

Nov. 11 , 1924.

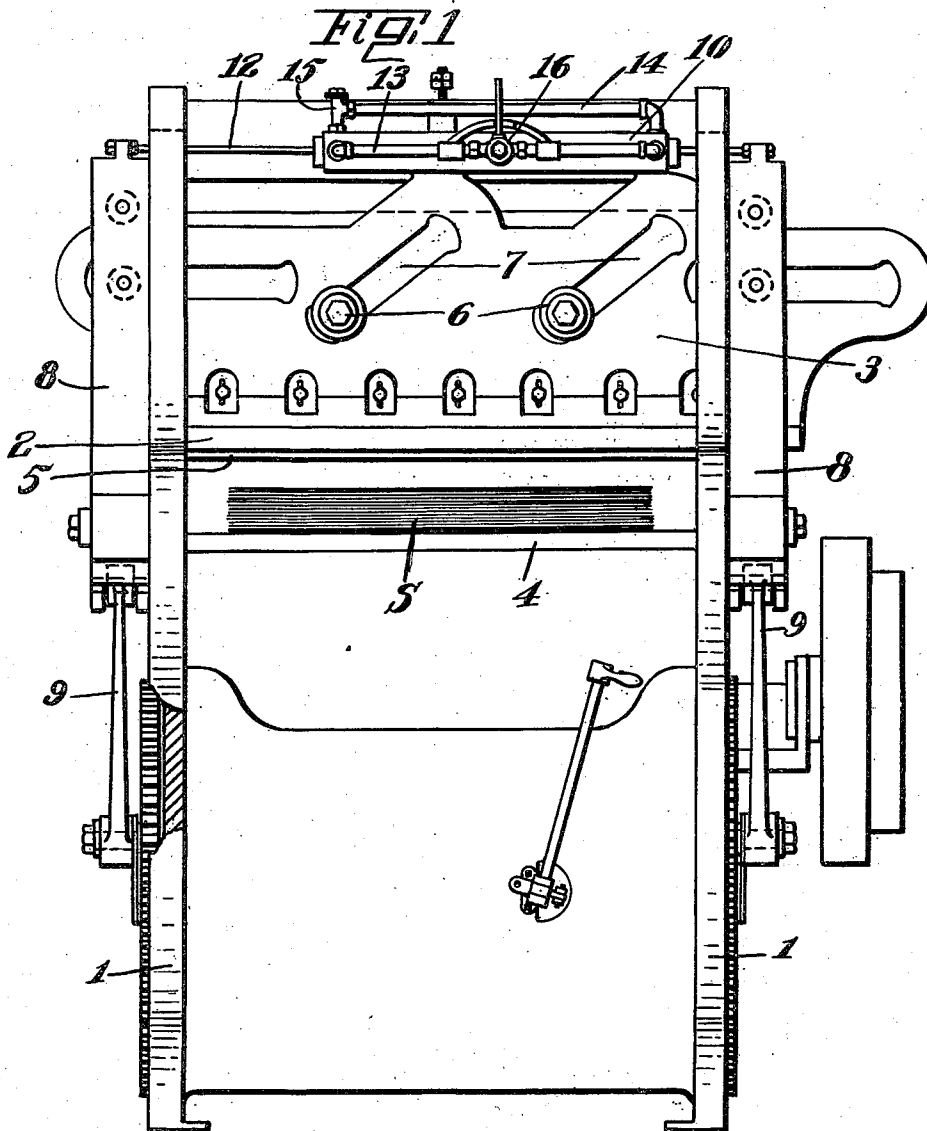
1,515,013

B. F. DE COSTA

PAPER CUTTING MACHINE

Filed Feb. 10, 1922.

2 Sheets-Sheet 1



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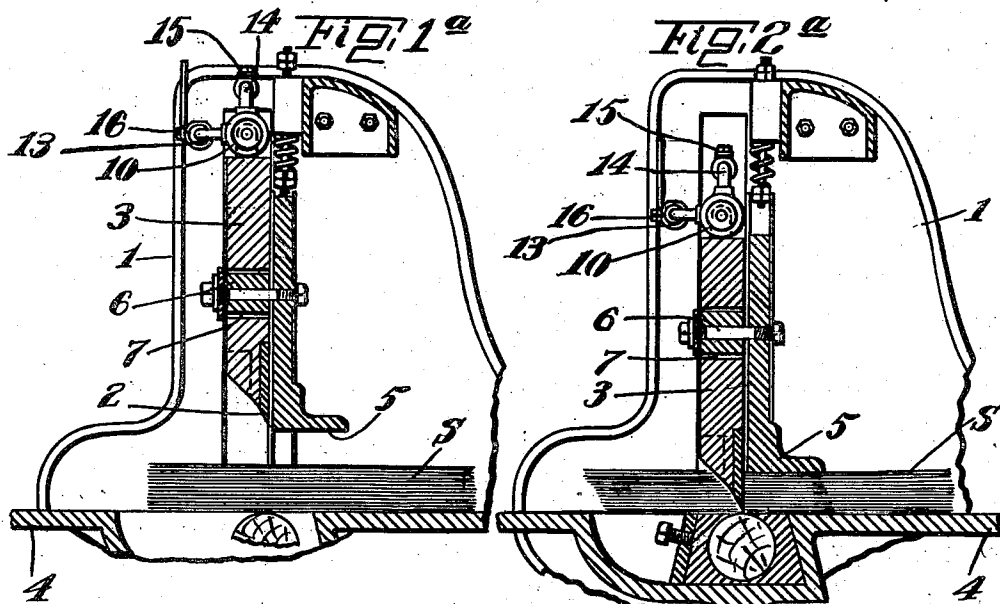
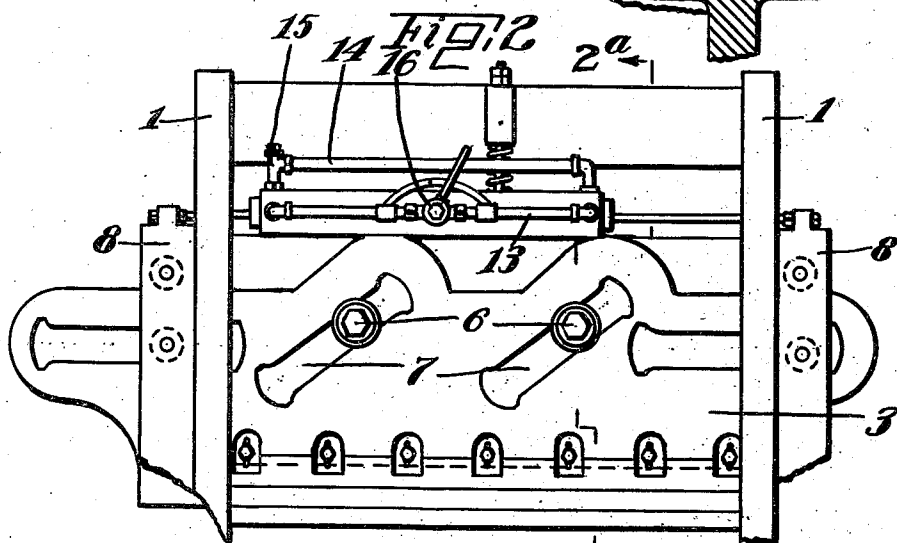
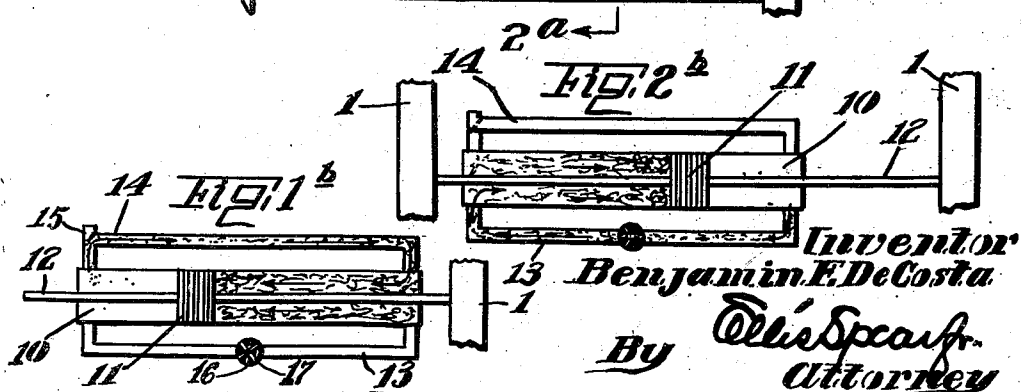
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

BENJAMIN F. DE COSTA, OF ROXBURY, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO HIMSELF AND ONE-HALF TO WILLIAM A. DE COSTA, OF NEW BEDFORD, MASSACHUSETTS.

PAPER-CUTTING MACHINE.

Application filed February 10, 1922. Serial No. 535,667.

To all whom it may concern:

Be it known that I, BENJAMIN F. DE COSTA, a citizen of the United States, residing at Roxbury, county of Suffolk, Commonwealth of Massachusetts, have invented certain new and useful Improvements in Paper-Cutting Machines, of which the following is a specification.

This invention relates to paper cutting machines, and particularly to a machine of the type disclosed in my prior Patent No. 742,974, issued November 3, 1903, to which reference is made as illustrating a machine of the same general character involved herein.

In such a machine, the paper clamp and knife bar move vertically downwardly together with the clamp in advance of the knife until the clamp contacts the pile of paper to be cut and holds the paper against movement. The knife continues to descend and at the same time is moved horizontally in an endwise direction to cut through the paper with a shearing cut.

In this type of machine the clamping pressure on the paper is applied automatically and increases as the resistance to the cutting action of the knife is increased. This is a feature of importance in that as the cutting edge of the knife becomes dull and the necessity for an increased clamping pressure arises, such pressure is automatically provided by the increased resistance to the cutting action.

With such machine, however, it is difficult to vary the clamping pressure for different kinds of stock. Ordinarily, such machines are provided with friction blocks inserted in the clamp and adjusting screws for forcing said blocks against the back face of the knife bar, thereby offering resistance to the endwise movement of the knife bar, and thus increasing the clamping pressure. This expedient is open to the objection however, that the operative is apt to set up the friction blocks too tightly, thereby springing the knife out of line so that it will move endwise through the pile as a curved edge instead of a straight edge.

In another type of machine, the clamping pressure is applied by weights, friction devices or springs, and while it is possible to obtain a proper adjustment with this type of machine, the mechanism is open to

the objection that the clamping pressure is not an automatic pressure and does not increase with the resistance to the cutting action of the knife.

To the end therefore of providing in a machine of the type indicated simple and positive mechanism for selectively increasing or decreasing the clamping pressure, according to the character of the stock being cut, and for automatically relieving the clamping pressure upon completion of the cut, to permit the knife bar to return freely to original position, I have devised my present invention.

According to my invention, I provide a dash pot mechanism which is adapted to offer resistance to the endwise movement of the knife bar as it cuts through the stock thereby increasing the clamping pressure of the clamp on the stock. The degree of resistance may be varied according to prevailing conditions of operation by adjustment of the dash pot mechanism and upon the return movement of the knife bar the resistance may be relieved to permit the knife bar to freely move back to its original position.

The construction and operation of my machine, together with a selected embodiment which well illustrates the principles involved, is described and illustrated in the accompanying specification and drawings, and the characteristic features of novelty are particularly pointed out in the appended claims. Throughout the specification and drawings like reference characters are correspondingly applied, and in the drawings:

Fig. 1 is a front elevation, partly broken away of a paper cutting machine equipped in accordance with my invention, the knife bar being shown in its normal elevated position.

Fig. 1^a is a partial vertical section corresponding to Fig. 1.

Figs. 2 and 2^a are views corresponding to Figs. 1 and 1^a and showing the knife bar drawn downwardly to cut the stock, and

Figs. 1^b and 2^b are diagrams illustrating the operation of the dash pot mechanism.

I have indicated at 1 the end frames of a paper cutting machine of the type illustrated in my prior patent hereinbefore referred to, at 2 the knife blade, at 3 the knife bar to which said blade is bolted, at 4 the

work table, at S a pile of stock to be cut supported on said table 4, at 5 the paper clamp, at 6 the studs carried by said clamp, at 7 the diagonal slots in the knife bar within which the studs 6 work, at 8 the draw arms for the knife bar, and at 9 the connecting rods for imparting a downward movement through said arms 8 to the knife bar and clamp. These several parts are standard construction in a machine of the type involved herein.

The paper clamp and with it the knife bar move downwardly together until the clamp contacts the stock S. The knife bar continues its downward travel and is also moved endwise by reason of the diagonal disposition of the slots 7 whereby to draw the blade 2 through the stock S with a shearing cut. As the resistance to this endwise movement of the knife increases, the pressure of the clamp 5 on the stock is proportionately increased.

According to my invention, I provide means for selectively increasing or decreasing the clamping pressure according to the character of the stock being cut. In its simplest form, I provide a dash pot adapted to offer an increasing resistance to the endwise motion of the knife bar as it is drawn through the stock, thereby to increase the pressure of the clamp on the pile being cut and adapted to relieve the pressure upon the return movement of the knife bar and clamp.

Preferably, the knife bar itself constitutes the moving carrier for the cylinder 10 of the dash pot and the piston 11 of the dash pot is fast on a tie rod 12 which connects the draw arms 8 of the knife bar and moves with said arms. The dash pot may be of pneumatic type or it may be filled with some heavy oil. In the embodiment illustrated, the cylinder moves endwise with the knife bar and the piston is relatively stationary.

At one side of the cylinder is a passage 13 extending from end to end of the cylinder whereby the air, oil or other fluid within the cylinder may be transferred from one side to the other of the piston during the relative movement of the piston and cylinder so as to offer an increasing resistance to the endwise motion of the knife as it cuts through the stock, and thereby increases the clamping pressure of the clamp on the stock. This action is illustrated diagrammatically in Fig. 2^b wherein the cylinder is shown as having moved endwise to the left and the fluid as having been transferred through the passage 13 from behind to in front of the relatively stationary piston 11.

As indicated diagrammatically in Fig. 1^b, upon the return movement of the knife bar, the cylinder travels endwise towards the right, and the fluid is transferred through a by-pass 14 extending from end to end of the cylinder from its position in front of the

piston back to its original position in rear of the piston whereby to relieve the resistance and permit the knife bar to freely return to normal position.

Within the by-pass 14 is a check valve 15 effective to prevent passage of the liquid through said by-pass when the cylinder moves to the left, as in Fig. 2^b, but permitting such passage upon movement of the cylinder to the right, as in Fig. 1^b.

In order to vary the resistance and thus the degree of clamping pressure I provide in the passageway 13 a manually operable valve 16 having a plurality of ports 17 of different sizes therethrough. By adjusting this valve, the volume of the liquid passing through the conduit 13 may be regulated at will to increase or decrease the resistance of the clamp 5 on the stock.

In an alternative form of my invention, I may mount the dash pot between the clamp and the knife bar. In this form the piston is relatively movable and the cylinder is relatively stationary. Preferably the piston and cylinder are arranged at an angle substantially coinciding with the angle of the slots 5. The piston is connected to the clamp, being offset to operate within the cylinder which is fast to the knife bar.

Various other modifications in the construction and operation of my device may obviously be resorted to without departing from the spirit of my invention if within the limits of the appended claims.

What I therefore claim and desire to secure by Letters Patent is:

1. In a machine of the class described, a pair of draw arms, a tie rod connecting said arms, a stock clamp and a knife bar operated by said draw arms, operative connections between said clamp and knife bar for imparting independent travel in an endwise direction to said knife bar, and a dash pot, one member of which is attached to the knife bar and the other member of which is mounted on the tie rod for offering a resisting pressure to the knife bar upon endwise movement of said bar in the cutting operation.

2. In a machine of the class described, a movable stock clamp, a knife bar moving therewith and having an independent phase of movement in a direction transverse thereto, a dash pot mounted to follow the movements of said knife bar and constructed and arranged to offer a resisting pressure to the movement of said knife bar in one direction of its phase of independent travel relative to the clamp whereby to increase the clamping pressure of the clamp on the stock and to relieve said resisting pressure upon movement of the knife bar in its opposite direction of independent travel, and means associated with said dash pot for varying said resisting pressure.

3. In a machine of the class described, a movable stock clamp, a knife bar moving therewith and having an independent phase of movement in a direction transverse thereto, a dash pot mounted to follow the movements of said knife bar and comprising a piston and a cylinder, a conduit extending from one side to the other of the piston and through which the dash pot fluid passes upon movement of the knife bar and cylinder in one direction of its independent travel to offer a resisting pressure to the movement of said knife bar whereby to increase the clamping pressure of the clamp on the stock, and a by-pass extending from one side to the other of the piston and through which the dash pot fluid passes upon movement of the knife bar in the opposite direction of its independent travel to relieve said resisting pressure.

4. In a machine of the class described, a movable stock clamp, a knife bar moving therewith and having an independent phase of movement in a direction transverse thereto, a dash pot mounted to follow the movement of said knife bar and comprising a piston and a cylinder, a conduit extending from one side to the other of the piston and through which the dash pot fluid passes upon movement of the knife bar and cylinder in one direction of its independent travel to offer a resisting pressure to the movement of said knife bar whereby to increase the clamping pressure of the clamp on the stock, a by-pass extending from one side to the other of the piston and through which the dash pot fluid passes upon movement of the knife bar in the opposite direction of its independent travel to relieve said resisting pressure, and a valve mounted in said conduit and controlling the volume of fluid passing therethrough for varying the degree of resisting pressure.

5. In a machine of the class described, a pair of draw arms, a tie rod connecting said arms, a stock clamp and a knife bar operated by said draw arms, operative connections between said clamp and knife bar for imparting independent travel in an endwise direction to said knife bar, and a dash pot comprising a cylinder mounted on said knife bar to move therewith and a piston within said cylinder and mounted on said tie rod for offering a resisting pressure to the cylinder upon endwise movement of the knife bar in the cutting operation whereby to increase the pressure of the clamp on the stock and to relieve said resisting pressure upon the return movement of the knife bar.

6. In a machine of the class described, a pair of draw arms, a tie rod connecting said arms, a stock clamp and a knife bar operated by said draw arms, operative connections between said clamp and knife bar for imparting independent travel in an endwise direction to said knife bar, a dash pot comprising a cylinder mounted on said knife bar to move therewith and a piston within said cylinder and mounted on said tie rod, a conduit extending from one side to the other of said piston and through which the dash pot fluid passes upon endwise movement of the knife bar and cylinder in the cutting operation to offer a resisting pressure to the knife bar and thereby increase the pressure of the clamp on the stock through said operative connections, and a by-pass extending from one side to the other of the piston and through which the fluid passes upon the return movement of the knife bar whereby to relieve said resisting pressure.

7. In a machine of the class described, a pair of draw arms, a tie rod connecting said arms, a stock clamp and a knife bar operated by said draw arms, operative connections between said clamp and knife bar for imparting independent travel in an endwise direction to said knife bar, a dash pot comprising a cylinder mounted on said knife bar to move therewith and a piston within said cylinder and mounted on said tie rod, a conduit extending from one side to the other of said piston and through which the dash pot fluid passes upon endwise movement of the knife bar and cylinder in the cutting operation to offer a resisting pressure to the knife bar and thereby increase the pressure of the clamp on the stock through said operative connections, and a by-pass extending from one side to the other of the piston and through which the dash pot fluid passes upon the return movement of the knife bar whereby to relieve said resisting pressure, a valve in said conduit for variably controlling the volume of dash pot fluid passing therethrough and a check valve in said by-pass permitting flow of the dash pot fluid therethrough upon movement of the cylinder in one direction and preventing such flow upon movement of the cylinder in the opposite direction.

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN F. DE COSTA.

Witnesses:

ELSIE F. DYER,
GEO. B. RAWLINGS.