

(No Model.)

W. M. STROTHER.

## APPARATUS FOR MULTIPLYING COPIES.

No. 302,601.

Patented July 29, 1884.

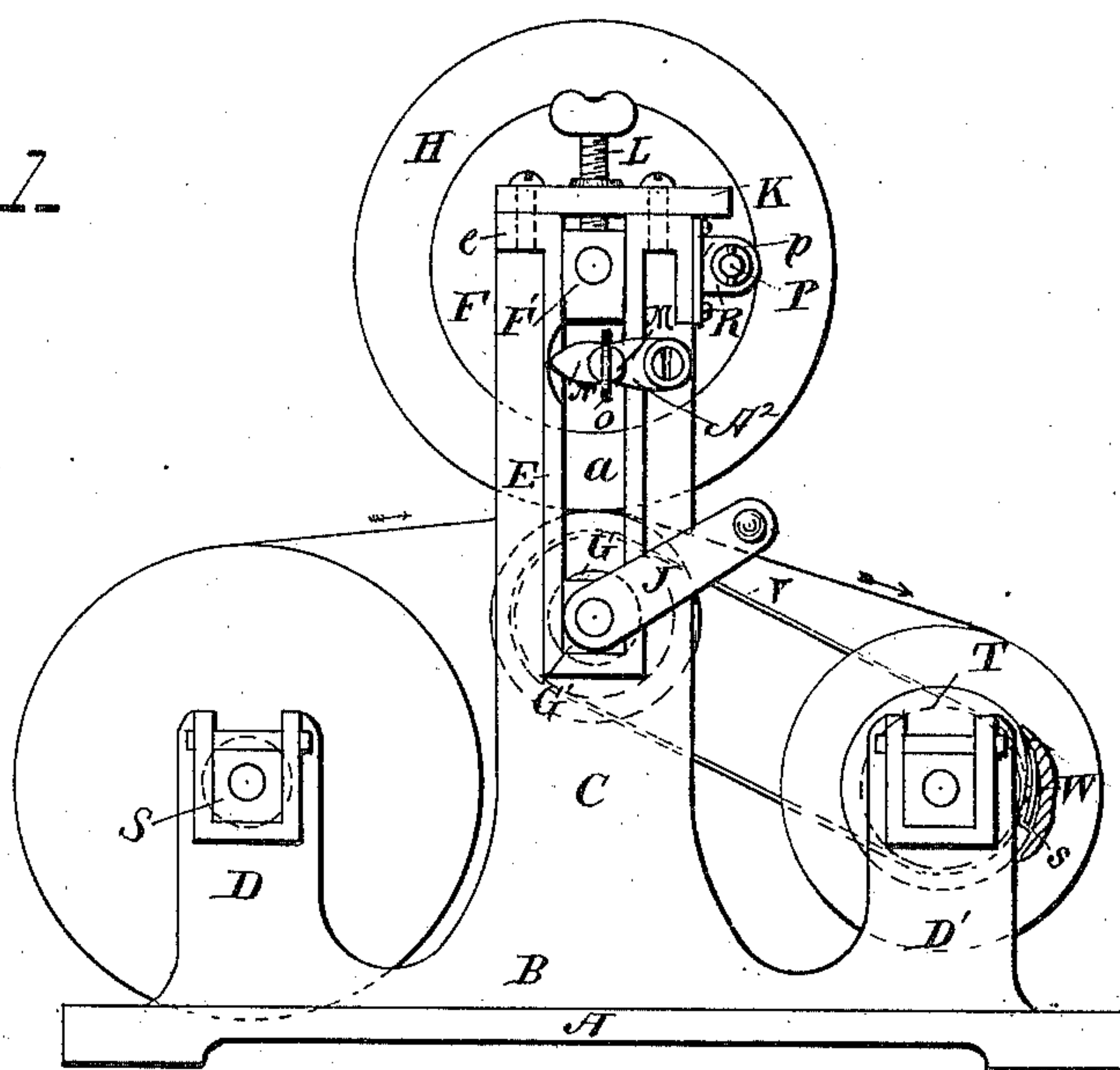
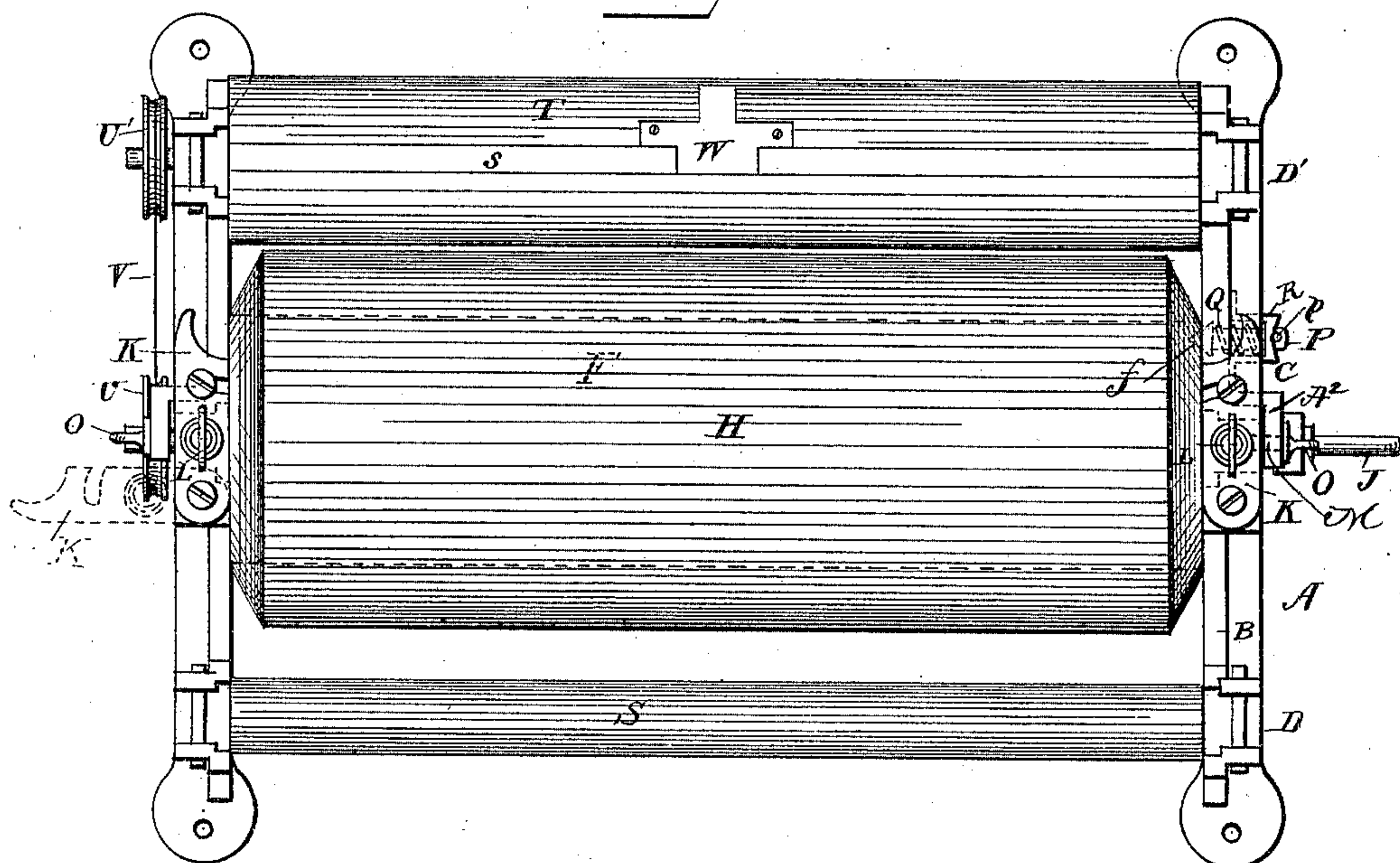


Fig. 2.



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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR MULTIPLYING COPIES.

SPECIFICATION forming part of Letters Patent No. 302,601, dated July 29, 1884.

Application filed July 24, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM M. STROTHER, a citizen of the United States, residing at Lynchburg, in the county of Campbell and State of Virginia, have invented a new and useful Apparatus for Multiplying Copies, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to apparatus for multiplying copies from a single writing with a well-known kind of ink; and it has for its object to provide means whereby said copies or transfers can be effected with ease and rapidity, while the appearance of the copies will be uniform both in quality and color. With these ends in view I employ two revolving rollers, one provided with a gelatinous covering and the other with a covering of rubber, wood, paper, or other substance that will present a smooth surface, the prepared form in writing being passed between the aforesaid rollers, so as to leave the negative on the gelatinous roller, and then passing either single sheets or a long continuous sheet of paper between the rollers, a copy of the negative being transferred to the said sheets at each complete revolution of the gelatinous roller.

My invention consists in the means above stated, and in further details of construction, as will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view of my improved apparatus in position for operation, one of the rollers being filled with paper while the other roller is receiving the same, so as to provide a continuous sheet when taken therefrom. Fig. 2 is a plan view, the paper being off the roller.

40 Like letters refer to corresponding parts in both figures.

Referring to the drawings, A designates the bed of my improved apparatus, said bed being of any suitable construction, but preferably rectangular in form. At each side of the bed are standards B, erected upon the same, the standards being formed of a main or middle upright, C, and the side uprights, D D'. The main upright is slotted vertically, as at a, and in this slot is fitted a U-shaped plate, E,

the edges of which project outward beyond the upright. As seen, the plate is securely fastened to the slot by means of screws, which hold the flanges e of said plate to the upright.

F G designate two revolving rollers journaled in blocks F' G', respectively, which are fitted in the U-shaped plate. The roller F is provided with a gelatinous covering, H, of any suitable thickness, and formed of proper ingredients, so as to withstand the wear and execute the work perfectly, while the surface of the covering is very smooth, thereby avoiding defects in the printing of copies. The roller G is provided with a covering of rubber, wool, wood, paper, cloth, or other suitable substance that will present a smooth surface, which, when the apparatus is in motion, bears against the gelatinous covering and serves to press any intervening sheet of paper against the same. On the outer end of roller G is a crank, J, through which motion is imparted to the said roller, and thence to the other roller, F, in the manner hereinafter stated.

K is an adjustable cap-plate fastened to the top of upright C and the flanges e of plate E, and provided with a thumb-screw, L, working through said cap-plate, and bearing at the lower end upon the block F' of roller F. It will be seen that by moving said screw up or down the pressure between the rollers F G is governed so as to adapt them to varying thicknesses of paper, but more especially to allow or compensate for the wear on the gelatinous roller occasioned by constant washing. At each side of the frame is provided a pin, M, passing through a bracket, A<sup>2</sup>, fastened to the upright C, and provided with a cam, N, at its inner end and a finger-hold, O, at the outer end, whereby by the turning of said finger-holds the pin moves the cam in an upward direction, causing the block F', against which said cam bears, to move upwardly, thereby withdrawing the roller F from the lower roller, as desired. The upper roller can be returned to its former position by turning the finger-hold in the opposite direction.

P designates a pointed rod having a spiral spring, Q, secured around the same, said rod being attached to an arm of an extension, R,



of the upright C. On the end of roller F is an indentation, *f*, with which said pointed rod is adapted to engage. In operation the spring forces the rod outward and keeps the point thereof rubbing on the end of the roller, which is moved in the manner stated. When the indentation *f* comes opposite the pointed rod, the point of said rod is received by the indentation, and thus the roller F is checked at each complete revolution, thereby indicating when the said roller has reached the starting-point. As the turning of crank J is continued the resistance offered by said rod will be overcome, and thus the operation can be repeated, the pointed rod working automatically to stop the roller F, and also automatically disengaging itself from the indentation of the roller. When passing single sheets of paper between the rollers, the gelatinous roller will be stopped at each complete revolution, as stated, and, since the roller will be in the same position for each sheet, each copy transferred to the sheets will register at the same place on said sheets. It will be seen that all danger of crooked transfers will thus be avoided, and each copy will be printed straight and in the same place as the preceding ones, thereby adding to the value of the apparatus. The outer end of the extension R is dished, and a pin, *p*, on the rod P rests in the lowest point of said dish-shaped end when single copies are taken on separate sheets. In using the continuous roll of paper, as hereinafter explained, the rod P is turned so that the pin is brought over the highest point of the dish-shaped end, thus holding the point of said rod from contact with the roller F.

S T designate rollers journaled, respectively, in the uprights D D' of standard B. One of the rollers—namely, T—is formed with a recess, *s*, and in this recess is fitted a spring-clamp, W, pivoted to the roller, and adapted to hold the end of the paper while the apparatus is in motion. These rollers are intended to be used only when a continuous sheet is employed in taking the transfers.

The operation of my improved apparatus is obvious. The form is written with aniline ink, according to the mode employed in multiplying copies by the hektograph, and said form is passed between the rollers F G, the written side being adjacent to the gelatinous roller F, so as to transfer the negative to said roller. Single sheets can then be passed between the rollers in the manner well-known to the art, the rollers being operated by the revolution of crank J. Each sheet, as it passes through the rollers, receives a copy or transfer from the negative on said gelatinous roller, the latter being stopped at each complete revolution, as stated, and thus insuring the copies to be uniform. I however prefer placing a coil or roll of paper on roller S, passing one end of the roll through or between the copying-rollers to the roller T, where the end is held by the spring-clamp.

U U' designate pulleys on the end of rollers G T, respectively, a cord, V, connecting the pulleys, so that as the roller G is operated by the crank said pulley U will transmit motion to the roller T. It will be seen that as the continuous sheet is fed between the rollers a series of consecutive copies will be transferred to the sheet, while the copies as they are printed will be wound upon the roller T until the full number has been taken. The copies can then be cut from the continuous sheet; or, if desired, a continuous sheet divided by perforations into sheets of the required size may be employed; and in the latter case the copies can be readily removed, as is well known.

In the above I do not claim any special compound for the gelatinous roller; nor do I claim any certain kind of aniline ink to be used in writing the form, but base my claims on the above-described means for taking the copies.

My apparatus avoids rumpling or tearing the paper, while the copies will be uniform both in color and in arrangement on the sheets. It can be operated to produce copies in one-twentieth the time as heretofore, and the gelatinous roller can be taken off from the machine when it is required to replenish the covering of said roller; or after each time the apparatus is used, in order to wash the roller.

It is obvious that various modifications can be made in the foregoing without departing from the spirit or scope of my invention.

Having thus described my invention, what I claim as my own is—

1. The gelatinous rollers journaled in blocks mounted in the supporting-upright C, in combination with the roller G, a bracket projecting from the upright on each side of the frame, pins passing through the brackets, each pin having a cam at its inner end, and a finger-hold at its outer end, whereby the turning of the finger-holds causes the cams to bear against the blocks and raise the gelatinous roller upward from the roller G, as set forth.

2. The gelatinous roller and the roller G, in combination with the rollers S T and a cord or strap connecting rollers T G, as set forth.

3. The gelatinous roller having an indentation at one end, in combination with the roller G and the upright in which said rollers are mounted, a spring-pressed rod, also mounted in said upright, and having its inner pointed end bearing on the end of the gelatinous roller, said rod being arranged to automatically engage and disengage itself from the indentation, and means, substantially as described, for positively holding said rod from engagement when it is desired to use a continuous sheet, as set forth.

4. The combination, with the gelatinous roller and roller G, of the rollers S T, one of which is provided with a spring-clamp fitted



in a recess thereof, said clamp receiving the end of the paper from the other roller, as set forth.

5 5. The gelatinous roller and the roller G, the latter having a crank at one end and a pulley, U, at the other end, in combination with the rollers S T, the roller T, formed with a recess, in which is pivoted a spring-clamp, W, and provided with a pulley, U', and cord

connecting the pulleys U U', for the purpose to set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

WILLIAM M. STROTHER.

Witnesses:

PLEASANT PRESTON,  
J. OWEN HANVEY.