

March 31, 1936.

W. P. LLOYD

2,035,558

PHOTOCOPY MACHINE

Filed Sept. 20, 1935

4 Sheets-Sheet 1

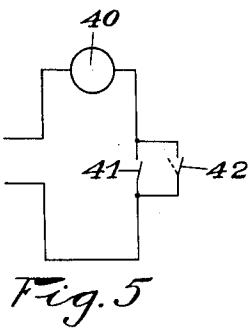
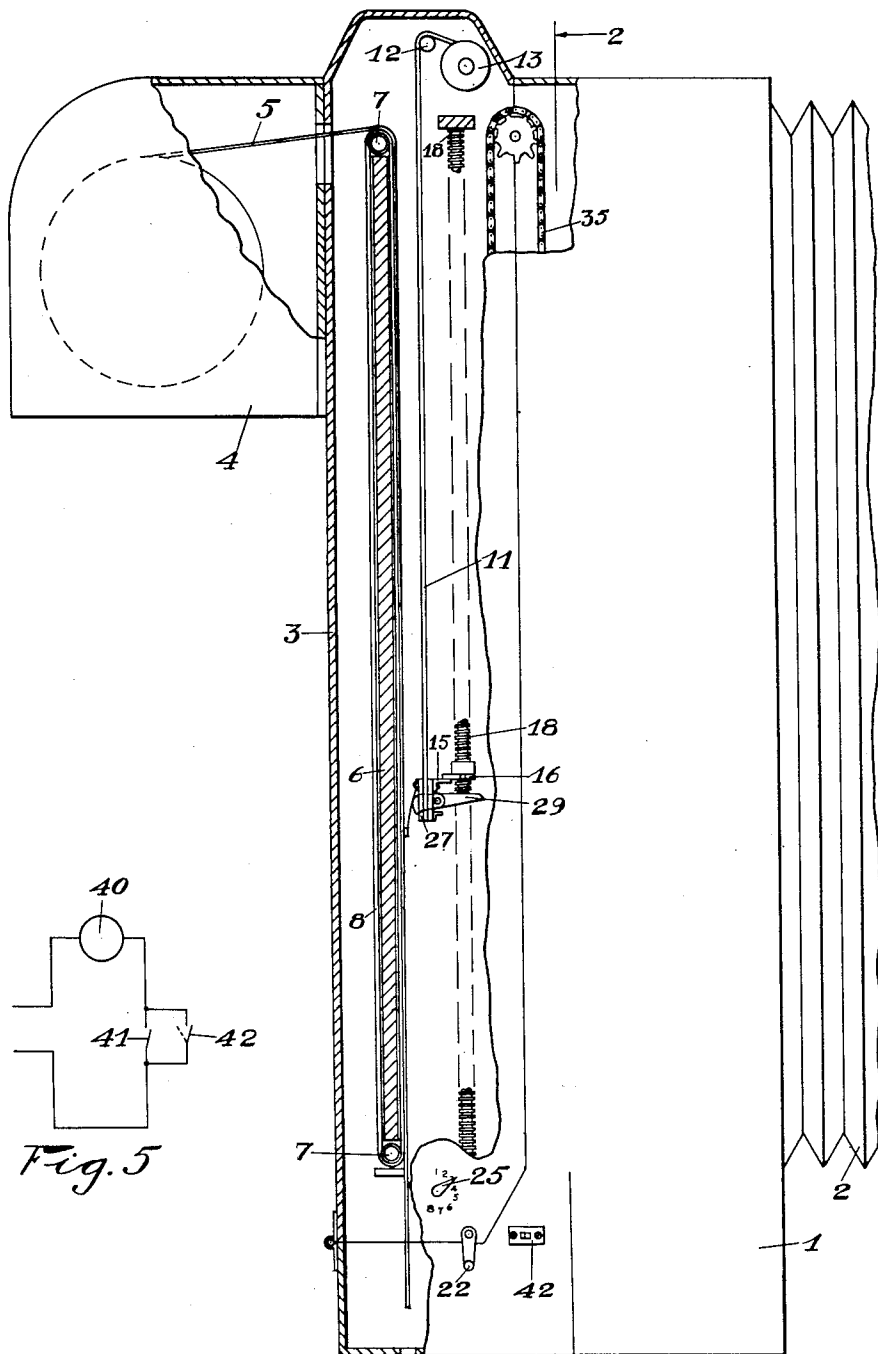


Fig. 1

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4 Sheets-Sheet 2

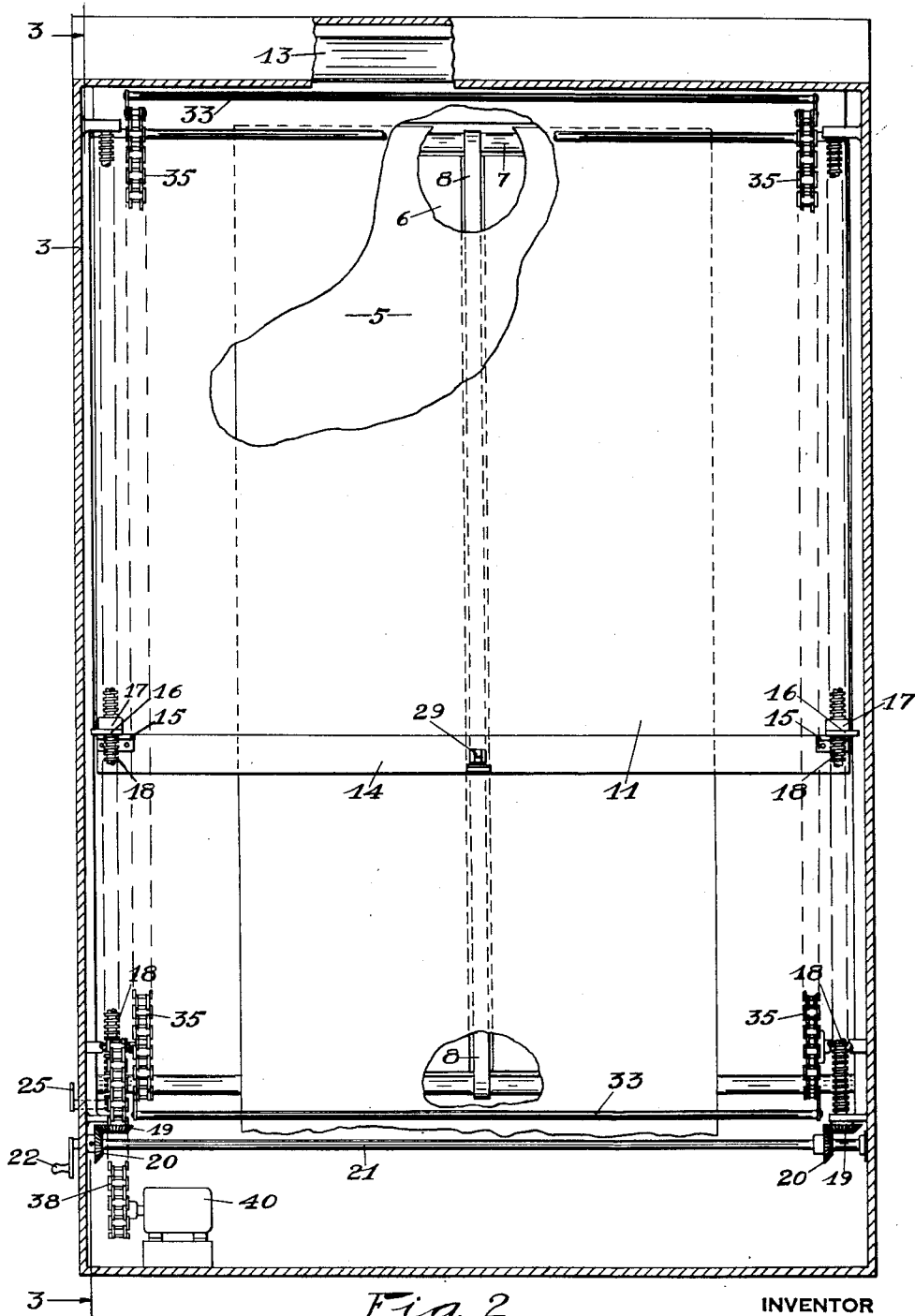


Fig. 2

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4 Sheets-Sheet 3

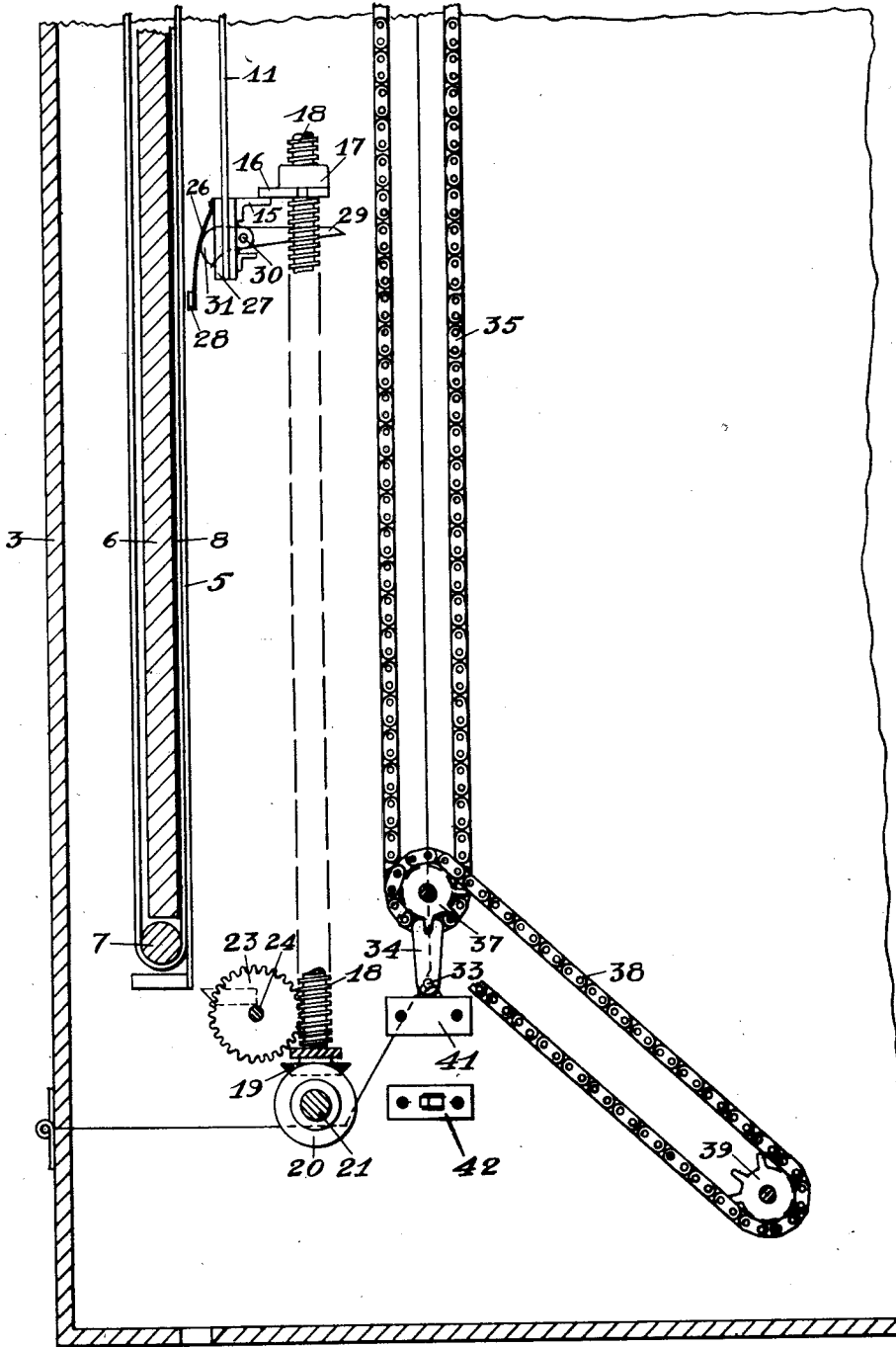


Fig. 3

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4 Sheets-Sheet 4

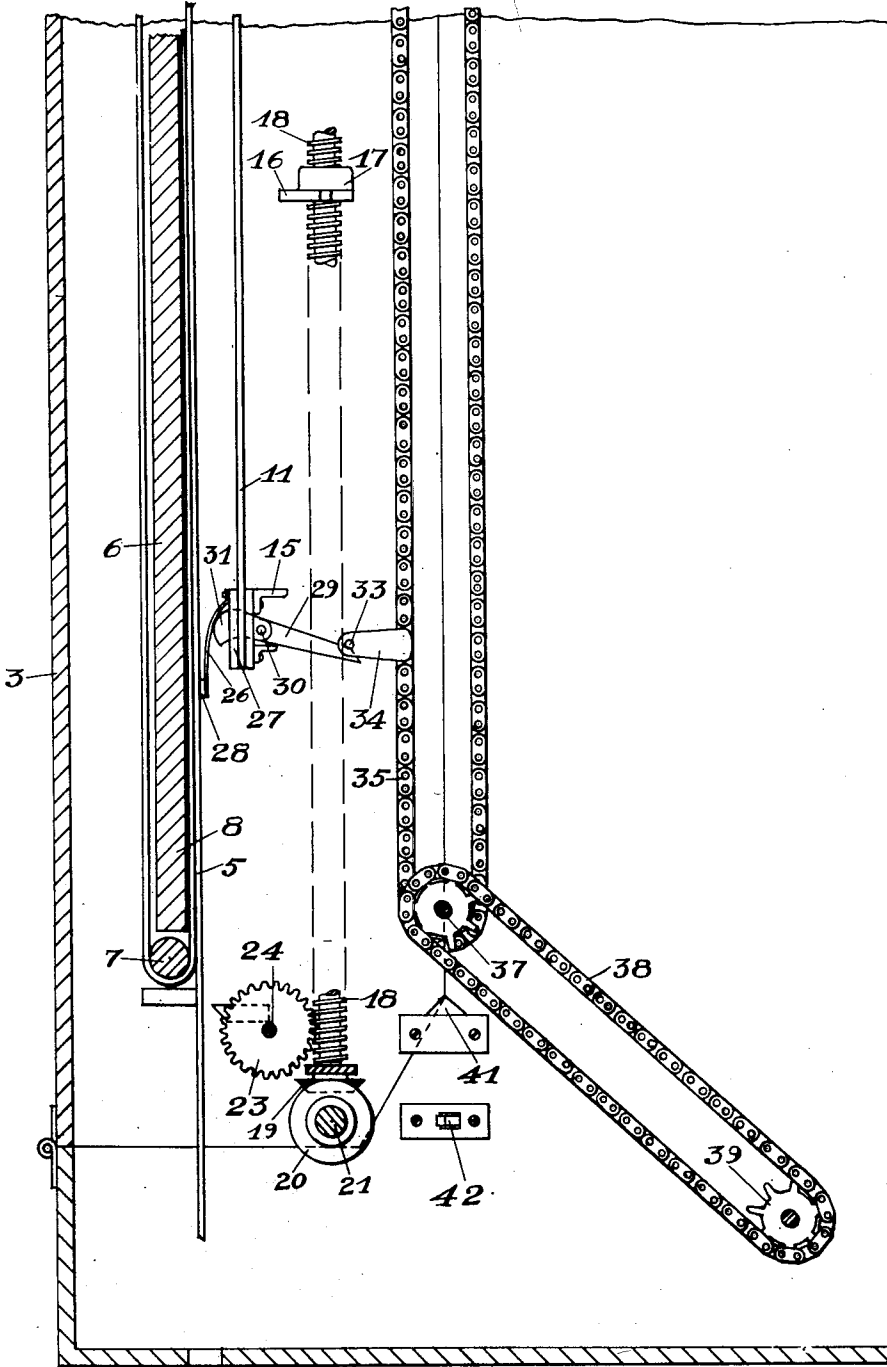


Fig. 4

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PHOTOCOPY MACHINE

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Application September 20, 1935, Serial No. 41,414

12 Claims. (Cl. 95—34)

This invention relates to a photo copy machine of the general type used for reproducing documents, maps, or other records, in which an exposure is made on a portion of a sheet of sensitized paper supplied from a roll, the exposed portion of the paper being fed and severed after exposure, and it has for its object to afford a practical, efficient and simple mechanism for automatically effecting the necessary feeding movement of the paper through operation of the curtain which determines the size of the area of paper exposed, the amount of paper fed depending on the position of the curtain.

In machines of this character, there is employed a movable curtain which can be adjusted to different positions to regulate the size of the exposure on the paper in accordance with the size of the subject being reproduced, and a more particular purpose of the invention is to afford a construction whereby the paper is fed by devices carried upon or movable with the curtain and which are set in operation to feed the paper during movement of the curtain to its closed position, the latter being automatically returned to its open position, as determined by an adjustable stop, after the paper is fed.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear clearly from the following description when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims following the specification.

In the drawings:

Fig. 1 is a side elevation, partially broken away and with parts in section, of a photo copy machine embodying a preferred arrangement of the invention, the curtain appearing in one adjusted open position;

Fig. 2 is a transverse vertical sectional view on the line 2—2 of Fig. 1, the chains being broken away;

Fig. 3 is an enlarged sectional view with parts broken away on the line 3—3 of Fig. 2;

Fig. 4 is a view similar to Fig. 3 showing the position of the curtain and paper engaging means during movement of the curtain toward its closed position, and

Fig. 5 is a diagrammatic view of the switch and circuit arrangement controlling the operating motor.

Referring more particularly to the drawings, in which like reference characters refer to the same parts throughout the several views, 1 designates the body portion of a conventional type of photo

copy machine, 2 is the bellows, 3 is the magazine, and 4 is the roll box from which the sheet of sensitized paper 5 is fed into the magazine in front of the backing plate 6. Arranged transversely at the top and bottom of the backing plate 6 are rotatable rolls 7 around which travels an endless belt 8 against which the paper sheet 5 is pressed as it is fed downwardly by the mechanism to be described presently.

Arranged forwardly of the paper sheet 5 in the magazine is a curtain 11 which travels around an idler roller 12 at the top of the magazine and is connected to and wound upon a spring roller 13 which retracts the curtain to open position after it is released by the curtain operating means. It will be understood that any suitable spring means may be used for this purpose.

The curtain 11 is adjustably held in open position, and to this end is provided at its lower end with a transverse plate 14 having at its opposite ends the lugs 15 which engage adjustable stops 16 as shown in Figs. 1 and 2. The adjustable stops 16 are preferably formed upon or carried by nuts 17 which travel on the vertically arranged screws 18, and by turning the screws 18, the nuts 17 and stops 16 are movable upwardly or downwardly to vary the open position of the curtain in accordance with the size of the exposure to be made.

Screws 18 carry at their lower ends bevel pinions 19 which are engaged and actuated by the meshing bevel pinions 20 mounted on a transverse shaft 21 which extends through the casing and carries an operating handle 22 at its outer end. The handle 22 may be turned by the operator in order to shift the stops 16 upwardly or downwardly as the case may be to bring the curtain to any desired point. One of the vertical screws 18 engages a worm gear 23, see Fig. 4, mounted on an arbor 24 which carries an indicator 25 at its end outside the casing, the latter cooperating with a suitable indicating scale so that the operator is enabled to determine the position of the curtain at any time, and thus facilitate adjusting it to the proper point.

The curtain is normally open, being held in such position against the adjustable stops by the spring means to which reference has already been made, and after exposure, is moved downwardly by suitable curtain operating means and carries with it during such downward movement the exposed part of the sensitized paper. The paper engaging means and the manner in which it and the curtain are controlled by the curtain operating means will now be set forth in detail.

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The curtain engaging means may be constructed in different ways, and in the illustrated embodiment comprises a spring arm 26 secured to a plate 27 attached at the lower end of the curtain 11, and carrying at its free end a finger or presser foot 28 which engages the paper sheet and holds it tightly against the endless belt 8. The spring arm 26 is held in position to engage the paper by an actuating member preferably in the form of a lever 29 pivoted at 30 and having a cam portion 31 which when moved upwardly engages the spring arm 26 and swings it outwardly from the position shown in Figs. 1 and 3 to the position shown in Fig. 4.

The actuating member or lever 29 is controlled by the curtain operating means which in the present instance includes a transverse rod 33 extending between and connecting the brackets 34 which are carried by endless chains 35 arranged at either side of the machine. There are preferably two pairs of brackets 34 and two rods 33 normally located at the top and bottom of the machine, as shown in Fig. 2, and at each operation, one of the rods 33 travels from its top position to the bottom position as the chains complete half of their travel, and during such movement the top rod 33 engages the actuating member or lever 29, as shown in Fig. 4, forcing it downwardly until the paper engaging means grips the paper tightly against the endless belt 8, and further movement of the endless chains and rod 33 thereupon carries the curtain 11 downwardly and with it the sheet of sensitized paper.

As the rod 33 reaches the limit of its downward movement, it rides off of the actuating member 29, releasing the curtain and likewise releasing the paper engaging means from the paper, and the curtain thereupon is retracted by the spring roller 13 to its open position against the stops, the rod 33 assuming the position shown in Fig. 3. This movement of the curtain operating means is automatically brought about through a switch controlled by the operator, and the following mechanism.

The chains 35 travel around sprockets on a shaft 37 which also has fixed thereon a sprocket engaged by a drive chain 38 from a drive shaft 39 that is operated by the electric motor 40. The motor 40 is in a circuit that is controlled by a switch 41 that lies in the path of the rods 33 and is operated thereby as shown in Fig. 3 to open the motor circuit when one rod 33 reaches the bottom of its travel, and 42 is a manually controlled momentary switch which may be of any conventional type and which, when closed by the operator, maintains the circuit closed for a sufficient length of time to permit the motor to operate the endless chains 35 and carry the bottom-most rod 33 out of engagement with the switch 41, which thereupon closes by spring action and holds the circuit closed until the next rod 33 reaches its bottom position and engages switch 41 to open the circuit. The switches 41 and 42 are arranged in parallel, as shown in Fig. 5, switch 42 opening automatically shortly after it is released by the operator and after the switch 41 is permitted to close the circuit upon movement of the rod 33.

The operation briefly is as follows: The operator adjusts the curtain stops by turning handle 22 to bring the curtain to any desired position. After an exposure has been made, the operator closes switch 42 which brings the curtain operating means into operation, causing the rod 33

that is at the top of the machine to travel downwardly as indicated in Fig. 4 until it reaches the position shown in Fig. 3, whereupon the circuit is automatically opened and the parts are ready for another operation. During such downward travel of the curtain operating means, the actuating member or lever 29 is first moved to cause the paper engaging means to grip the paper against endless belt 8, and following this the rod 33 carries with it downwardly the lever 29, the curtain 11, and the paper sheet 5 until the rod 33 travelling around the lower sprocket rides off of the lever 29, at which time the paper and curtain are released, the curtain immediately being retracted to its open position. The paper is then ready to be severed, and the curtain is in position for another exposure, prior to which the operator may change the position of the curtain if a different sized opening is desired.

While the invention has been described with reference to a particular structural arrangement, it is not confined to the details herein disclosed, and this application is intended to cover any modifications or departures coming within the purposes of the improvement or the scope of the following claims.

I claim:

1. In a photo copy machine, the combination with a flexible curtain, spring means for actuating it to open position, and curtain operating means for moving the curtain to closed position, of paper engaging means carried by the curtain and moved by said curtain operating means to feed the paper when the curtain is moved toward closed position.

2. In a photo copy machine, the combination with a flexible curtain, spring means for actuating it to open position, and curtain operating means for moving the curtain to closed position, of paper engaging means movable with the curtain, said curtain operating means acting to cause said paper engaging means to engage and feed the paper as the curtain travels to closed position, the paper engaging means being free of the paper during movement of the curtain to open position.

3. In a photo copy machine, the combination with a flexible curtain, spring means for actuating it to open position, and curtain operating means for moving the curtain to closed position, of paper engaging means carried by the curtain, the curtain operating means also actuating the paper engaging means to cause the latter to engage and feed the paper as the curtain travels toward closed position.

4. In a photo copy machine, the combination with a flexible curtain and spring means for operating the curtain to open position, of curtain operating means for moving the curtain to closed position, and an adjustable stop for limiting the opening movement of the curtain.

5. In a photo copy machine, the combination with a flexible curtain and spring means for operating the curtain to open position, of an adjustable stop for limiting the opening movement of the curtain, curtain operating means for moving the curtain to closed position, and paper engaging means carried by the curtain and acting automatically to engage and feed the paper as the curtain is moved toward closed position.

6. In a photo copy machine, the combination with a flexible curtain and curtain operating means for moving the curtain to closed position, of paper engaging means carried by the curtain, and an actuating member movably mounted on

the curtain and controlled by said curtain operating means to actuate the paper engaging means into contact with the paper for feeding the latter when the curtain is moved to closed position, and to move the curtain.

5 7. In a photo copy machine, the combination with a curtain and spring means for operating the curtain to open position, of a pair of stops cooperating with opposite ends of the curtain for limiting its opening movement, said stops being 10 carried by a pair of vertically movable nuts, a pair of screws on which said nuts are mounted, and means for simultaneously turning said screws to adjust the stops.

15 8. In a photo copy machine, the combination with a curtain and curtain operating means for moving the curtain to closed position, of an endless belt, and paper engaging means carried by the curtain and operable to press the paper 20 against said belt and to feed the paper as the curtain is moved toward closed position.

25 9. In a photo copy machine, the combination with a curtain and curtain operating means for moving the curtain to closed position, of an endless belt, paper engaging means carried by the curtain and acting to press the paper against said belt, and an actuating member movably mounted on the curtain and engageable by said curtain operating means to force the paper engaging

means into contact with the paper and to move the curtain downwardly.

10. In a photo copy machine, the combination with a flexible curtain and spring means for operating the curtain to open position, of an adjustable stop for limiting the opening movement of the curtain, curtain operating means for moving the curtain to closed position, and paper engaging means movable with the curtain and operable to feed the paper during movement 10 of the curtain to closed position.

11. In a photo copy machine, the combination with a curtain, spring means for operating the curtain to open position, an adjustable stop for the curtain, and curtain operating means which 15 when set in operation automatically moves the curtain to closed position and then releases the curtain.

12. In a photo copy machine, the combination with a curtain, spring means for operating the curtain to open position, an adjustable stop for the curtain, curtain operating means which when set in operation automatically moves the curtain to closed position and then releases the curtain, and paper engaging means carried by the curtain 25 and automatically controlled by the curtain operating means to engage and feed the paper as the curtain is moved to closed position.

WHITTEN P. LLOYD.