

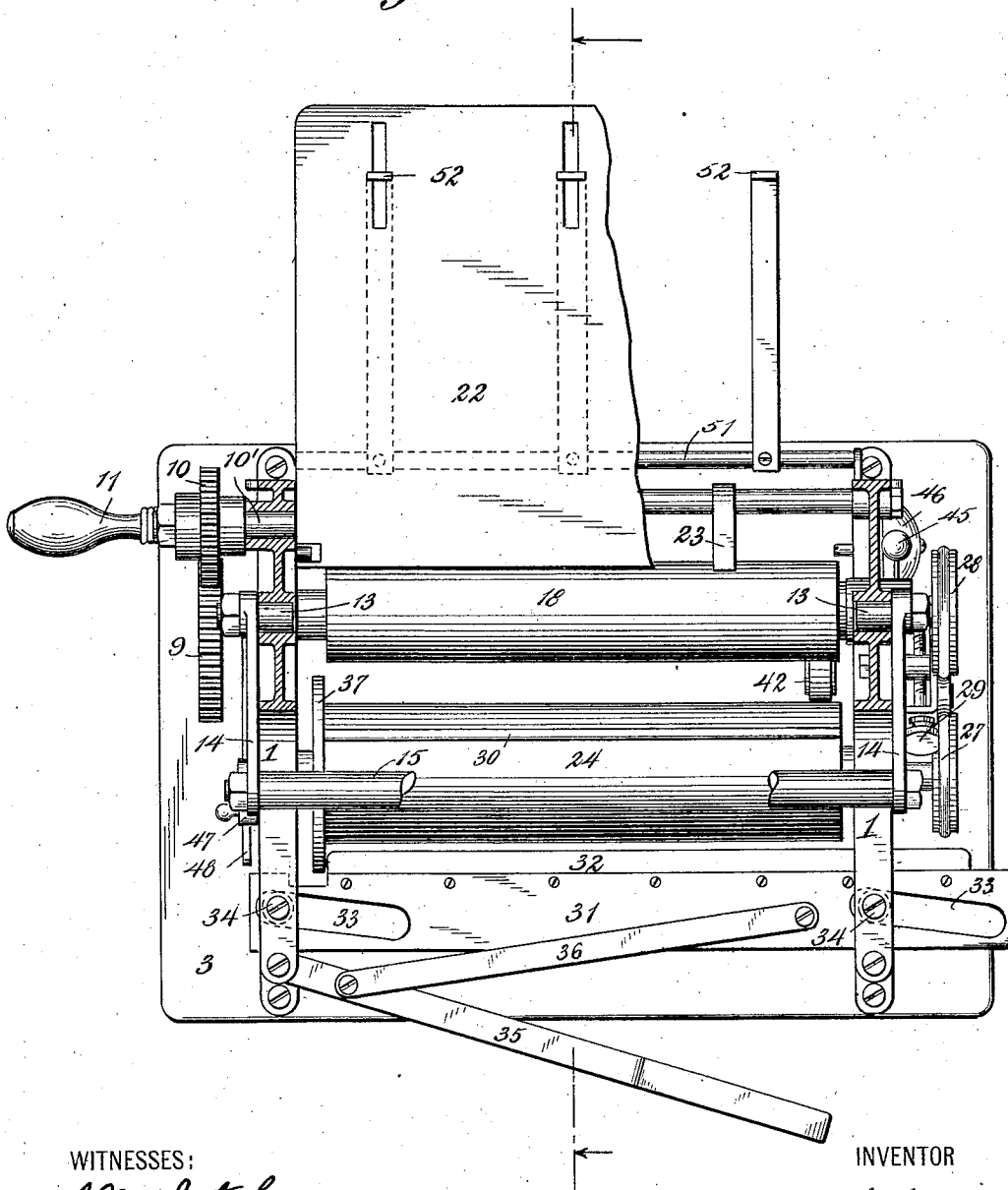
No. 848,594.

PATENTED MAR. 26, 1907.

A. D. KLABER.
COPYING MACHINE.
APPLICATION FILED OCT. 28, 1905.

2 SHEETS—SHEET 1.

Fig. 1,



WITNESSES:

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A. Edwards

INVENTOR

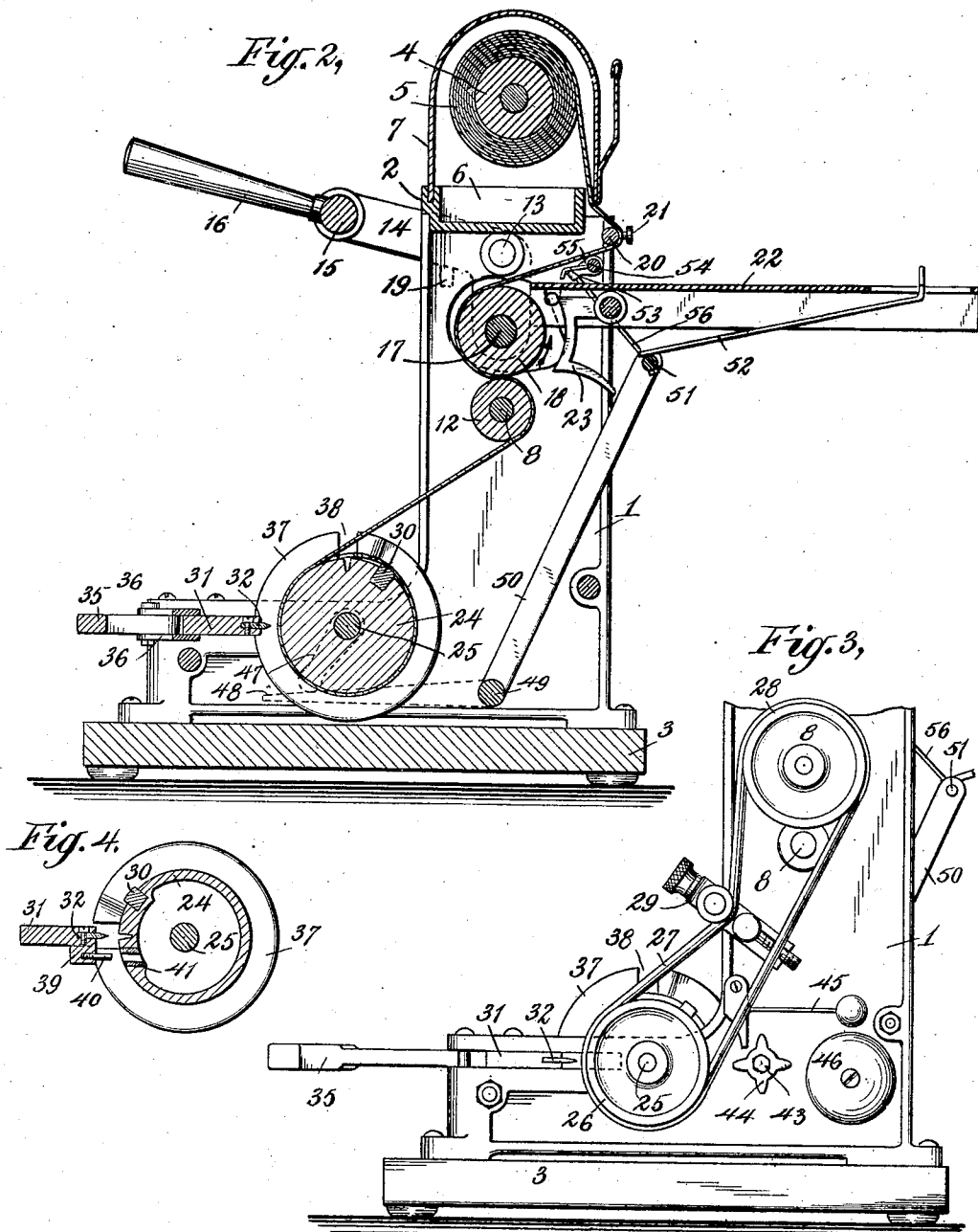
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2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

AUGUSTUS D. KLABER, OF LONDON, ENGLAND.

COPYING-MACHINE.

No. 848,594.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed October 28, 1905. Serial No. 234,920.

To all whom it may concern:

Be it known that I, AUGUSTUS D. KLABER, a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improvements in Copying-Machines, of which the following is a specification.

This invention relates to copying-machines, and more particularly to that class of machines commonly used in offices for obtaining impressions of letters.

The object of the invention is to provide a copying-machine which is simple and inexpensive in construction and convenient to operate, by which sharply-defined impressions of letters are obtained, and in the use of which creasing of the letters in passing them through the machine is avoided.

Other objects of the invention are to provide a feeding device for the letters, means to prevent feeding in the letters except at the proper times, and improved devices for receiving the web of paper with the impressions thereon and for cutting the web into sheets.

These and other novel features of the invention will be more definitely set forth in the claims appended hereto.

The details of the construction and the method of operating my improved copying-machine will be better understood by reference to the following description, taken in connection with the accompanying drawings, which show the preferred embodiment of my invention, and in which—

Figure 1 is a top view of the machine, broken away in parts. Fig. 2 is a section of the machine. Fig. 3 is an elevation showing a portion of the operating mechanisms, and Fig. 4 is a detail view showing a modification.

Referring to the drawings, which illustrate a type of machine adapted for the use of a prepared copying-paper which does not require damping in the machine, 1 1 indicate the sides, and 2 the top, of the frame of the machine mounted on a base 3, of wood or other suitable material. On the top 2 are standards carrying a pivoted supply-roller 4, on which the prepared paper 5 is wound. A depression 6 is formed in the upper surface of the top 2 for the reception of water or a piece of felt or similar material saturated with water, and a cover 7 is provided, fitting down upon the top 2 to inclose the roll of paper. In this way evaporation of the moistening material with which the copying-paper is sat-

urated is prevented, and the paper is kept constantly moist. Mounted in suitable bearings in the sides of the frame below the top 2 is a shaft 8, the ends of which are extended through the frame. At one end the shaft carries a gear 9, which meshes with a pinion 10, secured on a short shaft 10', mounted in a suitable bearing and carrying a handle 11, so that turning handle 11 causes rotation of shaft 8 and the actuating-roller 12 of the machine, which is carried by shaft 8. Pivoted at 13 to the sides of the frame above the actuating-roller 12 are bell-crank levers 14, the outer ends of which are connected by a rod 15, carrying a handle 16. At the other ends of the bell-crank levers are formed bearings for a shaft 17, the ends of which extend through enlarged openings in the sides 1 1 of the frame of the machine. Shaft 17 carries the presser-roller 18. This roller is formed of rubber or other suitable resilient material and may be either cylindrical or in the form of a circular cylinder, bulging slightly at its center. The actuating-roller 12 is much smaller in diameter than the presser-roller 18 and is in the form of a circular cylinder, which may become slightly bent when pressed in contact with the presser-roller when the bulged presser-roller is used. The actuating-roller 12 may be made of any suitable material. For use in conjunction with a cylindrical presser-roller I prefer to make it of a hard-wood core surrounded by a tube of copper or other metal.

On the sides 1 1 of the frame of the machine are formed stops, as indicated at 19, against which the arms of the bell-crank levers 14, carrying the presser-roller 18, abut, when handle 16 is moved downward, to limit the forward movement of the presser-roller. In moving to this position the presser-roller is forced into hard engagement with the actuating-roller, and when in this position the axis of the presser-roller is in or slightly forward of the plane through the axes of the actuating-roller 12 and the pivots of the bell-crank levers 14. The rotation of the actuating roller in the direction to copy letters, as indicated by the arrow in Fig. 2, tends to maintain the parts in this relation, while a slight backward rotation of handle 11 instead of turning the shaft of the presser-roller in its bearings turns the bell-crank levers 14 on their pivots to carry the presser-roller 18 away from the position in which it is held by the toggle arrangement of the parts in hard

contact with the actuating-roller 12. This is done to avoid injury to the surface of the presser-roller by being pressed in contact with the actuating-roller for long periods when the machine is not in use.

In the bottom of the inclosure for the roll 5 of prepared paper is a narrow slit, through which the end of the roll of paper is carried and which may be made practically air-tight, if desired, by a flap of rubber placed along its edge. Directly below this slit a roller 20, formed from a polished metal rod of small diameter, is mounted in bearings on the sides of the frame. A set-screw 21 enters a threaded opening in one of the bearings for roller 20. The web of paper after passing out of the inclosure for the roll 5 through the slit therein is carried over the roller 20, then to the presser-roller 18 and around about half of the cylindrical surface of the roller to the line of contact of the presser and actuating rollers, and then around the actuating-roller. With every moist paper any material amount of friction at the roller 20 would tear the paper, so that when using such paper I permit the roller 20 to turn freely in its bearings; but when using ordinary paper a little friction is a great improvement, since it keeps the paper tight, and in that case I tighten up the set-screw 21, so as to prevent the turning of roller 20. The letters to be copied are fed in between the presser-roller 18 and the copying-paper from a slide 22, removably mounted upon the sides of the frame. If desired, this slide may be so arranged that the letter falls by its own weight into the correct position. The letter passes, with the copying-paper, around about half of the circumference of the presser-roller and between the presser and actuating rollers and may fall into a tray placed in the proper position. In order to prevent the letters from sticking to the presser-roller and passing around it twice, I provide pieces 23 to guide the letters away from the roller.

The web of paper after passing between the actuating and pressing rollers is wound upon a receiving-roller 24, carried by a shaft 25, which is mounted for rotation in suitable bearings in the frame of the machine. Shaft 25 is extended through the frame at one end and carries a pulley 26. A belt 27 runs on pulley 26 and a pulley 28, secured on the end of shaft 8 opposite that carrying the gear 9, to communicate rotary motion to the receiving-roller when the actuating-roller 12 is rotated, a suitable belt-tightening device 29 being provided, if desired. In a longitudinal groove in the surface of the receiving-roller is a strip 30, of heavy felt or other suitable material impregnated with glycerin, to which the end of the web of paper may be readily attached by pressing it against the viscous surface presented by the felt. Mounted for longitudinal movement in openings in the

frame of the machine is a bar 31, carrying a knife-edge 32, and in the bar are slots 33, disposed at an acute angle to the length of the bar, through which bolts 34 extend. Pivoted to the bar 31 is a handle 35, and two links 36 are pivotally connected at one end to handle 35 and at the other to bar 31. In the roller 24 is a narrow slot to receive the knife-edge 32 when the cutting device is operated. The circumference of the receiving-roller 24 is equal to the length of the web of copying-paper required for one letter, so that each convolution of the web on the receiving-roller contains a copy of the letter. It is therefore essential that the cutting device should be operated only when the receiving-roller is in a definite position with respect to the cutting edge, so that the cuts will be made midway between adjacent copies. For this purpose I provide a circular plate 37 on the end of the receiving-roller 24, having a slot cut therein, as indicated at 38. The outer edge of plate 37 extends into the path of movement of the end of bar 31, so that the slot 38 must be opposite the end of the bar to permit operation of the cutting device. The slot 38 is preferably just ahead of the strip 30, and its back edge is beveled off, so that if the receiving-roller is turned just past the position for cutting and the handle 35 is operated the end of bar 31 will engage this beveled edge and turn the roller back to the correct position for cutting, thus easing off the web of paper between the receiving and actuating rollers. It is sometimes desirable to punch holes in the sheets formed when the web on the receiving-roller is cut, along the edge of the sheets, so that they can be filed away, and in Fig. 4 I show a form of cutting device suitable for accomplishing this simultaneously with the cutting of the web into sheets. Secured to the under side of the bar 31, carrying the cutting edge, is a strip 39, carrying one or more punches 40, and in the roller 24, which in this case may be hollow, and just ahead of the slot which receives the knife-edge is a metallic strip 41, having holes therein to receive the punches 40.

In order that the operator will not permit too great a number of letters to be wound upon the receiving-roller, so that the relation of the copied letters with respect to the cutting device is noticeably affected, I provide a signaling device which is operated to give a signal after a definite number of convolutions have been wound on roller 24. Any suitable audible or visual signaling device may be employed for the purpose. In the drawings I have shown a roller 42 mounted opposite roller 24 on a short shaft 43, which extends through the frame of the machine and carries on its outer end a star-wheel 44. When this wheel is turned by the engagement of the roller 42 with the paper on roller 24, the teeth thereon reciprocate a pivoted

hammer 45, which strikes a bell 46, thus indicating that the cutting device should be operated and the sheets into which the web is cut removed from the receiving-roller.

5 Since the web of copying-paper is wound upon a roller and while so wound is cut into a plurality of sheets, the letters from which the copies are made should be introduced into the machine at such times that the copies
10 made therefrom will be properly disposed upon the receiving-roller 24. In order that this may be done, I may employ any suitable signaling device arranged to give an audible or visual indication of the times for introducing the letters. However, I prefer to use an
15 automatically-operated feeding device which is actuated by the receiving-roller and which moves the letters into position at the proper times. Such a device is shown in the drawings, in which 47 indicates a crank or cam on
20 the shaft 25 of the roller 24, adapted to engage an arm 48 on a pivoted shaft 49. Secured to this shaft are arms 50, in the ends of which is pivoted a rod 51, carrying a plurality
25 of fingers 52. The ends of these fingers extend up through slots in the slide 22. Thus each time crank 47 engages arm 48 the ends of the fingers 52, protruding through the slide 22, are moved forward toward the presser-
30 roller 18, and if a letter is on the slide the fingers push it forward until its forward edge is caught between the web of copying-paper and the presser-roller 18, and when the letter is introduced in this way the copy formed
35 from it will be wound upon the receiving-roller 25 in the proper position for cutting.

In order to positively prevent the introduction of letters at improper times, I provide at the forward end of the slide a plurality
40 of fingers 53, carried by a pivoted rod 54, which normally rest upon slide 22 and which are raised off the slide only at the proper times for introducing the letters from which copies are to be made between the web and
45 the presser-roller. On the rod 54 is a crank 55, carrying a pivoted stud having an opening therein, through which extends a rod 56, carried by the rod 51. Rod 56 is adapted to
50 slide through the opening in the pivoted stud carried by crank 55, but only after moving the crank to the limit of its movement up or down to raise or lower the fingers 53. It is obvious that either one or both of the sets of
55 fingers 52 and 53 may be employed.

The operation of the machine will now be described.

The handle 16 is pressed downward, thus moving the pressure-roller 16 into hard contact with the actuating-roller 12, the movement being arrested when the axis of roller
60 16 has crossed the plane through the axes of shaft 8, carrying the actuating-roller and the pivots 13 of levers 14. The web of copying-paper is passed over the rollers in the manner
65 described and its end secured to the viscous

strip on the receiving-roller. A letter to be copied is then placed upon the slide 22 and the handle 11 turned, thus turning the actuating-roller 12, the presser-roller 16, on account of its contact with the actuating-roller, 70 and the receiving-roller 24 by means of the belt 27. The copying-paper is thus unwound from the supply-roller 4 and wound upon the receiving-roller. When the crank 47 on the shaft of the receiving-roller engages arm 48, 75 the ends of the fingers 53 are raised and the ends of fingers 52 are moved up in the slots in slide 22. Fingers 52 engage the edge of the letter on the slide and push the letter forward until its forward edge is caught between 80 the web of copying-paper and the presser-roller. Further rotation carries the letter around the presser-roller and between it and the actuating-roller in contact with the web of copying - paper. As the letter passes 85 around substantially half of the circumference of the presser-roller before passing between it and the actuating-roller, it is always straightened out upon the roller and creasing thereof is avoided, and as the actuating-roller 90 is of much smaller diameter than the presser-roller a sharply-defined copy is obtained upon the copying-paper. Other letters are successively placed upon the slide and automatically fed in between the web and 95 the presser-roller in a similar manner. The web of copying-paper with copies of the letters thereon is wound on the receiving-roller 24, and when a definite amount has been so wound the paper engages roller 42 and rotates it, thus ringing bell 46 and giving a signal that the web of copying-paper should be removed from roller 24. After this signal is given the rotation of the rollers is discontinued, when the parts are in such a position 105 that the slot 38 in plate 37 is opposite or preferably just past the end of bar 31. Handle 35 is then swung around on its pivot, thus moving bar 31 and the knife-edge carried thereby toward and along the surface of 110 the receiving-roller. The end of the bar engages the beveled edge of the stop 38, moves the receiving-roller backward somewhat, and then passes through the slot 38, and the knife-edge 32 effects a drawing cut of the several 115 convolutions of the paper upon the receiving-roller. If the punches 40 are employed, holes are punched in the sheets thus formed adjacent to the edge to facilitate binding. The loose end of the web is then secured to the 120 viscous strip 30 and the parts are in readiness for further copying.

I do not wish to be understood as limited to the exact construction which I have herein shown and described, as many modifications can be made therein without departing from the spirit of my invention. Such modifications I consider within the scope of my invention, and I aim to cover them by the terms of the claims appended hereto. 125 130

What I claim is—

1. A copying-machine having a supply-roller on which a continuous web of copying-paper is wound, an inclosure for the roller having a narrow opening therein through
5 which the web of paper passes, a receptacle for a damping medium within the inclosure, two rollers between which said web passes, and means for actuating said rollers, substantially as described.

2. A copying-machine comprising a supply-roller on which a continuous web of copying-paper is wound, two copying-rollers one having a resilient surface and the other being
15 of smaller diameter and having a hard surface, means for pressing said rollers together, means for rotating one of said rollers, and a feed-board so located with reference to said rollers that the impression-sheets fed from
20 said board are caused to pass around substantially half the circumference of one of said rollers in contact with said web and then between said rollers, substantially as described.

3. In a copying-machine, the combination of a supply-roller on which a continuous web of copying-paper is wound, two rollers mounted for rotation in contact with each other and between which the web of paper passes,
30 means for rotating one of said rollers, an automatically-operated feeding device for feeding sheets from which copies are to be made between the web of paper and one of said rollers, a receiving-roller on which the web is
35 wound after passing between said rollers, and means for cutting the web of paper upon the receiving-roller, substantially as described.

4. A copying-machine having a supply-roller upon which a continuous web of copying-paper is wound, two rollers between
40 which the web of paper passes, means for rotating one of said rollers, a member having a plane surface over which sheets from which copies are to be made are moved, devices for preventing the feeding of sheets over said
45 surface, and means for operating said devices intermittently to permit of feeding, substantially as described.

5. A copying-machine having a supply-roller upon which a continuous web of copying-paper is wound, two rollers between
50 which the web of paper passes, means for rotating one of said rollers, means for feeding sheets from which copies are to be made between the web of paper and one of said rollers, devices for preventing the feeding of the
55 sheets, and means for operating said devices intermittently to permit of feeding, substantially as described.

6. In a copying-machine, the combination of a supply-roller upon which a continuous web of copying-paper is wound, two rollers between which the web of paper passes,
60 means for rotating one of said rollers, a receiving-roller on which the web is wound af-

ter passing between said rollers, a member having a plane surface over which sheets from which copies are to be made are moved, and means for preventing the feeding of sheets over said surface except when the
70 parts are in a predetermined relation, substantially as described.

7. In a copying-machine, the combination of a supply-roller upon which a continuous web of copying-paper is wound, two rollers
75 between which the web of paper passes, means for rotating one of said rollers, a receiving-roller upon which the web is wound after passing between said rollers, means for cutting the web of paper upon the receiving-
80 roller, a member having a plane surface over which the sheets from which copies are to be made are moved, devices for preventing the feeding of sheets over said surface, and means for operating said devices intermit-
85 tently to permit of feeding, substantially as described.

8. A copying-machine having a supply-roller upon which a continuous web of copying-paper is wound, two rollers between
90 which the web of paper passes, means for rotating one of said rollers, a member having a plane surface over which sheets from which copies are to be made are moved, feeding devices for moving sheets over said surface, de-
95 vices for obstructing the movement of sheets over said surface, and means operated automatically for simultaneously moving said obstructing devices and actuating said feeding devices to move a sheet into position for
100 copying, substantially as described.

9. In a copying-machine, the combination of a supply-roller upon which a continuous web of copying-paper is wound, two rollers between which the web of paper passes,
105 means for rotating one of said rollers, an automatically-operated device for feeding sheets between the web and one of said rollers, devices for preventing the feed of the sheets, means for operating said devices to
110 permit feeding, a receiving-roller upon which the web is wound, and means for cutting the web upon the receiving-roller, substantially as described.

10. In a copying-machine, the combination of a supply-roller upon which a continuous web of copying-paper is wound, two rollers between which the web of paper passes,
115 means for rotating one of said rollers, a receiving-roller upon which the web is wound after passing between said rollers, means for cutting the web upon the receiving-roller, and an indicator operated automatically when a definite amount of paper has been wound upon the receiving-roller, substantially as
125 described.

11. In a copying-machine, the combination of a supply-roller upon which a continuous web of copying-paper is wound, two rollers between which the web of paper passes,
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means for rotating one of said rollers, a receiving-roller upon which the web is wound, an indicator arranged to give an indication when a definite amount of paper has been wound on the receiving-roller, and means for cutting the web of paper upon the receiving-roller, substantially as described.

12. In a copying-machine, the combination of a supply-roller upon which a continuous web of copying-paper is wound, two rollers between which the web of paper passes, means for rotating one of said rollers, a receiving-roller upon which the web of paper is wound, a viscous section upon the surface of said receiving-roller, and means for rotating the receiving-roller, substantially as described.

13. In a copying-machine, the combination of a supply-roller on which a continuous web of copying-paper is wound, two rollers between which the web of paper passes, means for rotating one of said rollers, a receiving-roller on which the web of paper is wound after passing between said rollers, and devices for cutting the web of paper upon the receiving-roller and for simultaneously punching holes in the sheets thus formed adjacent to the line of the cut, substantially as described.

14. In a copying-machine, the combination of a frame, a supply-roller on which a continuous web of copying-paper is wound, two rollers between which the web of paper and the sheets from which the copies are to be made pass, one of said rollers being mounted in said frame, a pivoted frame carrying the other of said rollers and adapted to be swung about its pivots to carry said roller into and out of engagement with the roller first named, and means for rotating one of said rollers, substantially as described.

15. A copying-machine having a supply-roller on which a continuous web of copying-paper is wound, two rollers between which the web of paper and the sheet from which the copy is to be made pass, pivoted arms in which one of said rollers is supported, stops to limit the movement of said arms when the axis of the roller carried thereby has crossed the plane of the axes of the other roller and the pivots of said arms, and means for rotating one of said rollers, substantially as described.

16. In a copying-machine, the combination of a supply-roller, two rollers between which the web from the supply-roller passes, means for rotating one of said rollers, a roller

to receive the web, a cutting device for cutting the web of paper upon said receiving-roller, means for operating said device, and means to prevent operating the cutting device except when the receiving-roller is in a definite position, substantially as described.

17. In a copying-machine, the combination of a supply-roller on which a continuous web of copying-paper is wound, two rollers between which the web of paper passes, means for rotating one of said rollers, a receiving-roller on which the web is wound, means for operating the same, devices for feeding sheets from which copies are to be made between the web and one of said rollers, and means for operating said devices when the receiving-roller is in a definite position, substantially as described.

18. In a copying-machine, the combination of a supply-roller on which a continuous web of paper is wound, two rollers between which the web of paper passes, means for rotating one of said rollers, a receiving-roller on which the web is wound after passing between said rollers, and means to insure the introduction of sheets between the web and one of said rollers when the receiving-roller is in a definite position, substantially as described.

19. In a copying-machine, the combination of a supply-roller on which a continuous web of paper is wound, two rollers between which the web of paper passes, means for rotating one of said rollers, a receiving-roller on which the web is wound after passing between said rollers, and means controlled by the receiving-roller governing the introduction of the sheets from which copies are to be made between the web of paper and one of said rollers, substantially as described.

20. A copying-machine comprising a supply-roller on which a continuous web of copying-paper is wound, two copying-rollers, means for pressing said rollers together, means for rotating one of said rollers, and a feed-board so located with reference to said rollers that the impression-sheets fed from said board are caused to pass around substantially half the circumference of one of said rollers in contact with said web and then between said rollers, substantially as set forth.

This specification signed and witnessed this 12th day of October, 1905.

AUGUSTUS D. KLABER.

Witnesses:

S. O. EDMONDS,
W. S. EDMONDS.