

Nov. 5, 1935.

J. W. HERNLUND ET AL

2,019,703

DUPLICATING MACHINE

Filed May 11, 1934

5 Sheets-Sheet 1

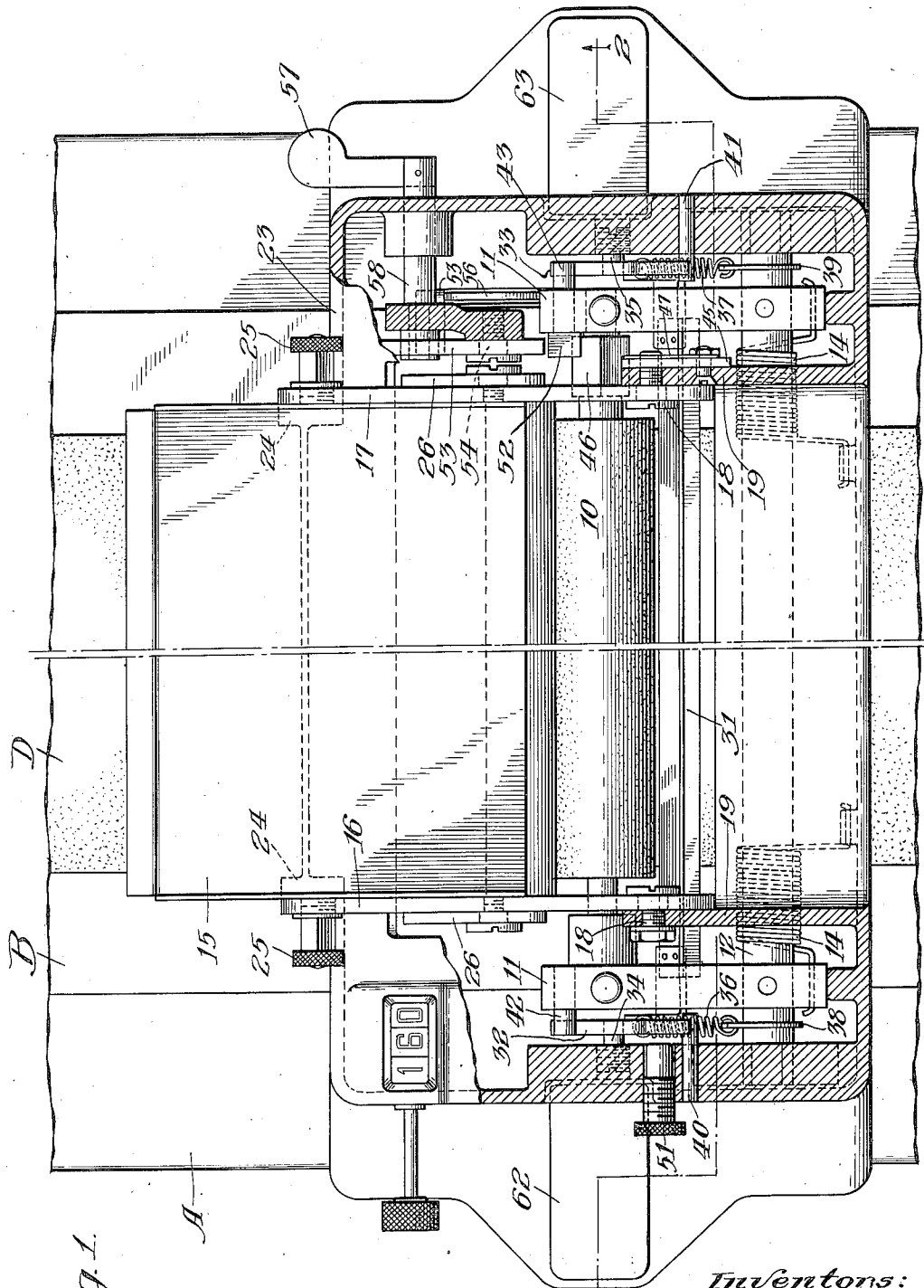


Fig. 1.

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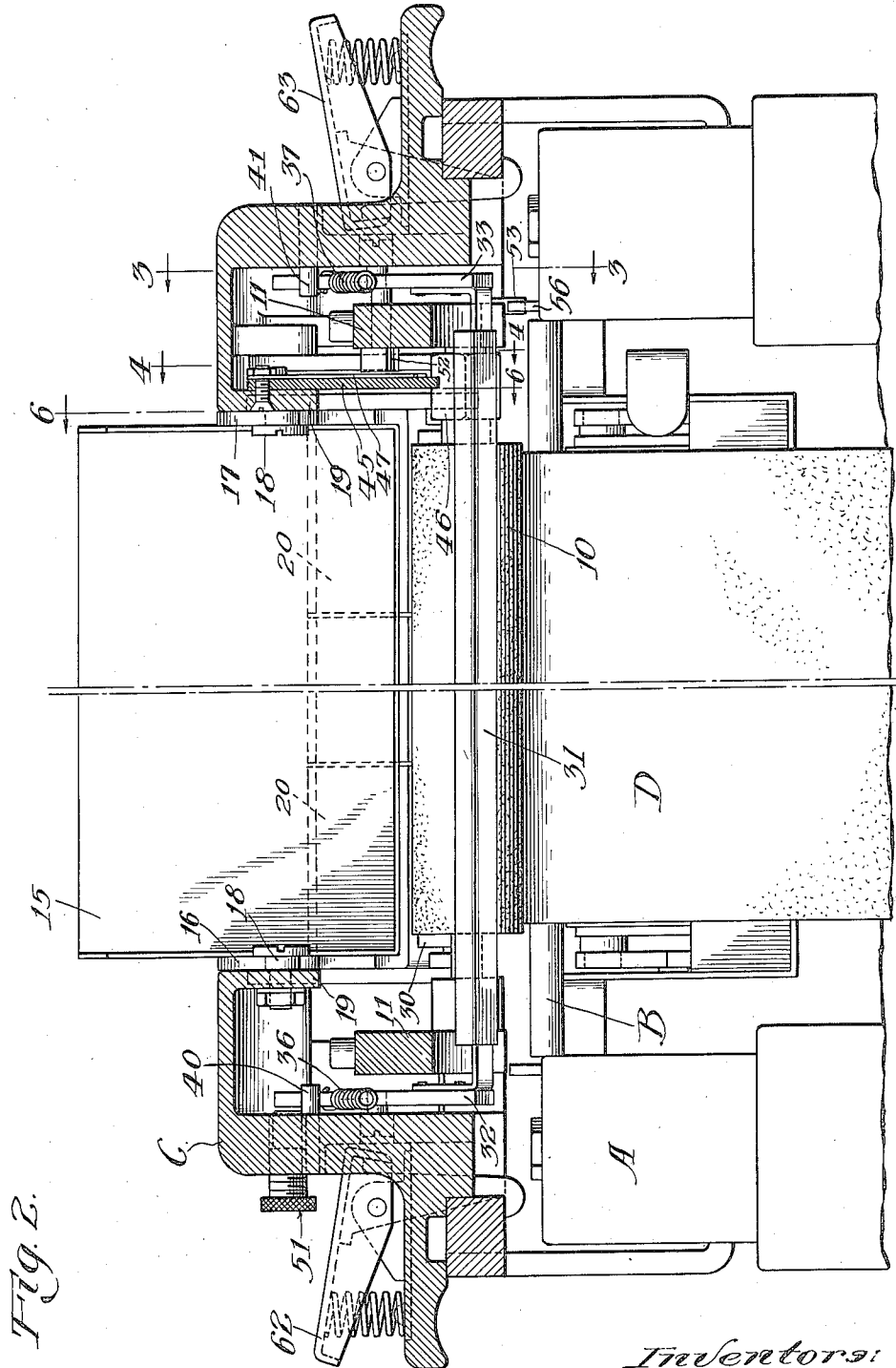
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5 Sheets-Sheet 2



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5 Sheets-Sheet 3

Fig. 3.

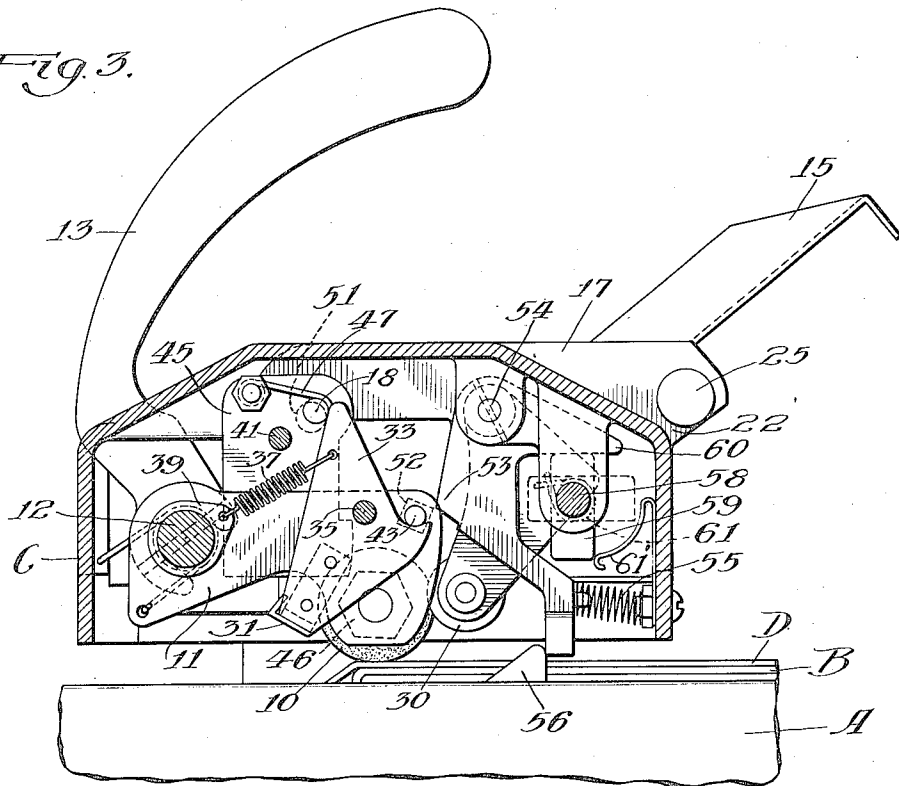


Fig. 4.

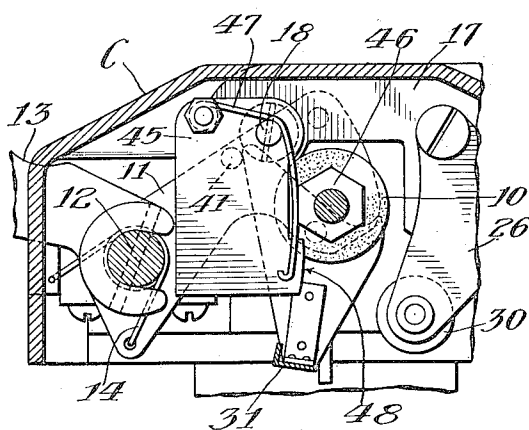
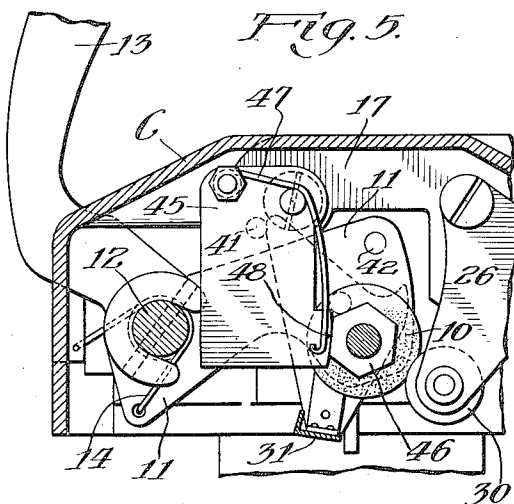


Fig. 5.



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5 Sheets-Sheet 4

Fig. 6.

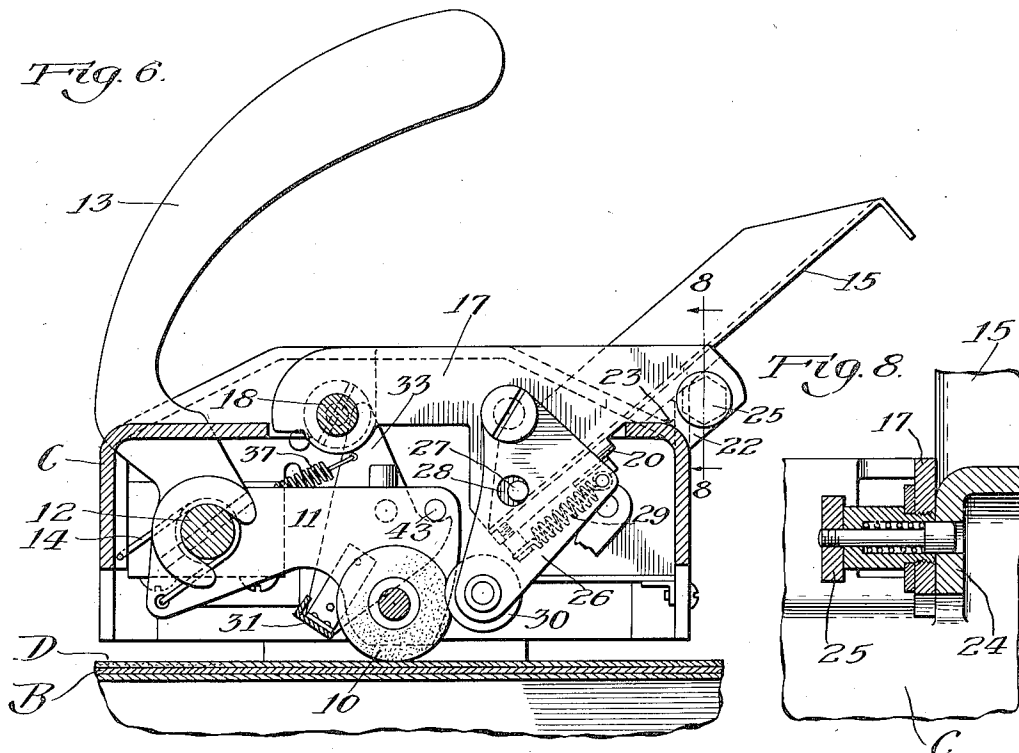


Fig. 8.

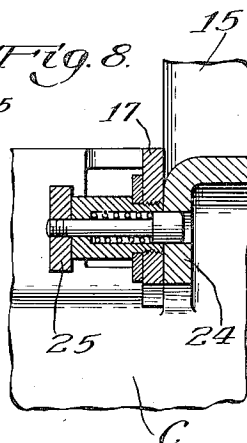


Fig. 7.

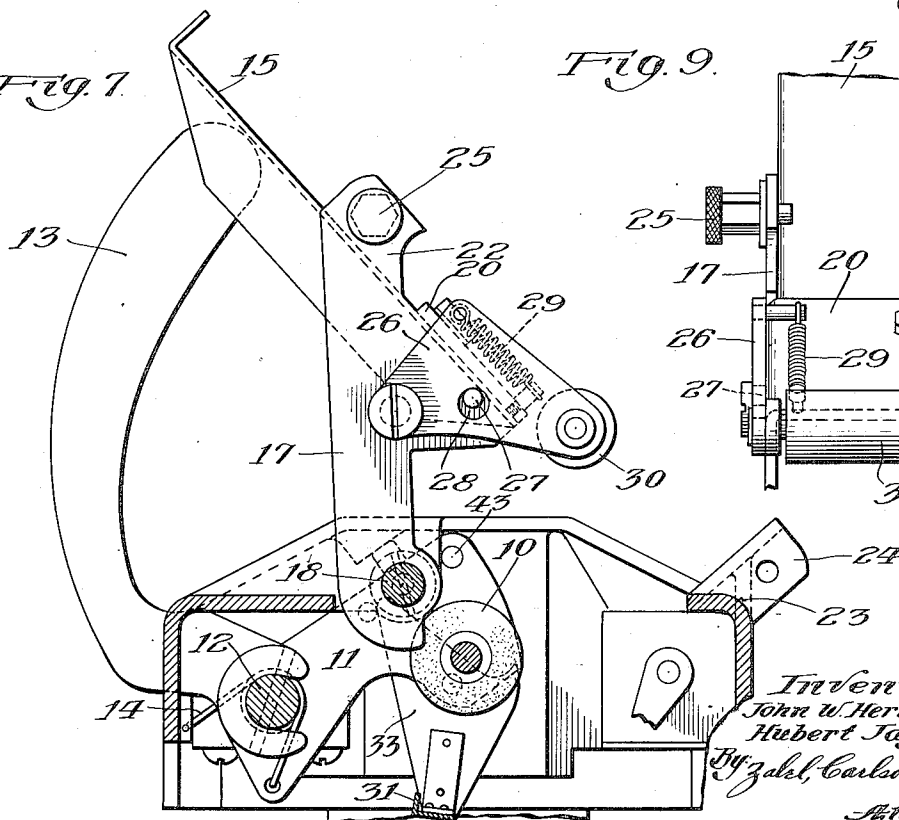
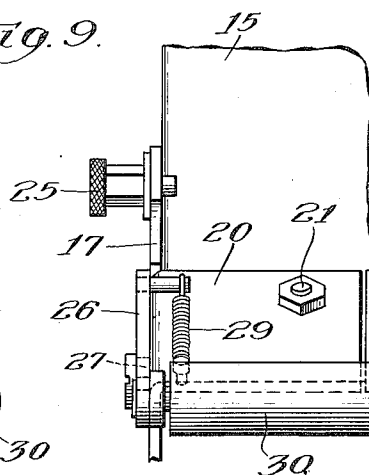


Fig. 9.



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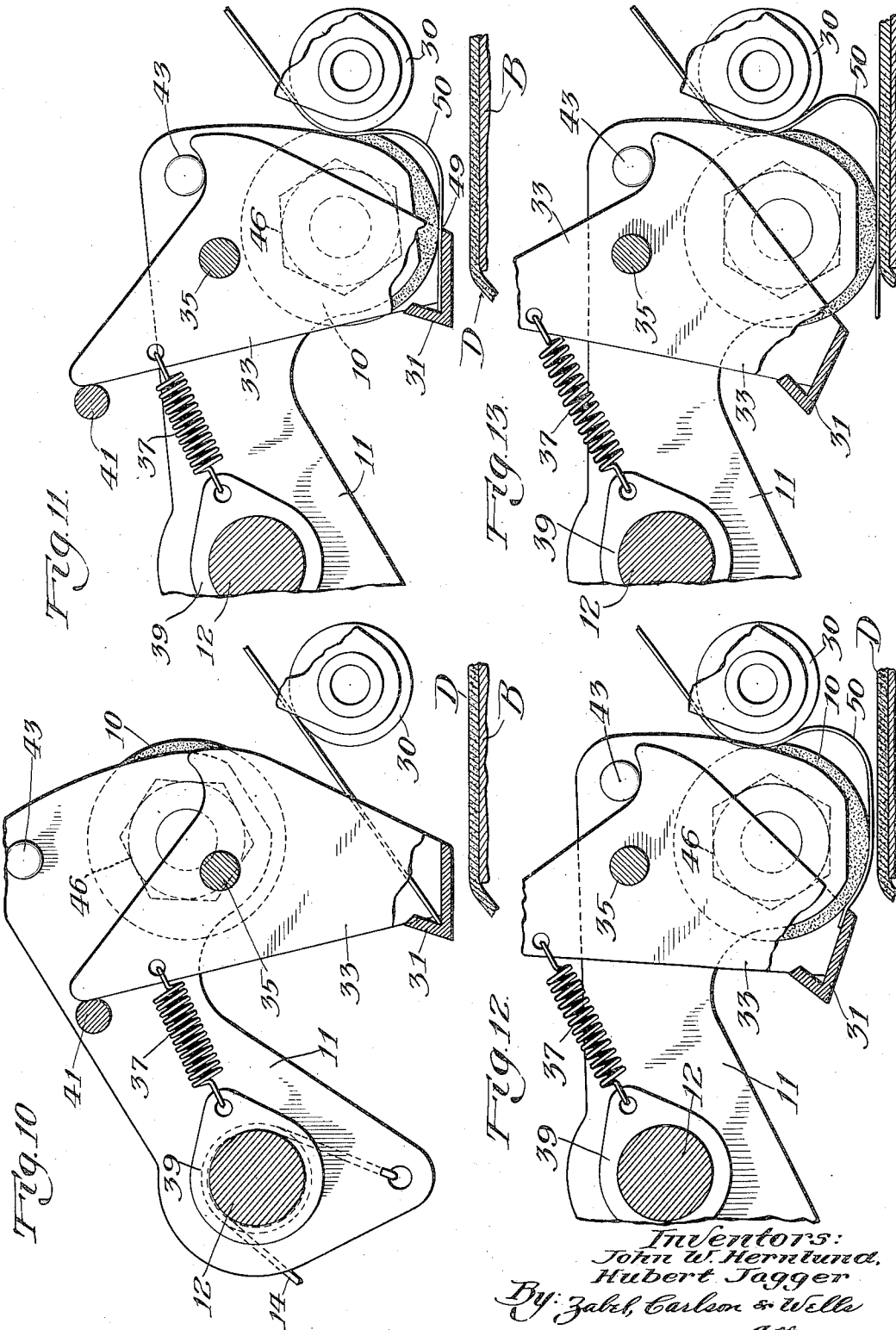
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DUPLICATING MACHINE

Filed May 11, 1934

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,019,703

DUPLICATING MACHINE

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Application May 11, 1934, Serial No. 725,037

17 Claims. (Cl. 101—133)

This invention relates to duplicating machines and is particularly adapted to be embodied in duplicating machines of the hectograph type.

In machines of the type to which this invention relates there is provided a bed plate or platen upon which a gelatin or hectograph sheet is supported. A suitable carriage is movably mounted over the bed plate so that it may be moved lengthwise. This carriage is provided with a platen roller for pressing the sheets of paper onto the gelatin surface and a pressure roller which cooperates with the platen roller to feed the sheets of paper. The paper guide is mounted upon the carriage and there is a margin bar which is to be engaged by the edge of the fresh sheet of paper to position the paper.

The platen roller is supported on a yoke which is rocked to move the roller upwardly and downwardly. When the platen roller is moved downwardly, it engages the paper and in cooperation with the pressure roller and the margin bar, places the paper in contact with the duplicating surface of the gelatin band. The carriage is then moved to roll the platen roller over the entire sheet of paper in the duplicating process.

In the present invention, we are concerned principally with a machine of the type having an automatic margin bar, that is, a machine in which the margin bar moves with the carriage and is caused to release the paper when the carriage is moved along the gelatin band. However, some features of the invention may be embodied in duplicating machines wherein the margin bar is mounted in the frame.

It is a purpose of this invention to prevent wrinkling of the paper in its application to the duplicating surface.

It is also a purpose of this invention to provide means for accurately positioning the paper on the duplicating surface.

It is a further purpose of this invention to provide means for more effectively avoiding injury to the duplicating surface by the paper edge when it is released by the margin bar.

Other objects and advantages of the invention will appear as the description progresses in connection with the accompanying drawings in which—

Fig. 1 is a plan view partly in section of the carriage showing it mounted on the frame of the machine over the platen or bed plate;

Fig. 2 is a section substantially on the line 2—2 of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a section on the line 4—4 of Fig. 2 showing the platen roller in one position;

Fig. 5 is a section like Fig. 4 showing a changed position of the parts;

Fig. 6 is a section substantially on the line 6—6 of Fig. 2;

Fig. 7 is a section like Fig. 6 but with the parts in a changed position;

Fig. 8 is an enlarged section on the line 8—8 of Fig. 6;

Fig. 9 is an enlarged detail of a part of the paper guide and pressure roller mechanism; and

Figs. 10, 11, 12, and 13 are enlarged details illustrating the manner in which the platen roller, the pressure roller and the margin bar cooperate in laying the paper sheet down upon the gelatin surface.

Referring now to the drawings wherein a preferred embodiment is illustrated, A designates the frame of the duplicating machine, B designates the platen or bed plate mounted on the frame A, and C designates the carriage which is slidable lengthwise of the frame A and which is adapted to apply a sheet of paper to the gelatin or duplicating band D which extends over the bed plate B.

The carriage C and the parts mounted thereon embody the invention in the present application and the future description will be substantially limited thereto, it all being understood that this carriage is adapted to be moved back and forth along the bed plate in the usual manner during the duplicating process.

The carriage has mounted therein the platen roller 10 which is pivotally supported by means of the arms 11, there being one of these arms at each side of the carriage. These arms are fixed upon the shaft 12 which is journaled in suitable bearings in the carriage frame. The operating handle or arm 13 (see Fig. 3) is also fixed to shaft 12 for raising and lowering the platen roller. Suitable springs 14 are secured to the carriage frame and the arms 11 to normally urge the platen roller into raised position.

The paper guide or support is indicated at 15. This support is carried on the arms 16 and 17, which arms are in turn pivoted by means of the pins such as 18 to the carriage frame. There is a downturned flange portion 19 at each side of the carriage frame receiving the pins 18. By reference, Figs. 6 to 9, it will be clear that the guide or support 15 is secured to the arms 16 and 17 by means of an intumed portion 20 on each of the arms 16 and 17 and suitable bolts as indicated at 21. The arms 16 and 17 are extended as in—

licated at 22 and curved to fit snugly over the rounded portion 23 of the carriage frame.

The carriage frame has the upstanding lugs 24, one at each side of the paper support and these lugs are apertured to receive the locking pins 25 on the extensions 22 of the arms 16 and 17. The purpose of the locking pins is to lock the paper guide in lower or operating position as shown in Fig. 6. When these pins are withdrawn, the arms 16 and 17 may be swung about their pivots to bring the paper support up into the position shown in Fig. 7.

The pressure roller 30 is mounted for limited pivotal movement on the arms 16 and 17 by means of the arm members 26, the movement of the arms 26 being limited by the pin 27 and the enlarged hole 28 (see Figs. 6 and 7). Suitable springs such as indicated at 29 connected to pins on the arms 26 and the portions 20 of the arms 16 and 17 serve to yieldingly urge the pressure roller 30 against the platen roller 10 as illustrated, for example, in Fig. 6.

The mounting of the margin bar 31 is accomplished by means of the two cam members 32 and 33 which are pivoted upon the pins 34 and 35 in the carriage frame. These cam members are connected by springs such as 36 and 37 to suitable collars 38 and 39 on the shaft 12. The springs thus tend to swing the margin bar in a counter-clockwise direction. Suitable stops indicated at 40 and 41 limit the movement of the cam members 32 and 33 in one direction so that when the platen roller is raised, the margin bar will rest in position shown in Figs. 4, 5, 10 and 11.

The platen roller arms 11 have pins 42 and 43 thereon, which pins engage the cam members 32 and 33 as the arms 11 are moved downwardly in lowering the platen roller. The pins 42 and 43 thus serve to swing the margin bar 31 about the pivots 34 and 35 after the platen roller has been dropped to the point where pins 42 and 43 contact the cams 32 and 33. This is substantially the position shown in Fig. 11.

The margin bar is moved in a clockwise direction as the platen roller descends as shown in Figs. 12 and 13, maintaining the contact of the paper with both the margin bar and the platen roller until the paper is brought substantially into contact with the gelatin band. Thus the paper sheet has no opportunity to get out of position and is more accurately positioned with respect to the duplicating surface.

In the descending movement of the platen roller, it first engages the pressure roller to grip the paper between these two rollers. In order that the paper may be held up snugly against the margin bar and a sufficient amount of paper fed past the pressure roller to insure proper final position of the paper on the duplicating surface with the paper buckled out in front of the platen roller to avoid wrinkling, we provide means for holding the platen roller against rotation in a counter-clockwise direction, and causing it to hold the slack paper ahead of it while it is descending into duplicating position.

Referring now more particularly to Figs. 3, 4, and 5, we provide a cam plate 45 which is mounted on the frame flange 19 on the side opposite the arm 17 as shown, for example, in section in Fig. 2. This cam plate cooperates with the hexagonal member 46 mounted on the shaft of the platen roller to control the rotation of the platen roller as it descends. A spring member 47 is mounted on the cam plate 45 so as to make it possible to rotate the platen roller by hand when it is in the

position shown in Fig. 4 if desired. As the platen roller is lowered, however, the hexagonal member 46 passes on to the solid shoulder 48 of the cam plate 45 which positively prevents rotation of the platen roller while it is in contact with the pressure roller and while the member 46 is in contact with the shoulder 48 (see the position shown in Fig. 5).

The downward movement of the platen roller after it engages the paper on the pressure roller pushes the paper down to form the loop 50 in the paper. Then in the further descending movement, the margin bar is pushed back by the pins 42 and 43 and its forward edge at 49 holds the paper against the platen roller and slides back 15 on the paper to the position shown in Fig. 12 at which time the platen roller has practically reached the gelatin surface. Thus the paper is gripped between the platen roller and the gelatin surface before it is released by the margin bar. 20 Since the platen roller furnishes more friction against the paper than the margin bar edge 49, the paper remains stationary with respect to the platen roller after the roller engages it in the position shown in Fig. 11. Of course after the 25 paper has been pressed against the gelatin surface, the margin bar moves out and releases the free end of the paper.

It will be noted that the movement of the margin bar, after the platen roller has reached the 30 position shown in Fig. 12, will carry it out away from the platen roller and thus release the paper at just about the time the platen roller presses the paper down upon the gelatin surface. The loop 35 shown at 50 in the paper allows the paper to flatten itself out smoothly on the gelatin surface ahead of the platen roller. The margin bar of course, remains out of the way during the advancing of the carriage because it is held back by the pins 42 and 43 engaging the cam plates 40 32 and 33.

If it is desired to use the carriage with a standard margin bar or in other words, to lock the margin bar 31 back out of the way, this can be accomplished by means of the permanent stop 45 shown at 51 (see principally Figs. 1 and 2). This permanent stop is adapted to be screwed in and out and when it is in, it engages the tip of plate 32 substantially in the position shown in Fig. 3 (see the dotted line position of stop 51 in Fig. 3). 50

Means are provided to lock the platen roller in duplicating position so as to avoid poor duplicating because of variable pressure by the operator on the handle 13. This means consists of the square pin 52 mounted on one of the platen roller arms 11, together with the latch member 53, (see Figs. 1 and 3) which is pivoted on the carriage frame at 54. This latch member is pushed out to hook over the pin 52 by the spring 55 except when the carriage is in home position, 60 that is, at the position where the fresh sheet is put under the platen roller. When the carriage reaches home position, the stop 56 on the machine frame pushes the latch back to release pin 52 as shown in Fig. 3. 65

In order that the platen roller can be raised at any point along the path it traverses, a trip mechanism is provided to release the pin 52 from latch 53. This mechanism consists of the trip lever 57, shaft 58, the cam member 59, and the 70 projection 60 of latch 52. By pressing on lever 57, latch 53 can be moved back to release the platen roller. The little spring 61 is to push the cam member 59 back to normal position after it has tripped the latch. Spring 61' provides 75

the means for holding the cam 59 in its functionally operative position, until manually released by lever 57.

The clips 62 and 63 shown in Fig. 2 hold the carriage down and may be released to permit lifting of the carriage. They form no part of the present invention however, and therefore will not be further described.

While a certain 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 intended to claim all novelty inherent in the invention as broadly as possible in view of the prior art.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent is:

1. A duplicating machine having a printing bed adapted to support a duplicating band, a platen roller arranged to travel over and movable to and from said bed, a pressure roller cooperating with said platen roller to feed a copy sheet therebetween during the movement of said platen roller toward the printing bed, a margin bar and means to swing said margin bar between a sheet receiving position beneath the platen roller, and a sheet releasing position at one side of the platen roller as the platen roller moves toward the printing bed, said platen roller and margin bar holding the sheet against the lowermost surface of the platen roller to prevent its slipping on the platen roller until the sheet is pressed against the duplicating surface.

2. A duplicating process which consists in forming a free loop section in a copy sheet before it contacts the duplicating surface pressing the copy sheet down upon the duplicating surface progressively in one direction along the sheet and maintaining the free loop section in the sheet immediately ahead of the portion contacting the duplicating surface.

3. In a duplicating process wherein the copy sheet is rolled down upon the duplicating surface, the step of feeding an excess of the sheet in front of the line of contact of the sheet and duplicating surface at the beginning of the process before the sheet engages the duplicating surface to cause the copy sheet to buckle out ahead of the line of contact.

4. In a duplicating process wherein the copy sheet is rolled down upon the duplicating surface, the step of feeding an excess of the sheet in front of the line of contact of the sheet and duplicating surface at the beginning of the process before the sheet engages the duplicating surface to cause the copy sheet to buckle out ahead of the line of contact, and feeding the copy sheet fast enough to keep it buckled out until substantially all of the duplicating surface has been traversed.

5. A duplicating machine having a printing bed adapted to support a duplicating band, a platen roller arranged to travel over and movable to and from said bed, a pressure roller cooperating with said platen roller to feed a copy sheet therebetween during the movement of said platen roller toward the printing bed, means to keep the platen roller from turning as it descends in contact with the pressure roller, and means cooperating with the platen roller to hold the sheet tight against the bottom of the platen roller until it reaches the duplicating surface.

6. In a duplicating machine, a printing bed, a carriage, a platen roller mounted in said carriage for movement to and from the printing bed, a pressure roller cooperating with the platen roller to feed a copy sheet therebetween during the movement of the platen roller toward the printing bed, and means below the platen roller to hold the lower end of the sheet stationary during the initial downward movement of the platen roller in engagement with the copy sheet on the pressure roller whereby to buckle the sheet out away from the platen roller below the pressure roller.

7. In a duplicating machine, a printing bed, a carriage, a platen roller mounted in said carriage for movement to and from the printing bed, a pressure roller cooperating with the platen roller to feed a copy sheet therebetween during the movement of the platen roller toward the printing bed, a margin bar on the carriage having a portion cooperating with the platen roller to grip the copy sheet therebetween during a part of the descent of the platen roller and means for thereafter moving the margin bar out of engagement with the sheet.

8. In a duplicating machine, a printing bed, a carriage, a platen roller mounted in said carriage for movement to and from the printing bed, means to prevent rotation of the platen roller during a part of its movement toward the bed, a pressure roller cooperating with the platen roller to feed a copy sheet therebetween during the movement of the platen roller toward the printing bed, means below the platen roller to hold the lower end of the sheet stationary during the initial downward movement of the platen roller in engagement with the copy sheet on the pressure roller whereby to buckle the sheet out away from the platen roller below the pressure roller.

9. In a duplicating machine, a printing bed, a carriage, a platen roller mounted in said carriage for movement to and from the printing bed, means to prevent rotation of the platen roller during a part of its movement toward the bed, a pressure roller cooperating with the platen roller to feed a copy sheet therebetween during the movement of the platen roller toward the printing bed, a margin bar on the carriage having a portion cooperating with the platen roller to grip the copy sheet therebetween during a part of the descent of the platen roller and means for thereafter moving the margin bar out of engagement with the sheet.

10. In a duplicating machine having a printing bed, a carriage having a platen roller movable to and from said printing bed, a pressure roller cooperating with said platen roller to feed a copy sheet therebetween and a margin bar, said margin bar having a portion engaging the under surface of the copy sheet and pressing the sheet directly against the platen roller as the platen roller moves toward the bed.

11. In a duplicating machine having a printing bed, a carriage having a platen roller movable to and from said printing bed, a pressure roller cooperating with said platen roller to feed a copy sheet therebetween and a margin bar, said margin bar having a portion engaging the under surface of the copy sheet and pressing the sheet directly against the platen roller as the platen roller moves toward the bed, and means to prevent rotation of the platen roller while the margin bar is pressing the copy sheet against it.

12. In a duplicating machine having a print-

ing bed, a carriage having a platen roller movable to and from said printing bed, a pressure roller cooperating with said platen roller to feed a copy sheet therebetween and a margin bar, said margin bar having a portion engaging the under surface of the copy sheet and pressing the sheet directly against the platen roller as the platen roller moves toward the bed, and means to prevent rotation of the platen roller while the margin bar is pressing the copy sheet against it, said means comprising a polygonal member fixed to the platen roller and a cam on the carriage.

13. In a duplicating machine having a printing bed, a carriage having a platen roller movable to and from said printing bed, a pressure roller cooperating with said platen roller to feed a copy sheet therebetween and a margin bar, said margin bar having a portion engaging the under surface of the copy sheet and pressing the sheet directly against the platen roller as the platen roller moves toward the bed, said margin bar being movably mounted on the carriage and means associated with said platen roller adapted to move the margin bar away from the platen roller as the platen roller ends its downward movement.

14. In a duplicating machine having a printing bed, a carriage having a platen roller movable to and from said printing bed, a pressure roller cooperating with said platen roller to feed a copy sheet therebetween and a margin bar, said margin bar having a portion engaging the under surface of the copy sheet and pressing the sheet directly against the platen roller as the platen roller moves toward the bed, said margin bar being supported by cam members pivoted in the carriage, and said platen roller having means

engaging said cam members to swing the margin bar out of sheet gripping position with respect to the platen roller as the platen roller ends its downward movement.

15. In a duplicating machine having a printing bed, a carriage having a platen roller movable to and from said printing bed, a margin bar carried by said carriage, said margin bar having a portion engaging the under surface of a copy sheet fed beneath said platen roller and pressing the sheet directly against the platen roller as the roller moves toward the bed.

16. In a duplicating machine having a printing bed, a carriage having a platen roller movable to and from said printing bed, a margin bar carried by said carriage, said margin bar having a portion engaging the under surface of a copy sheet fed beneath said platen roller and pressing the sheet directly against the platen roller as the roller moves toward the bed, and means to cause said margin bar to move around the lower surface of the platen roller as the platen roller descends and thereby hold the copy sheet against the platen roller.

17. In a duplicating machine having a printing bed, a carriage having a platen roller movable to and from said printing bed, a margin bar carried by said carriage, said margin bar having a portion engaging the under surface of a copy sheet fed beneath said platen roller and pressing the sheet directly against the platen roller as the roller moves toward the bed, said margin bar being pivoted on the carriage, and means actuated by the downward movement of the platen roller to swing said margin bar about its pivots.

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