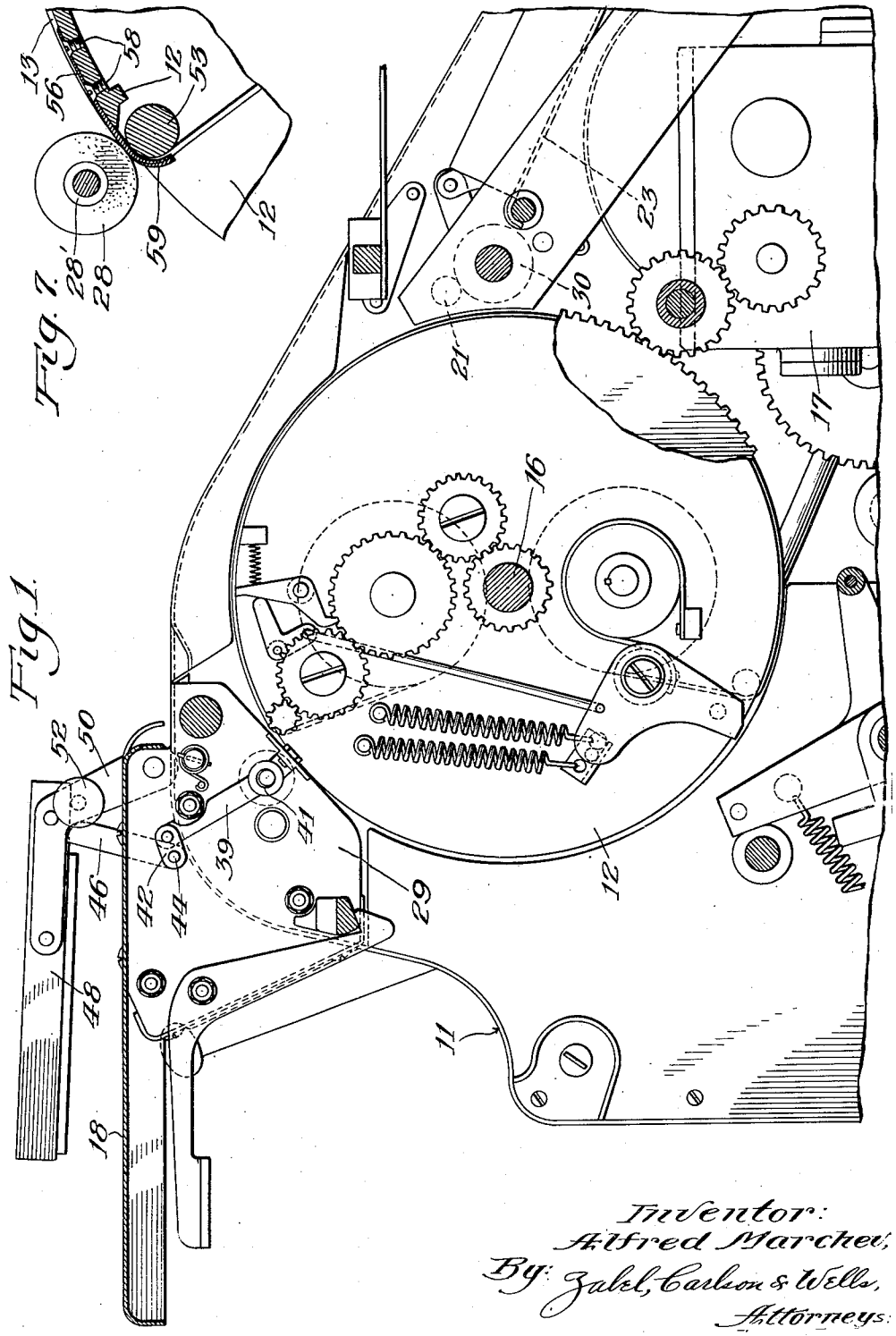
March 14, 1939. A. MARCHEV 2,150,744

DUPLICATING APPARATUS

Filed Dec. 24, 1935. 4 Sheets-Sheet 1



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DUPLICATING APPARATUS

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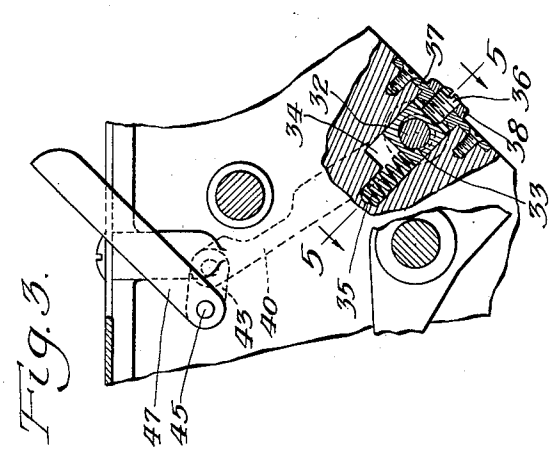


Fig. 3.

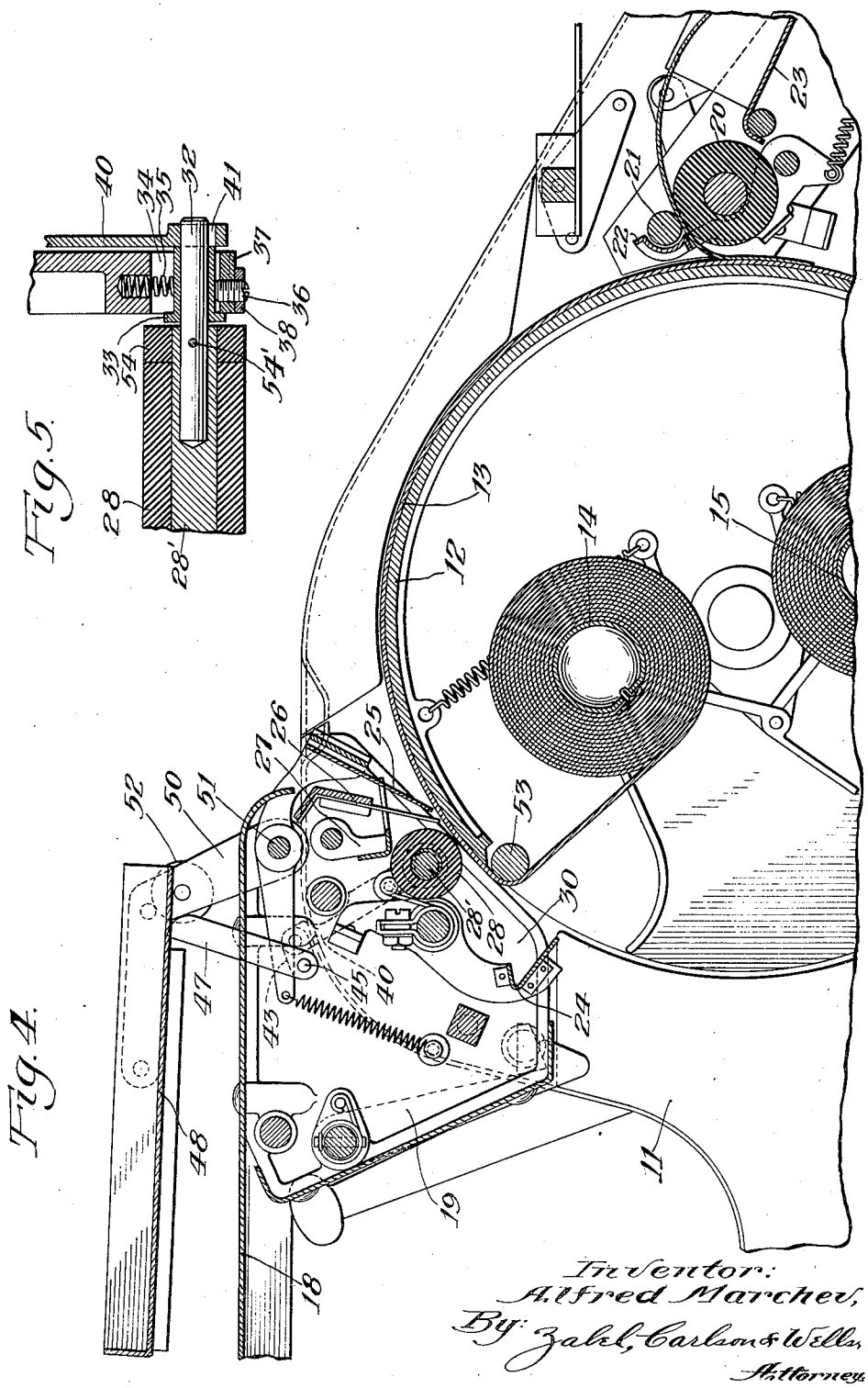
Fig. 2.

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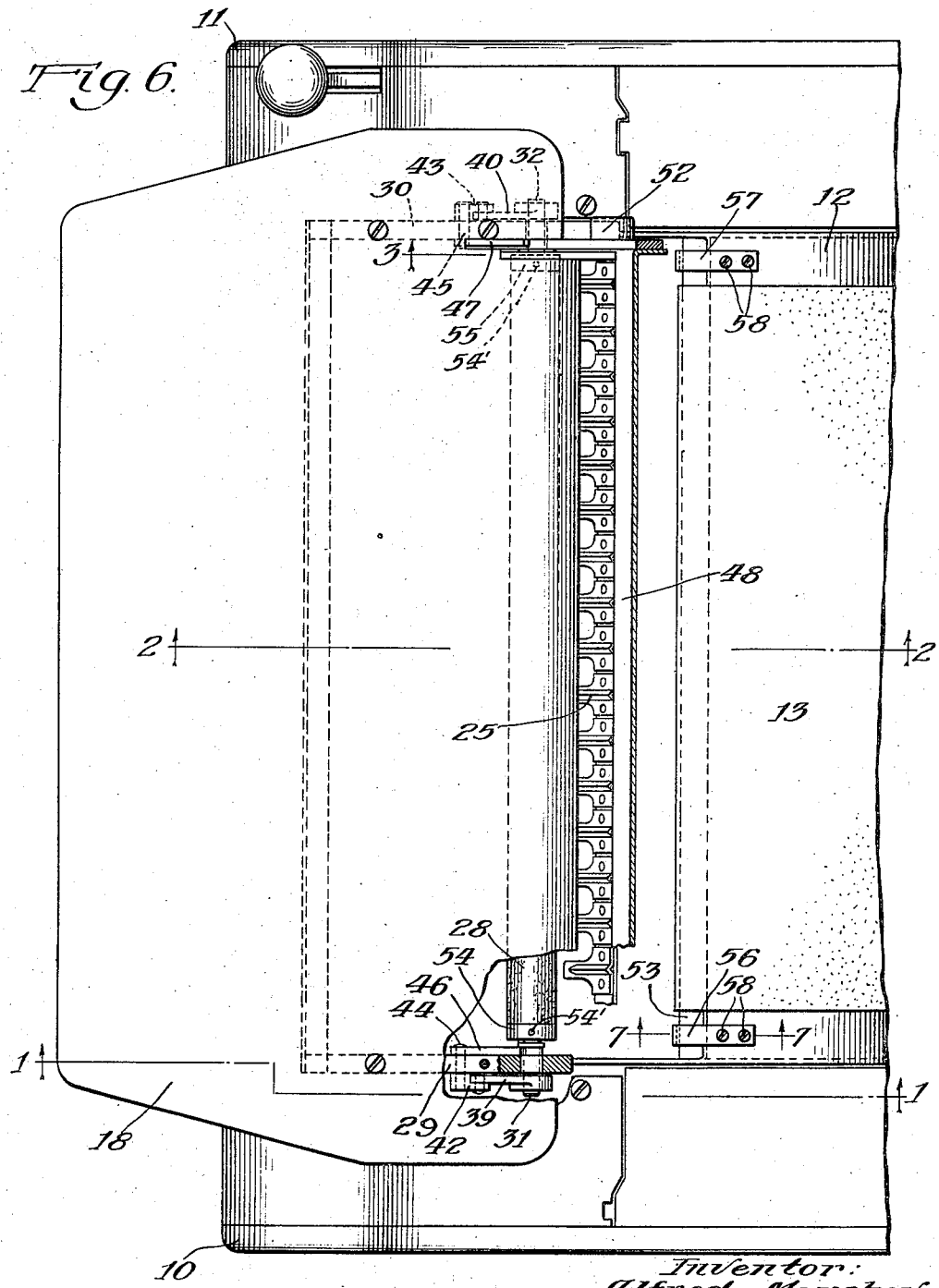


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Fig. 6.



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2,150,744

DUPLICATING APPARATUS

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Application December 24, 1935, Serial No. 55,969

7 Claims. (Cl. 101—132)

This invention relates to duplicating machines and is particularly adapted to be embodied in rotary duplicating machines of the type which are provided with gelatin bands to receive impressions from master sheets which impressions are imparted subsequently to copy sheets brought into contact with the gelatin surface.

In machines of this character, such for example as shown in the prior application of Alfred Marchev for improvements in Rotary duplicating machine, Serial No. 44,523, filed October 11, 1935, the feed elements and the stripping elements are so located that any sheet fed to the rotary drum, if longer than the distance around the drum from the point of stripping to the point of feeding the sheet, requires more than one rotation of the drum to remove it. There is a great probability that the platen roller which normally presses the sheets against the gelatin band and which engages the gelatin band on the second rotation of the drum will receive an offset of at least a portion of the imprint on the band.

In the operation of these machines, the master sheet is fed to the drum and stripped therefrom before a copy sheet is applied to the drum. Again, in stripping the last copy sheet of a number of copies made, it will be readily understood that a portion of the gelatin band may be fed beneath the platen roller and thus offsetting will be produced of at least a portion of the imprint on the gelatin band onto the platen roller.

The present invention comprises mechanism whereby a simple manual operation by the operator of the machine is sufficient to overcome the difficulties due to the above actions.

The invention further comprises mechanism whereby damage to the gelatin surface by its contacting with the platen roller is also avoided. For example, the improved machine preferably comprises means which is manually operable for maintaining the platen roller out of contact with the gelatin band on the drum at the will of the operator and means cooperating therewith for preventing excessive pressure of the platen roller upon the gelatin band on the drum at all times during the operation of the machine.

Other objects and advantages will become apparent as the following detailed description progresses reference being had to the accompanying drawings wherein—

Fig. 1 is a vertical sectional view on substantially the line 1—1 of Fig. 6 of a rotary duplicating machine which embodies the invention;

Fig. 2 is a sectional view of the upper portion of such a machine taken on the line 2—2 of Fig. 6;

Fig. 3 is an enlarged fragmentary sectional view taken on the line 3—3 of Fig. 6;

Fig. 4 is a sectional view similar to Fig. 2 and showing a changed position of the mechanism;

Fig. 5 is an enlarged fragmentary sectional view taken on the line 5—5 of Fig. 3;

Fig. 6 is a plan view partly in section of a portion of the machine embodying the invention; and

Fig. 7 is an enlarged sectional view taken on the line 7—7 of Fig. 6.

Referring to the drawings in which a preferred embodiment of the invention is illustrated, the numerals 10 and 11 indicate side frames of the machine in which a drum 12 is journalled for rotation. The drum 12 has a gelatin band 13 thereon and, as disclosed in the aforesaid application, is provided with a pair of spindles 14 and 15 therein upon which the opposite ends of the gelatin band 13 are wound. The drum 12 is mounted upon a shaft 16 and is adapted to be driven from a suitable source of power such as a motor (not shown) through a reduction gear 17 in the general manner described in the aforesaid application.

Suitable stripping rollers 20 and 21 together with a stripping bar 22 are adapted to remove sheets from the drum and deliver the removed sheets to a receiving tray 23 in a manner that is well understood by those skilled in this art. A copy sheet table 18 forms a part of a feed unit indicated generally by the numeral 19.

The feed unit 19 preferably comprises a framework suitably supported in the side frames 10 and 11 and containing a margin bar 24, a feed chute comprising a guide plate 25, and a second plate 26 cooperating therewith together with a lock-out device 27 all as fully described in the aforesaid application.

The feed unit also comprises a sponge rubber platen roller 28 which is yieldingly mounted in a pair of end plates 29 and 30 of the feed unit 19. The platen roller 28 is mounted by means of a pair of stub shafts 31 and 32 fixed in the ends of the platen roller 28. Each stub shaft is yieldingly suported in its end frame member by a bearing block 33 which rides in a slot 34 provided in the corresponding end frame member 29 or 30. A spring 35 is provided in each slot 34 for yieldingly pressing the bearing blocks 33 downwardly against a set screw 36 which is screw threaded into a plate 37 mounted on the end frame and

provides an adjustable stop for the bearing member 33. A lock nut 38 is provided for the set screw 36.

On the free ends of the stub shafts 31 and 32, a pair of links 39 and 40 are provided. As shown best in Figs. 1 and 5, these links, which are outside of the adjacent end frame members 29 and 30, have openings 41 which are somewhat larger than the ends of the stub shafts to permit a limited amount of play. The links 39 and 40 are connected to a pair of arms 42 and 43 which arms are keyed on pins 44 and 45 rotatably journaled in the end frames 29 and 30. The pins 44 and 45 also have a pair of arms 46 and 47 secured thereto on the opposite sides of the end frames from the arms 42 and 43.

In the arrangement shown, there is provided a paper guide 48 which, in normal operating position, projects upwardly over the drum in the position shown in Fig. 2. Copy sheets such as indicated at 49 in Fig. 2, after being fed from the table 18, lie up against this paper guide 48 until they are brought into contact with the gelatin band 13 on the drum 12. The paper guide 48 is pivoted to the end plates 29 and 30 by suitable arms, one of which is shown at 50 in the drawings, the other arm being pivoted to the end plate 29 in the same manner as the arm 50 is pivoted by a shaft 51. The roller 52 carried by arm 50 is adapted to rest upon the end plate 30 when the paper guide 48 is in normal operating position. The paper guide 48, however, can be moved from the position shown in Fig. 2 forwardly toward the table 18 into the position shown in Fig. 1. In this movement, the arms 50 at the side of the paper guide 48 are adapted to engage the rounded free ends of the arms 46 and 47 and act as a means for moving these arms 46 and 47 in a counterclockwise direction.

The effect of the aforementioned movement is best illustrated by a comparison of Figs. 2 and 4. It will be noted that in Fig. 2 the platen roller 28 is in its printing position where the surface thereof intersects the cylindrical path of the gelatin band 13 so that a copy sheet 49, interposed between the platen roller 28 and the band 13, will be pressed against the band 13 as the drum 12 rotates.

In the position shown in Fig. 4 where the paper guide 48 has been folded over the feed table 18, the arms 46 and 47 are moved counterclockwise by their engagement with the arms 50 supporting the paper guide 48. The counterclockwise movement of the arms 46 and 47 operates through the pins 44 and 45, the arms 42 and 43, and the links 39 and 40 to lift the platen roller 28 away from the cylindrical path of the band 13 so that the platen roller can not contact the band. It is evident that, when the paper guide 48 is returned to its normal operating position, the springs 35 will again move the platen roller 28 to its functionally operative position. The limited amount of play provided at 41 between the links 39 and 40 and the shafts 31 and 32 provides the necessary play for the platen roller 28 in its normal operation without disturbing the normal resting position of the arms 46 and 47.

The mechanism just described cooperates with the additional means provided in connection with the drum and the platen roller 28 to prevent damage to the gelatin band 13 in normal operation by the striking of the platen roller 28 against the gelatin band where it passes over a guide rod 53 at the advancing edge of the drum 12. It has been found that the impact of the platen roller against the gelatin at this point may seriously damage the band in heavy service of the machine.

In order to prevent the impact of the gelatin roller against the gelatin band 13, means are provided on the drum 12 and the roller 28 to take the impact before the roller is brought into contact with the gelatin band. The roller 28 is provided with hard rubber collars 54 and 55 at the opposite ends thereof which collars are keyed in place upon a core 28' of the roller 28 by means of a pin 54' for each hard rubber collar. The collars 54 and 55 are of the same diameter as the sponge rubber portion of the roller 28 so as to form extensions of the roller beyond the sponge rubber portion.

The drum 12 is provided at the leading edge with a pair of metal cams 56 and 57 which cams are in alignment with the rubber collars 54 and 55. The cams are secured to the drum 12 by suitable screws indicated at 58 (see Fig. 7). Each cam has a curved front portion 59 extending around the member 53. Directly over the member 53, the cams are somewhat thicker than they are where they are secured to the drum 12, in fact, the cams taper from the forward portion 59 to the rear end so that the platen roller is gradually brought into contact with the gelatin band 13. As the platen roller meets the drum, the hard rubber collars 54 and 55 will meet the metal cams 56 and 57 in a manner to prevent immediate contact between the sponge rubber portion of the platen roller 28 and the gelatin band 13.

The yielding or floating mounting of the platen roller at its opposite ends provided by the bearings 33 movable in the slots 34 and the springs 35 pressing the bearings 33 toward the drum, will enable the platen roller to move outwardly so that the rubber collars 54 and 55 may ride up over the cams 56 and 57. Then as the collars 54 and 55 move along the tapering sections of the cams, the sponge rubber portion of the platen roller is gradually brought against the gelatin or rather against a sheet of paper interposed between the roller and the gelatin band so as to press the sheet to the gelatin with sufficient pressure to make a good copy. The advance of the platen roller toward the gelatin band may be nicely adjusted by the set screws 36. After the collars 54 and 55 have moved past the cams 56 and 57, they will be directly over the metal rim of the drum at the opposite ends thereof so as to retain the platen roller in proper relationship with respect to the gelatin band throughout the duplicating cycle.

While the preferred embodiment of the invention has been shown and described, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims in which it is the intention to claim all novelty inherent in the invention as broadly as possible in view of the prior art.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a duplicating machine, a duplicating drum, means to rotate said drum, a duplicating band on said drum, a paper guide for guiding sheets to said drum, stripping means for stripping sheets from said drum, a platen roller adapted to press the sheets against the band on said drum, mounting means for said platen roller in-

cluding spring means yieldingly pressing said roller toward the drum surface, means on the drum and the platen roller cooperating with said spring means to gradually lower the platen roller into position to press a copy sheet against the duplicating band as the drum is advanced, and manually operable means for lifting the platen roller away from said position at the will of the operator.

2. In a duplicating machine, a duplicating drum, means to rotate said drum, a duplicating band on said drum, a paper guide for guiding sheets to said drum, stripping means for stripping sheets from said drum, a platen roller adapted to press the sheets against the band on said drum, mounting means for said platen roller including spring means yieldingly pressing said roller toward the drum surface, means on the drum and the platen roller cooperating with said spring means to gradually lower the platen roller into position to press a copy sheet against the duplicating band as the drum is advanced, and manually operable means for lifting the platen roller away from said position at the will of the operator, said manually operable means comprising a paper guide, and means connected with said paper guide operable by movement of said paper guide into functionally inoperative position to lift said platen roller.

3. In a duplicating machine, a duplicating drum, means to rotate said drum, a duplicating band on said drum, a paper guide for guiding sheets to said drum, stripping means for stripping sheets from said drum, a platen roller adapted to press the sheets against the band on said drum, mounting means for said platen roller including spring means yieldingly pressing said roller toward the drum surface, and cooperating members associated with the platen roller and drum respectively to force the platen roller outwardly as the advancing edge of the duplicating band passes the platen roller, said members comprising rollers on the opposite ends of said platen roller of more rigid material than the intermediate portion of said platen roller, and cam members at the advancing edge of the drum, said cam members extending rearwardly of the advancing edge and gradually decreasing in height toward their ends.

4. In a duplicating machine, a frame, a duplicating drum rotatably journalled therein, a duplicating band on said drum, a paper feed chute for guiding sheets to said drum, a platen roller, stripping means for stripping sheets from said drum, a paper guide cooperating with said chute and pivotally mounted on said frame, mounting means for said platen roller comprising bearing members movably mounted in the frame to permit movement of the platen roller toward and away from the drum, means engaging said bearing members to press the platen roller toward the drum, link mechanisms adjacent said bearings for lifting the platen roller away from the drum, and means operated by movement of said paper guide out of functionally operative position for actuating said link mechanisms.

5. In a duplicating machine, the combination of a frame, a drum rotatably mounted on said frame, a platen roller rotatably mounted in bearings movable on said frame toward and from the axis of said drum, yielding means urging said platen roller normally into operative impression relationship with said drum, links having a lost motion connection with said platen roller and movable toward and from said drum adapted by movement outwardly to carry said platen roller out of operative position, and a movably mounted member adapted by a complete operative stroke in one direction to move said links outwardly in unison for taking up said lost motion and giving said platen roller a movement outwardly against the action of said yielding means.

6. In a duplicating machine, the combination of a frame, a drum rotatably mounted on said frame, a platen roller rotatably mounted in bearings movable on said frame toward and from the axis of said drum, yielding means urging said platen roller normally into operative impression relationship with said drum, links connected with said platen roller and movable toward and from said drum adapted normally to permit the roller to move inwardly toward the drum and adapted by movement outwardly to carry said roller out of operative position with respect to the drum, pivotally mounted arms operatively connected with said links adapted by an operative stroke to give said platen roller a movement outwardly against the action of said yielding means, and a movably mounted member adapted by an operative stroke to give said arms a swinging movement in unison for carrying said platen roller out of operative position.

7. In a duplicating machine, the combination of a frame, a drum rotatably mounted on said frame, a platen roller rotatably mounted in bearing blocks slidable in slots in said frame toward and from the axis of said drum, springs in said slots normally urging said roller into operative impression relationship with said drum, set screws adjustably mounted on said frame for limiting the inward movement of said platen roller, and means for moving said platen roller outwardly out of operative position with respect to the drum, comprising links loosely connected at their inner ends with said platen roller, arms pivotally mounted on said frame and pivotally connected with said links adapted by an operative stroke to move said links and said roller outwardly against the action of said springs, and a pivotally mounted member extending across adjacent to said platen roller adapted by a swinging movement to engage said arms for moving said links in unison in the direction for carrying said platen roller out of operative position.

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