

B. F. BERRY.
PAPER CUTTING MACHINE.

APPLICATION FILED JAN. 7, 1910. RENEWED MAY 7, 1912.

1,051,381.

Patented Jan. 28, 1913.

3 SHEETS—SHEET 1.

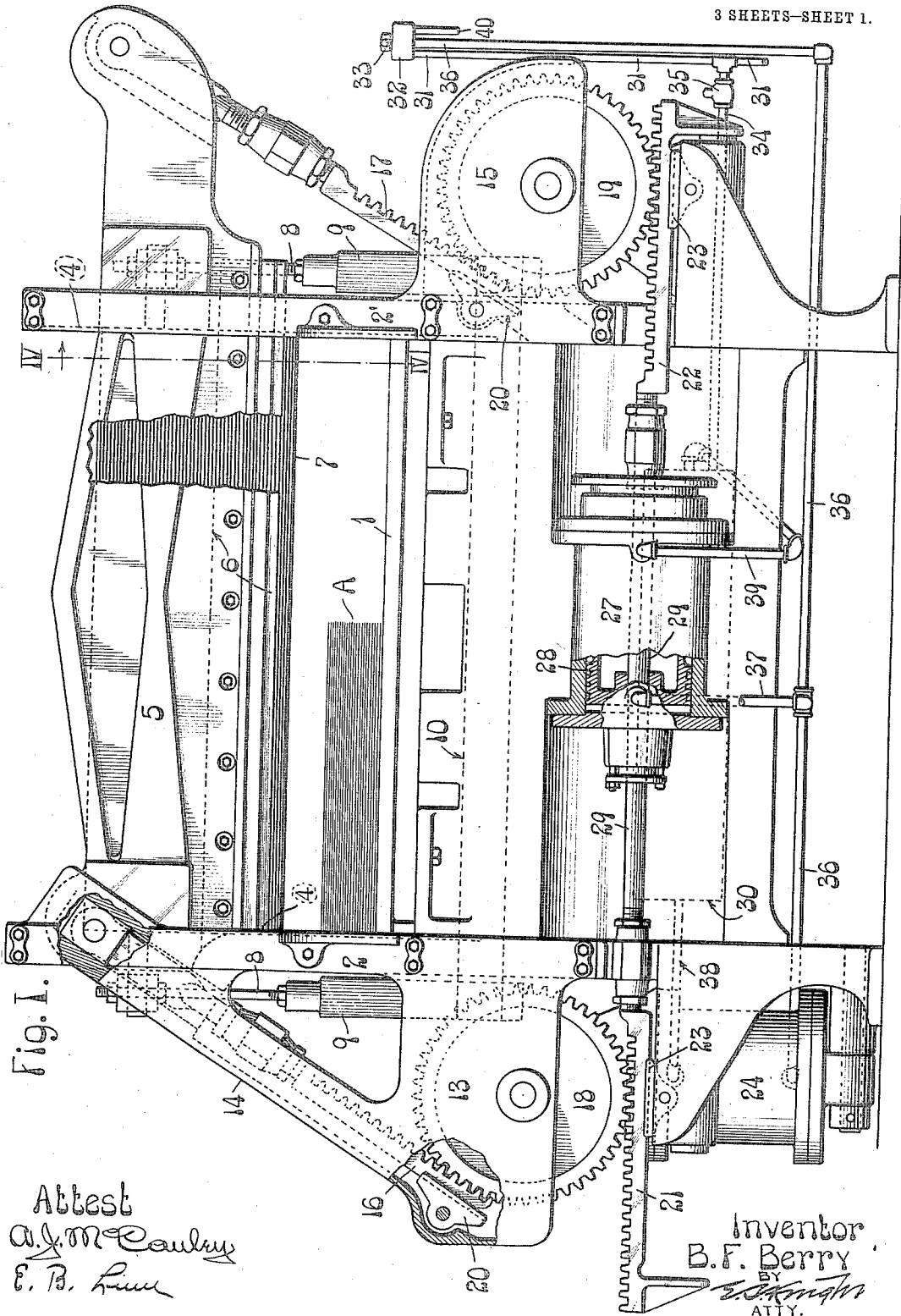


Fig. 1.

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Fig. III.

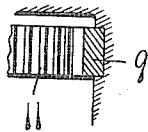
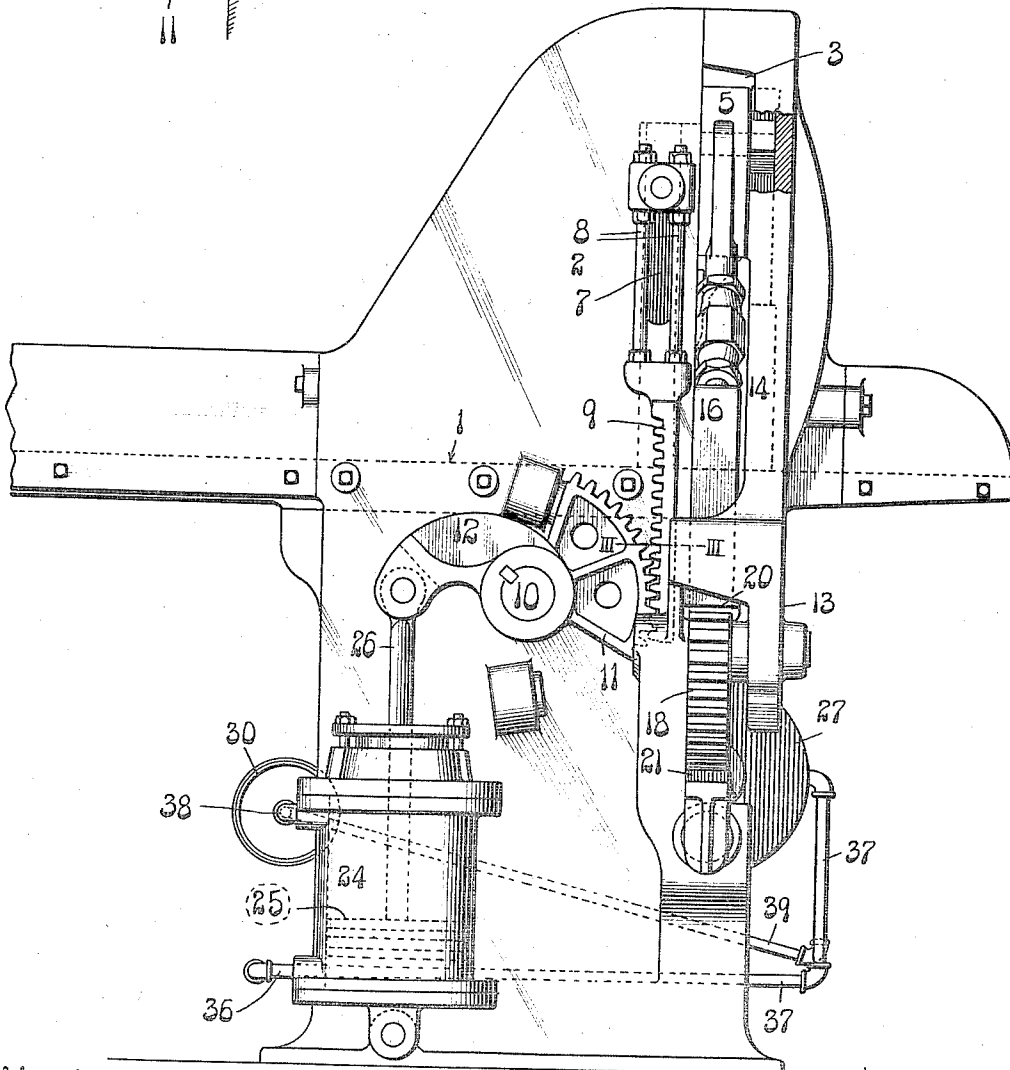


Fig. II.



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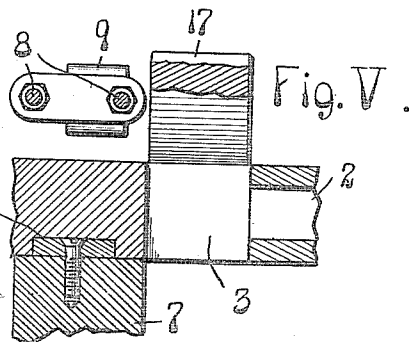
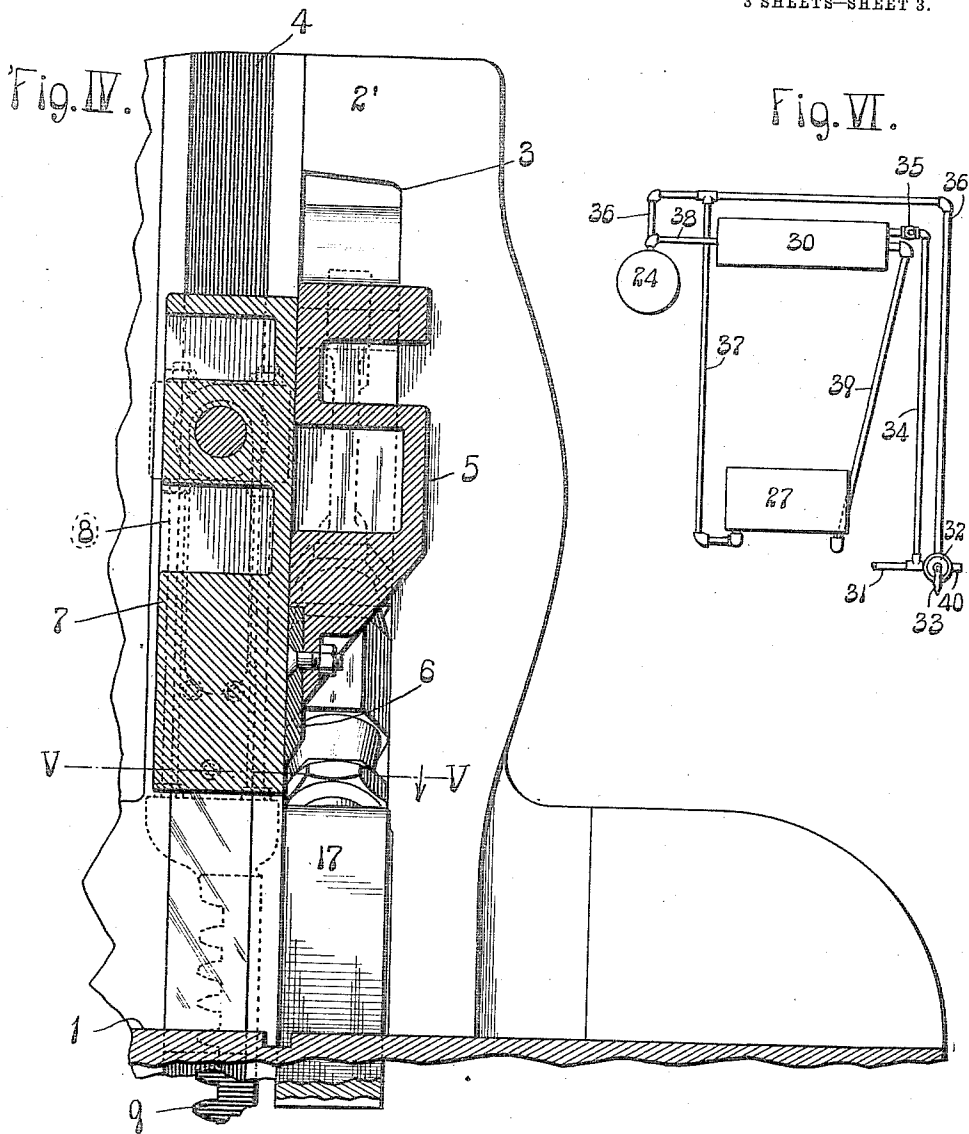
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UNITED STATES PATENT OFFICE.

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PAPER-CUTTING MACHINE.

1,051,381.

Specification of Letters Patent.

Patented Jan. 28, 1913.

Application filed January 7, 1910, Serial No. 536,877. Renewed May 7, 1912. Serial No. 695,781.

To all whom it may concern:

Be it known that I, BENJAMIN F. BERRY, a citizen of the United States of America, residing in the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Paper-Cutting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that character of paper cutting machines comprising a movable clamp for holding a pile of sheets of paper to be cut and a movable knife stock adjacent to the clamp carrying a knife adapted to be lowered to the pile of sheets to cut them, the clamp and knife stock being adapted to be lowered successively and elevated successively.

The present invention has for its object the construction of a paper cutting machine of the kind mentioned in which compressed air may be utilized as a power medium for operating the clamp and knife stock, and by the use of which power medium there is obtained perfect control of both the clamp and knife stock; and, furthermore, a construction is provided whereby it is made possible to lower and raise the clamp independently of the knife stock in order that the clamp may be again elevated after it has been lowered previous to the operation of the knife, thereby permitting readjustment of the sheets that are to be cut if the adjustment thereof is found to be imperfect after lowering the clamp.

Fig. I is a front elevation of my paper cutting machine, with portions in section. Fig. II is an end elevation of the machine. Fig. III is an enlarged cross section taken on line III—III, Fig. II. Fig. IV is an enlarged vertical section taken on line IV—IV, Fig. I. Fig. V is a horizontal section taken on line V—V, Fig. IV. Fig. VI is a diagrammatical view illustrating the cylinders and receiver tank, together with the piping and valve through which compressed air is conducted to said cylinders and receiving tank.

In the accompanying drawings:—1 designates the table of my paper cutting machine which is supported by end frames 2 and 2' that contain guideways 3 and 4 in which

the knife stock and clamp of the machine operate respectively.

5 designates the knife stock which carries a knife or cutter 6 and is adapted to move downwardly in the guideways 3 in an inclined direction toward the table 1, for the purpose of producing a shearing cut upon sheets of paper laid upon the table, as indicated at A, Fig. I.

7 is a clamp operable in the guideways 4, and which is adapted to be lowered in a direct vertical line onto the sheets of paper to be cut, prior to the descent of the knife stock. The clamp 7 has connected to it at its ends vertical rods 8, (see Figs. I and II), and these rods have connected to them rack bars 9, operable in suitable guideways provided therefor, as seen in full lines Fig. III and in dotted lines Fig. II.

10 is a rock shaft journaled in the end frames 2 and extending longitudinally through the paper cutting machine from end to end thereof. 11 are toothed sectors fixed to said rock shaft and arranged in mesh with the rack bars 9, one of the sectors having associated with it a lever arm 12 to which power is communicated by means to be hereinafter fully set forth.

13 designates a bracket located at one end of the machine and extending longitudinally of the machine from the end frame 2 by which it is supported, said bracket being surmounted by an upwardly and inwardly extending arm 14 which joins the bracket at its lower end and joins the adjacent end frame at its upper end.

15 is a bracket extending from the second end frame 2' of the machine.

16 and 17 designate rack bars connected at their upper ends to the knife stock 5 and extending downwardly in inclined directions relative to said knife stock, the rack bar 16 being located at the end of the machine occupied by the bracket 13 and inclined outwardly at said end within the arm 14, while the rack bar 17 is located at the end occupied by the bracket 15 and is inclined inwardly toward the end frame 2'. The object in arranging the rack bars as specified is to provide for an endwise movement of the knife stock when it is lowered through the medium of said rack bars and parts coöperable with them, in order that

the knife carried by the knife stock may operate with shearing action in its descent. The rack bars 16 and 17 mesh with spur wheels 18 and 19, journaled respectively in the brackets 13 and 15, to which they are held by pivotally mounted guide blocks 20 supported by said brackets.

21 and 22 are driver rack bars in mesh respectively with the spur wheels 18 and 19 and by which said spur wheels are operated to cause them to operate the rack bars 16 and 17 to lower and elevate the knife stock 5. The driver rack bars are supported by pivotally mounted guide blocks 23 that serve to maintain the said rack bars in engagement with the spur wheels 18 and 19.

24 designates a cylinder to which compressed air is delivered by means to be hereinafter mentioned and which contains a piston 25 (see dotted lines Fig. II), that carries a piston rod 26. The piston rod 26 is connected to the lever arm 12 associated with one of the sectors 11, and operates said lever arm to cause it to impart partial rotation to the rock shaft 10 and consequently to the two sectors 11 carried by said shaft. It will be seen that upon the actuation of the sectors, movement is imparted to the rack bars 9 and, as a consequence, the clamp 7 is either lowered or raised according to the direction of the movement of the piston 25 and piston rod 26.

27 designates a second cylinder to which compressed air is delivered to actuate the knife stock 5. In the cylinder 27 is a piston 28 through which extends a piston rod 29 movable with the piston and projecting through both ends of the cylinder. The driver rack bars 21 and 22 are connected to the ends of the piston rod 29, and upon longitudinal movement of the piston, said driver rack bars serve to actuate the spur wheels 18 and 19, which in turn perform the office of imparting movement to the rack bars 16 and 17, whereby the knife stock 5, to which the last named rack bars are connected, is either lowered or raised, according to the direction of movement of the piston rod 29.

30 is a storage reservoir for compressed air, (see dotted lines Fig. I and full lines Fig. VI).

31 designates a main compressed air supply pipe.

32 is a controlling valve to which the supply pipe 31 leads and which is supplied with a handle 33 adapted to be moved to control the flow of compressed air through said valve.

34 is a branch pipe leading from the supply pipe to the storage reservoir and by which a restricted degree of pressure of compressed air is constantly maintained in said storage tank, the degree of pressure admitted to the storage tank through said

tank being rendered less than the degree of pressure in the supply pipe, due to the introduction in said branch pipe of a "reducer" 35 in the branch pipe.

36 designates a main delivery pipe leading from the controlling valve 32 and which, through the medium of said valve, is adapted to be placed in communication with the supply pipe 31. The main delivery pipe leads to one end of the cylinder 24 containing the piston 25 by which the clamp of my machine is operated, so that the clamp will be carried to the paper to be cut and held thereupon with sufficient degree of pressure to prevent any movement of the paper.

37 designates a branch delivery pipe leading from the main delivery pipe 36 to the cylinder 27 containing the piston 28 by which the knife stock of my machine is operated, said supplemental delivery pipe being adapted to conduct compressed air to the cylinder 27 with less rapidity than it is delivered to the cylinder 24. To provide such difference in delivery, the cylinder 24 is arranged closer to the source of supply of compressed air than the cylinder 27, and consequently the compressed air is delivered from the main delivery pipe to the cylinder 24 to expand therein and operate the piston in said cylinder previous to the delivery of a sufficient degree of pressure medium to the cylinder 27 to operate the piston in the last named cylinder.

38 designates a connecting pipe leading from the end of the cylinder 24, opposite to that to which the main delivery pipe 26 leads, and which serves to provide communication between the cylinder 25 and the storage reservoir 30.

39 is a connecting pipe providing communication between the storage reservoir 30 and the end of the cylinder 27 opposite to that to which the supplemental delivery pipe 39 leads.

40 designates an exhaust pipe leading from the valve 32 and which is adapted to be placed in communication, through the medium of said valve, with the main delivery pipe 36.

In the practical use of my paper cutting machine, the pistons 25 and 28 in the cylinders 24 and 27, respectively, are brought into service to actuate the clamp 7 and the knife stock 5 by flow of compressed air in the following manner: By operating the handle 33 of the controlling valve 32, the operator places the main delivery pipe 36 in communication with the supply pipe 31, through said valve, and flow of compressed air is thereby permitted to take place through said main delivery pipe to the cylinder 24, with the result of causing movement to be imparted to the piston in said cylinder, and the lowering of the clamp 7

into operative position upon a pile of sheets of paper located on the table of the machine beneath the clamp. This actuation of the clamp occurs before sufficient compressed air has been conducted to the cylinder 27 through the supplemental delivery pipe 37 to impart movement to the piston 28 in the last named cylinder. Immediately after the clamp has been lowered, however, there is flow of compressed air to the cylinder 27 to furnish a sufficiently high degree of pressure in the last named cylinder to provide for the actuation of the piston 28 therein, and said piston is, therefore, moved and carries with it the piston rod 29, whereby the parts coöperable with said piston rod are actuated and the knife stock 5 is forcibly lowered for cutting action upon the sheets of paper held by the clamp 7. The operator next adjusts the handle 33 of the controlling valve so that the main delivery pipe 36 is placed in communication with the exhaust pipe 40 and the air in said pipe, together with the air that has been delivered from it, directly to the cylinder 24 and through the supplemental delivery pipe 34 to the cylinder 27 is permitted to find vent through said exhaust pipe. As has been previously mentioned, there is a constant supply of compressed air delivered to the storage reservoir 30 from the main supply pipe 31, which is of less degree of pressure force than the compressed air entering into the delivery pipes 36 and 37 and therefrom directly to the cylinders 24 and 27. This compressed air in the storage tank performs the office, by flowing through the connecting pipes 38 and 39 to the cylinders 24 and 27, respectively, of returning the pistons in said cylinders to their normal positions for the purpose of returning or elevating the clamp 7 and the knife stock 5. Upon each initial movement of the pistons 25 and 28, the air present in the ends of the cylinders with which the connecting pipes 38 and 39 communicate is returned to the storage reservoir.

It will be readily understood that, inasmuch as the cylinders 24 containing the piston 25 by which the clamp 7 is actuated through the medium of the intervening parts, the clamp may be operated both for downward and upward movements without the knife stock being brought into operation. That is to say, if a sufficient flow of compressed air is permitted to flow from the supply pipe through the main delivery pipe 36 to said cylinder 24 with the result of causing the clamp to be lowered, said clamp may be again elevated before the knife stock has been lowered for paper cutting action, as all that is required to provide for the elevation of the clamp at this time and the prevention of actuation of the knife stock is the discontinuance of flow of

compressed air through the main delivery pipe and the establishment of communication between said main delivery pipe and the exhaust pipe 40, with the result of permitting escape of compressed air from the pipe 36 to occur and flow of air from the storage reservoir through the connecting pipe 38 to the cylinder 24 to move the piston therein for the upward return of the clamp.

I claim:—

1. In a paper cutting machine, a clamp and knife stock, a cylinder, a piston operable in said cylinder for moving said knife stock both downwardly and upwardly, a second cylinder, a piston operable in said second cylinder and having connection with said clamp independent of said knife stock, means for conducting compressed air to said cylinders separately to operate the pistons therein independently of each other, thereby providing for independent movement of the knife stock and clamp, the compressed air conducting means being so arranged as to provide for the actuation of said clamp in either a downward direction or an upward direction previous to the actuation of said knife stock.

2. In a paper cutting machine, a clamp and knife stock, a cylinder, a piston operable in said cylinder for moving said knife stock both downwardly and upwardly, a second cylinder, a piston operable in said second cylinder and having connection with said clamp independent of said knife stock, means for conducting compressed air to said cylinders separately to operate the pistons therein independently of each other, thereby providing for independent movement of the knife stock and clamp, the air conducting means comprising compressed air conducting pipes leading direct from a source of compression to said cylinders to operate the cylinders in one direction, and a compressed air storage reservoir from which compressed air is delivered to the cylinders to move the pistons therein in the other direction.

3. In a paper cutting machine, a clamp and knife stock, a cylinder, a piston operable in said cylinder for moving said knife stock both downwardly and upwardly, a second cylinder, a piston operable in said second cylinder and having connection with said clamp independent of said knife stock, means for conducting compressed air to said cylinders separately to operate the pistons therein independently of each other, thereby providing for independent movement of the knife stock and clamp, the air conducting means comprising compressed air conducting pipes leading direct from a source of compression to said cylinder to operate the cylinders in one direction, a compressed air storage reservoir from which compressed

air is delivered to the cylinders to move the
pistons therein in the other direction, and
means whereby the pressure of air main-
tained in the storage reservoir is rendered
5 less than the pressure of air delivered di-
rectly to the cylinders from the source of
compression.

In testimony whereof, I have hereunto
affixed my signature, this 23rd day of De-
cember, 1909.

BENJAMIN F. BERRY.

In the presence of—

E. B. LINN,

A. J. McCauley.
