Dec. 22, 1942. W. M. REICHART ET AL 2,305,735

PAPER CUTTING MACHINE

Filed Sept. 14, 1940 2 Sheets-Sheet 1

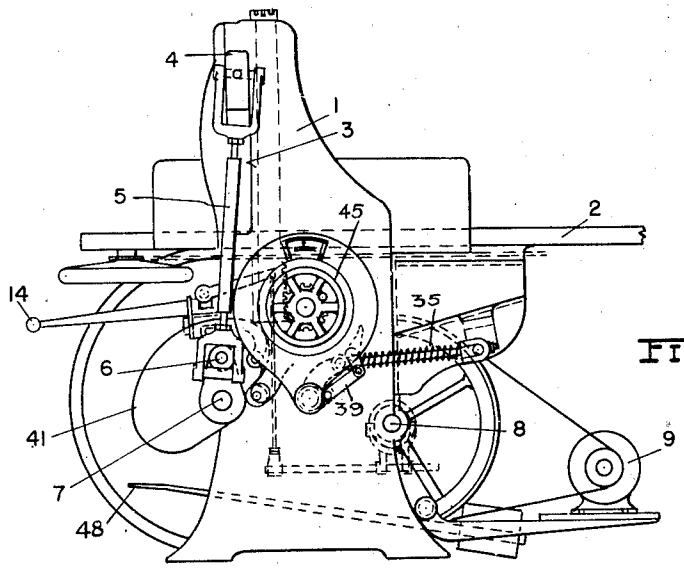


FIG. 1

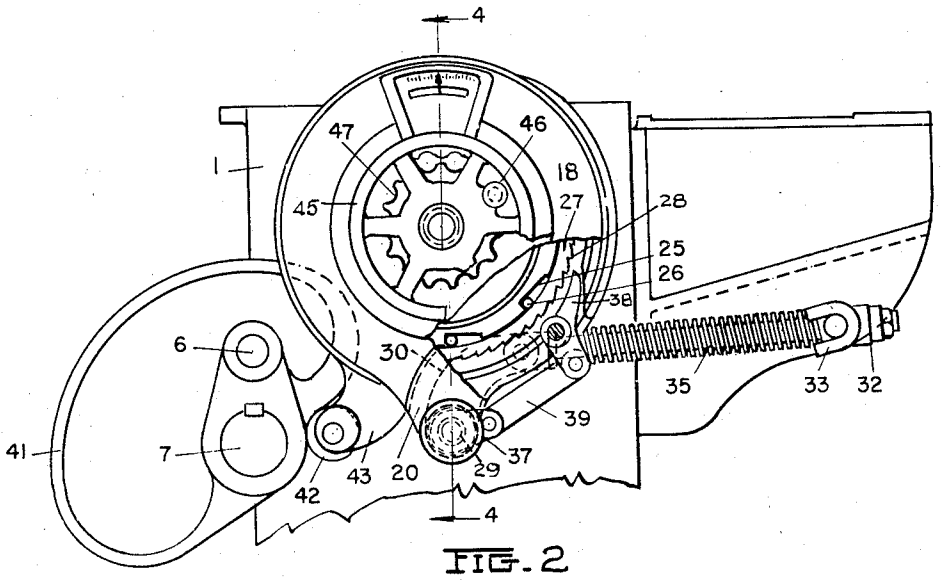


FIG. 2

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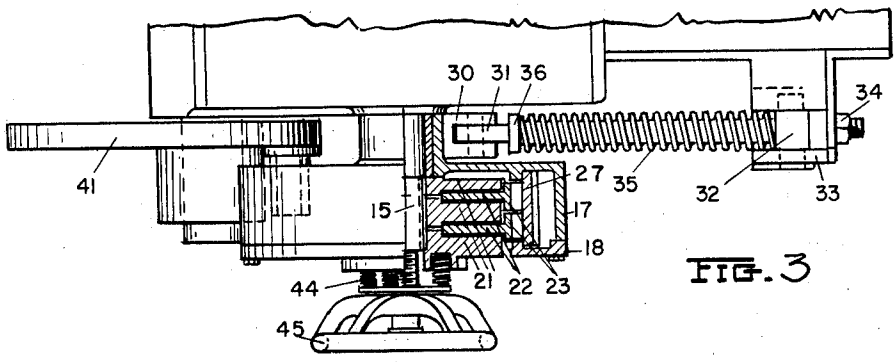


FIG. 3

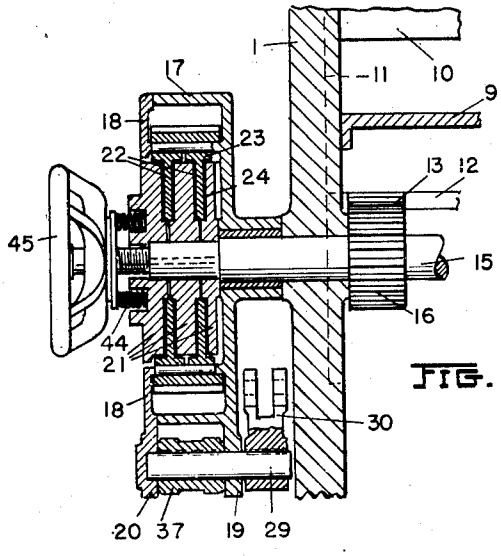


FIG. 4

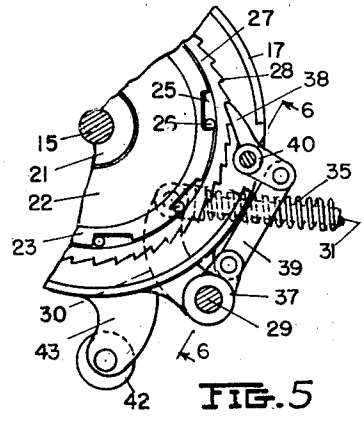


FIG. 5

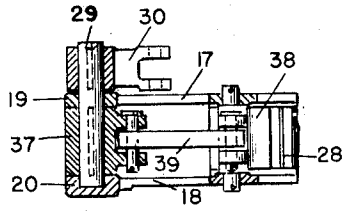


FIG. 6

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UNITED STATES PATENT OFFICE

2,305,735

PAPERCUTTING MACHINE

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Application September 14, 1940, Serial No. 356,802

2 Claims. (Cl. 164—54)

This invention relates, as indicated, to paper cutting machines, and more particularly to clamping means therefor adapted to exert pressure on the pile of paper to be cut immediately prior to and during the fall of the knife.

It has long been known in the art to employ clamping means which may first be brought into engagement with the pile of paper when the same has been properly positioned to make the desired cut and to provide further means for applying pressure to such clamp when the cut is made. Such pressure means has generally comprised a rotatable shaft adapted upon rotation to depress the clamp as by rack and pinion means, and a friction box operative in conjunction therewith to exert rotative force on such shaft. Various means have been proposed and employed to rotate the driving plates of such friction box during the fall of the knife, including simple pawl and ratchet means acting directly on the outer periphery of such plates. When employing simple pawl and ratchet means, however, the operation of the device is rendered noisy to an objectionable degree and it is subjected to an undue amount of shock. Furthermore, it is not possible to operate the clamp at a speed greater than the speed at which it is operated by the friction box, such speed being of course desirable when the operator is simply lowering the clamp into engagement with the pile.

It is, therefore, a primary object of the present invention to provide clamp actuating mechanism for paper cutting machines and the like embodying means for applying pressure to such clamp, such means being automatically operative in timed relation to the fall of the knife and positive in its action, without, however, entailing undue shock to the mechanism or objectionable noise.

Another object of the invention is to provide such pressure means which will be operative when required but will not interfere with the movement of the clamp at a speed greater than that at which it is operated by such means.

A further object of this invention is to provide such pressure means which will require a minimum of adjustment and repair.

Other objects of this invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a side elevational view of a paper cutting machine embodying the device of this invention;

Fig. 2 is an enlarged side elevational view of such device as shown in Fig. 1;

Fig. 3 is a top view, partly in section, of our new device as illustrated in Fig. 2;

Fig. 4 is a vertical sectional view taken along the line 4—4 on Fig. 2;

Fig. 5 is a fragmentary side elevational view of the friction box of our device, showing the detent means cooperative therewith; and

Fig. 6 is a sectional view of such detent means taken along the line 6—6 on Fig. 5.

Referring now more particularly to such drawings, and especially to Fig. 1 thereof, the paper cutting machine as illustrated therein comprises side members 1 and a bed or table 2. Reciprocably mounted in vertical slots 3 is a knife bar 4, means being provided including connecting rods 5 and cranks 6 for imparting such reciprocation. The cranks 6 are keyed to the respective ends of shaft 7 which is adapted to be driven from shaft 8 by means of suitable gearing (not shown), such shaft 8 being in turn driven by a motor 9.

A binder or clamp 10 is mounted for vertical reciprocal movement to the rear of knife bar 4, being provided with side bars 11 reciprocable in vertical grooves in side members 1. These side bars are connected at their lower ends by a cross member 12 (see Fig. 4) to which depending racks 13 are secured.

To raise and lower such clamp, conventional means which may comprise spring means tending to elevate the clamp and cam means (not shown) mounted on shaft 7 operable to depress the same may be provided, a control lever 14 being provided for operating such mechanism.

Mechanism is also provided with which this invention is more particularly concerned for applying further pressure to the clamp in order to compact and firmly hold the pile of paper during the cutting operation. Rotatable shaft 15 is suitably journalled in side members 1 and carries pinions 16 adapted to engage the racks 13 so that upon rotation of such shaft the clamp will be raised or lowered. Freely rotatably mounted on an end of such shaft is a housing 17 fitted

with an annular cover plate 18, such housing and cover plate being respectively provided with depending ears 19 and 20. Disposed within the housing and keyed to shaft 15 is a plurality of friction plates 21 which are cut away to receive driving plates 22 therebetween, such driving plates having peripheral annular flanges 23. Disposed between plates 22 and 23 are flat rings 24 of cork or other material having a high coefficient of friction. Flanges 23 are cut away at circumferentially disposed points in their outer peripheries to provide tapered recesses 25 containing rollers 26. Rotatably mounted about such flanges is a ring 27, the inner periphery of which engages the rollers 26. The outer periphery of the ring bears ratchet teeth 28 adapted when engaged to permit the rotation of such ring in a counterclockwise direction as viewed in Figs. 2 and 5, thus locking such ring in driving engagement with plates 22 through the agency of the free-wheeling device constituted by tapered recesses 25 and rollers 26.

Journalled in ears 19 and 20 is a small shaft 29 adjacent the inner end of which is keyed a lever arm 30. A rod 31 is pivotally connected to the end of such lever arm and extends through a pivotal mount 32 carried by a boss 33 on the frame of the machine. A nut 34 is provided adjacent the extremity of such rod and a coil spring 35 encircles such rod between such mount and a collar 36. A second lever arm 37 is keyed to shaft 29 between ears 19 and 20 and a detent 38 is pivotally mounted in the housing. A link 39 pivotally connects lever arm 37 and an angular extension 40 of such detent means. It will, therefore, be apparent that upon rotation of shaft 29, as through action of lever arm 30, lever arm 37 and link 39 will act conjointly as toggle means to cause the engagement of detent 38 with one of the teeth 28 of ring 27.

Mounted on shaft 7, which also carries the crank 6 by which the knife bar is reciprocated, is a cam 41 the periphery of which is adapted to engage a cam roller 42 carried by a bracket 43 mounted on the housing 17. Thus, as shaft 7 and cam 41 rotate, the housing will likewise be rocked on shaft 15 in a counterclockwise direction, as viewed in Fig. 2. Such rotation of the housing will clearly be against the impulse of spring 35 with the result that shaft 29 will be rotated relatively to such housing. The toggle means comprising lever arm 37 and link 39 is thus straightened, as shown in Fig. 5, and detent 38 caused to engage a tooth of ring 27. As cam 41 continues to rotate the housing, ring 27 will now likewise be rotated in a counterclockwise direction in association therewith, causing the above described free-wheeling mechanism to become engaged with resultant rotation of drive plates 22. Such plates of course tend to rotate plates 24 and thus shaft 15 to depress the clamp. However, when the paper can be no more compacted, plates 21 and 22 will slip relatively to each other but will maintain heavy pressure on the clamp due to the resistance generated in friction rings 24. As cam 41 continues to rotate subsequent to the cut, housing 17 is permitted to rock back into the position illustrated in Fig. 2 under the impulse of spring 35 and its own center of gravity. Detent 38 is thereby disengaged from ring 27 and such ring again rides freely on the free-wheeling rollers.

Means is also provided for regulating the pressure forcing plates 21 and 22 into lateral engagement, such means comprising a plurality of springs 44 seated in the outermost of such plates and adapted to be compressed by rotation of hand wheel 45 which is mounted on a threaded extension of shaft 15. Means for locking such wheel against accidental movement after the desired pressure has been secured is provided in the form of a pin 46 extending through the hand wheel and into one of the recesses 47 in the outer plate.

As will be seen from the above, means for applying pressure to the clamp has been provided which is noiseless and positive in operation and automatically disengageable after the cut to permit rapid movement of the clamp up or down by conventional means such as treadle 48. Little adjustment is necessary and that of the simplest form so that a mechanism has thus been provided which is substantially automatic in operation and avoids the disadvantages of prior art mechanisms.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention:

1. In clamp actuating mechanism for paper cutting machines and the like, means for moving such clamp into engagement with the pile of paper to be cut, and supplemental means for applying additional pressure to such clamp comprising a shaft having radially extending, driven, plates secured thereto, plates for driving said first-named plates, a ring encircling said driving plates and operative when rotated in one direction to rotate said driving plates, said ring being rotatable in the opposite direction independently of said driving plates, teeth on the outer periphery of said ring, detent means, and toggle means operative in timed relation with the fall of the knife of such machine to cause the engagement of said detent means with said teeth to rotate said ring relatively to said driving plates whereby to engage and rotate said last-named plates.

2. In clamp actuating mechanism for paper cutting machines and the like, means for applying pressure to such clamp comprising a shaft having radially extending, driven, plates secured thereto, plates for driving said first-named plates, a ring encircling said driving plates and operative when rotated in one direction relatively to said plates to engage and rotate said plates, said ring being rotatable in the opposite direction independently of said plates, teeth on the outer periphery of said ring, a housing for said plates and ring pivotally mounted on said shaft, detent means mounted on said housing and operative upon engagement with said teeth to rotate said ring relatively to said driving plates whereby to engage and rotate said last-named plates, cam means operative in timed relation with the fall of the knife of such machine to rock said housing, and toggle means operative when said housing is rocked to directly move said detent means into engagement with said teeth.

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