises novel means for rotating the platen element, as will later appear.

According to the first form of the invention, the platen comprises a rectangular plate 10 having a central circular opening 11, the plate being provided with a circular seating portion 12 outwardly of the opening and concentric therewith. The plate is further provided with tapped openings 13 for receiving screws, by which the platen is secured to the plunger B.

The platen further includes a circular plate 14 having a central hub 15 received in and rotatable in the opening 11. The plates 10 and 14 are maintained in operative engagement by a small circular plate 16 which is secured to hub 15 by screws 17 and whose marginal portion is rotatably supported in the seating portion 12 of the plate 10.

The plate 14 is provided with marginal gear teeth 18, and a suitable composition mat 19 rests upon the lower face of plate 14 and is suitably secured thereto. The plate 14 may have rotation imparted thereto by any suitable ratchet means which is operative by vertical reciprocation of the plunger B. The form illustrated comprises a pinion 20 suitably connected to the plunger B by means of a bracket 21, and the shaft 22 of the pinion is provided with a wheel having a plurality of radial pins 23.

A spring pawl member 24 has its upper end suitably secured to the guide plates for plunger B and the lower end of such member is provided with the head 25 having a horizontal shoulder 26 and a front curved cam face 27.

It is to be understood that suitable means as is common will be used to prevent clockwise rotation of the pin wheel, as observed in Fig. 1–A.

With this arrangement, the pawl member 24 will yield as the pin wheel moves upwardly with the plunger, but upon downward movement of the plunger the wheel will be rotated by engagement of a pin 23 with the shoulder 26, and accordingly the pinion will be rotated and the platen member 14 rotated to an extent that the punches D will not strike the mat 19 at the same points on the next operative cycle of the machine.

While an operative ratchet means is disclosed, other well known forms, such as the ball clutch, may be used.

According to the second or preferred embodiment of the invention, certain of the drive members of the present machine are utilized to rotate the platen. In this form of the invention, a plate 30 is used in place of plate 14, and this plate has a marginal belt groove 31. The shafts K and P, which in the patent carry the paper wind-up roll and the feed roll, respectively, are used to impart rotation to the platen member 30.

For this purpose, shaft P, which is rotated by the ratchet mechanism Q, is connected to shaft K (from which the paper roll has been removed) by means of a belt 32 trained over pulleys 33 and 34 on the shafts P and K, respectively.

The shaft K is provided with another pulley 35, and a crossed belt 36 extends over pulley 35 and the pulley groove 31 in the platen member 30.

While the slow rotation of the platen provides for the punches striking the mat in different points in the successive cycles of operation, in some instances this action may be improved by providing a slight oscillation to the platen, and which may be accomplished by mounting the member 30 eccentrically, as is illustrated in Fig. 7.

A modified and preferred form of drive for the platen is illustrated in Figs. 8, 9 and 10, which construction provides for more accurate guiding of and alinement of the belt with the grooved plate and driving pulley as well as avoiding crossing of the belt which occasions undue wear thereof.

In accordance with this form of drive, the platen is driven directly from the ratchet-actuated shaft P whereby a shorter belt is required with a corresponding increased effectiveness thereof.

In this construction, a pulley 40 is secured to the ratchet-actuated shaft P and the platen member 30′ is driven directly from the pulley by means of a round belt 41. In order to guide the opposed runs of the belt between the pulley 40 and the platen member 30′, a pair of pulleys 42 is provided, and such pulleys are rotatably supported in cages 43 having eye members 44 swivally connected therewith, as in well known practice.

The eye members 44 are connected by means of belt hooks 45 to the free ends of brackets 46 which project outwardly from the plunger B and are secured thereto as by bolts 47.

With this construction, the pulleys 42 readily aline with the runs of the belt due to their swivel mountings, and such pulleys also act to maintain the belt runs in proper position in vertical directions.

It is to be noted that the platen member 30′ is of circular pulley-like form as is the member 30 previously described, but the member 30′ includes a lower groove-forming portion 48 which projects substantially beyond the upper groove-forming portion, and as is shown in Fig. 9 the groove 31′ includes a lower substantially long arc 31^a extending outwardly to the edge of the portion 48 and which acts to accurately direct the belt 41 into the groove 31′.

In Figs. 11 and 12 is illustrated a modified form of mounting for the platen, and wherein provision is made for substantial oscillation of the mat

without effecting the movement of the drive belt. Accordingly, the plate 10 and platen member 30 are concentrically mounted and the mat 19 is mounted eccentrically of the member 30.

With this construction, the mat will have an oscillating or vibrating movement, as is indicated by the solid and dot-and-dash lines in Fig. 12.

While I have disclosed the improved platen structure in a perforating or cutting machine of the anvil type dies, such is for the purpose of disclosing an operative embodiment of the invention only, and the improved platen structures are not dependent upon such form of dies but are equally applicable for use with flat dies.

I have disclosed my invention in accordance with certain specific embodiments thereof, but such is to be considered as illustrative only, and not restrictive, the scope of the invention being defined in the following claims.

What I claim and desire to secure by U. S. Letters Patent is:

1. In a machine having a frame, a die member supported on the frame, an operating shaft rotatably journalled in the frame, a plunger supported in the frame above the die member and confined to vertical reciprocal movement relative thereto, and means operatively engaged with the shaft and plunger for imparting reciprocation to the latter; the improvement which comprises a platen secured to the lower end of the plunger and including a die-contacting circular plate rotatable about a fixed vertical axis, and drive means operative upon rotation of the shaft for rotating said circular plate about said axis, said drive means comprising a belt groove in the perimeter of said circular plate, a second shaft having a pulley thereon, a belt in driving engagement with said belt groove and said pulley, and intermittent drive means between said operating shaft and said second shaft.

2. In a perforating machine including a frame, punches supported by the frame, a plunger supported in the frame above the punches for vertical reciprocation relative thereto, a drive shaft rotatably supported in the frame, means operative by the drive shaft for reciprocating the plunger, a second shaft, and drive means between the drive shaft and second shaft for imparting step rotation to the latter; the improvement which comprises a platen supported by the lower end of the plunger and including a circular punch-contacting member rotatable about a vertical axis, and a belt drive connection between the second shaft and said member for imparting intermittent rotation thereto.

3. The structure according to claim 2, wherein said member comprises a grooved circular plate engaged by said belt, and a punch-contacting circular plate secured to said first plate in eccentric relation thereto.

4. The structure according to claim 2, together with a pair of pulleys supported by said member and disposed between same and said second shaft for supporting engagement with the opposite runs of the belt.

5. The structure according to claim 4, wherein said pulleys are connected to brackets projecting from said member by swivel means providing for free rotation of the pulleys about vertical axes.

6. The structure according to claim 2, wherein said member comprises a circular plate having a circumferential belt-receiving groove in its edge, the plate at the lower side of the groove projecting outwardly beyond the portion of the plate above the groove, and the upper face of said outwardly projecting portion being concavely curved in continuation of said groove.

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The following references are of record in the file of this patent:

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