

March 10, 1936.

A. MARCHEV

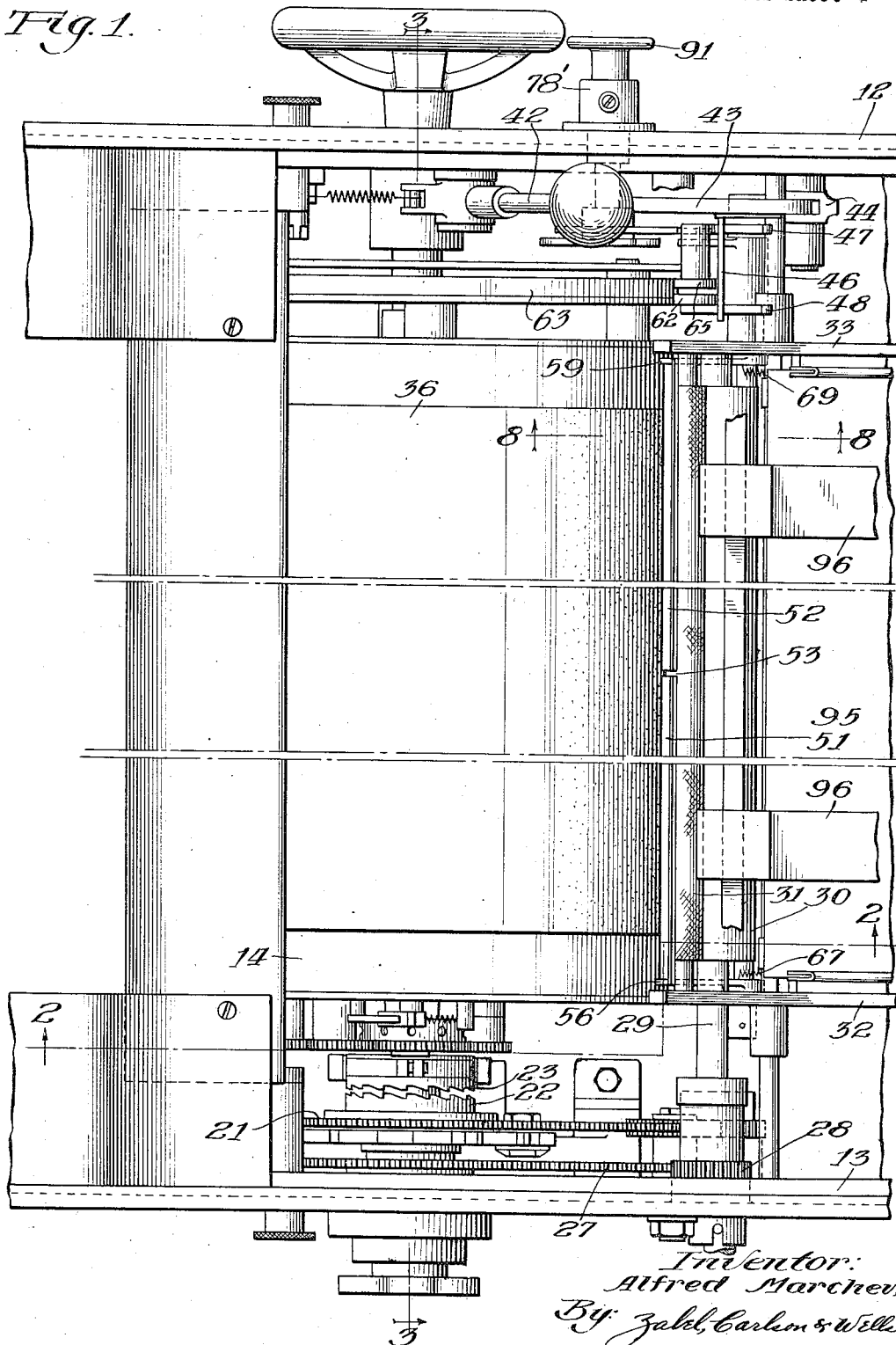
2,033,383

DUPPLICATING MACHINE

Filed June 15, 1935

7 Sheets-Sheet 1

Fig. 1.



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DUPLICATING MACHINE

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7 Sheets-Sheet 2

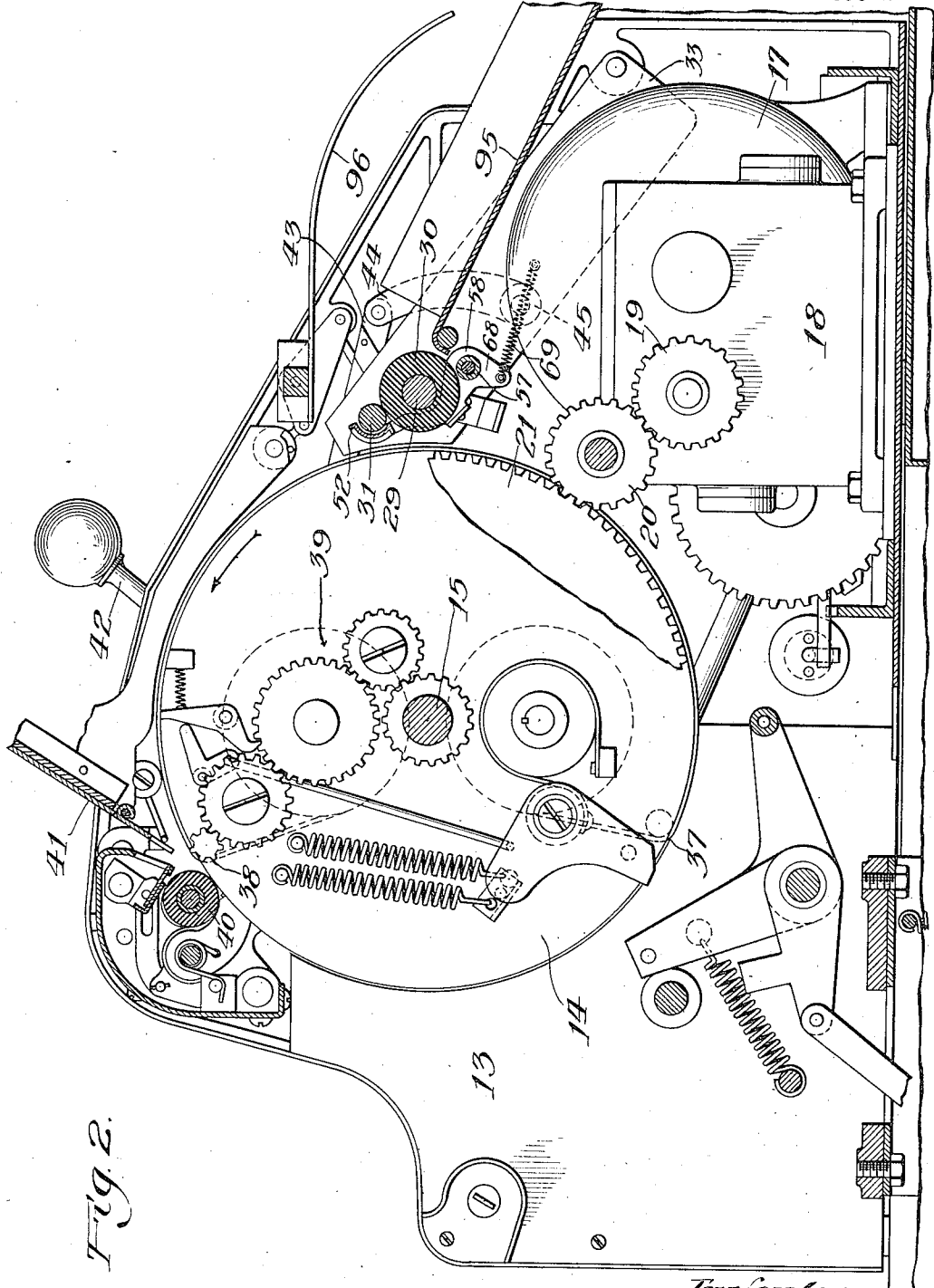


Fig. 2.

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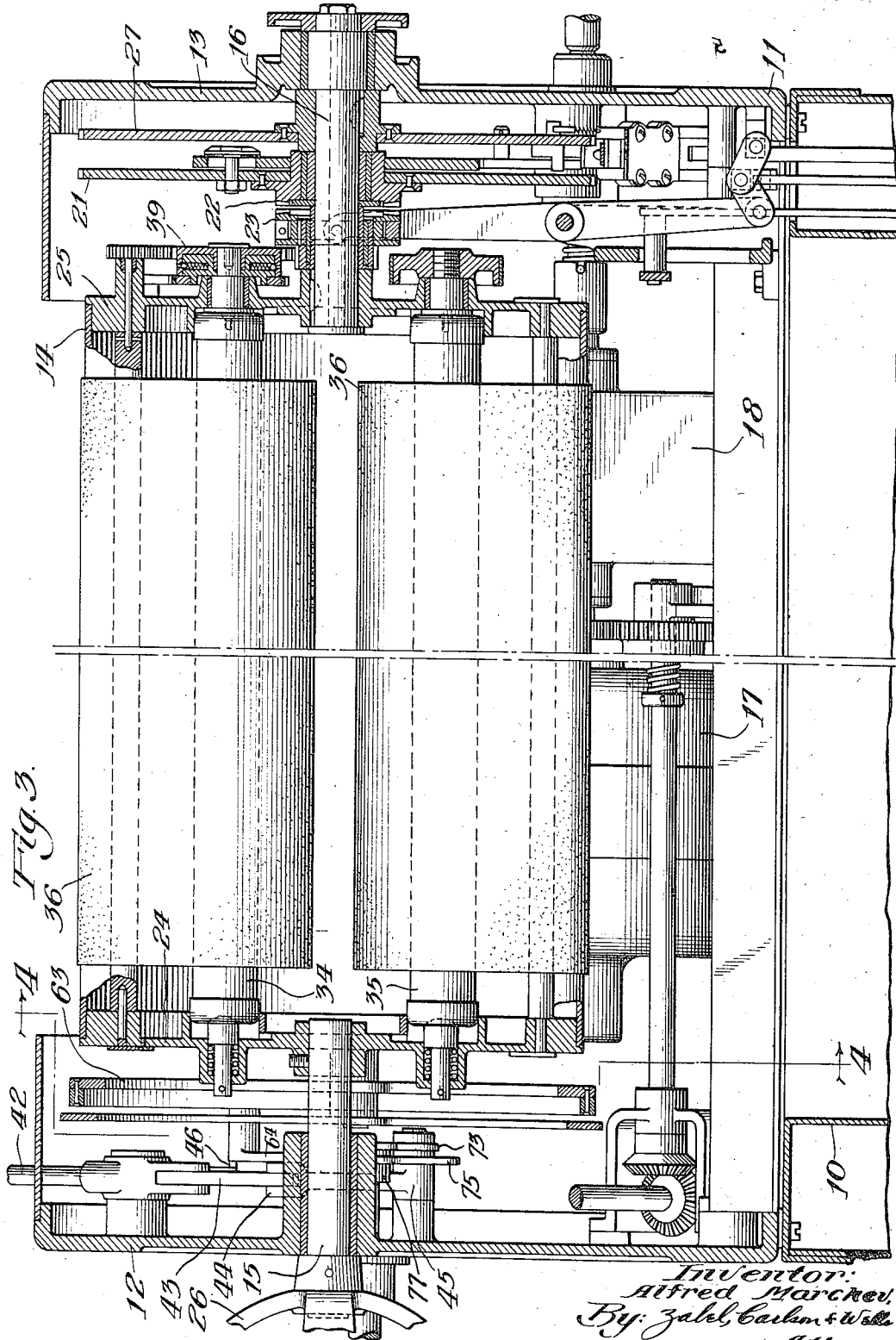
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DUPLICATING MACHINE

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7 Sheets-Sheet 3



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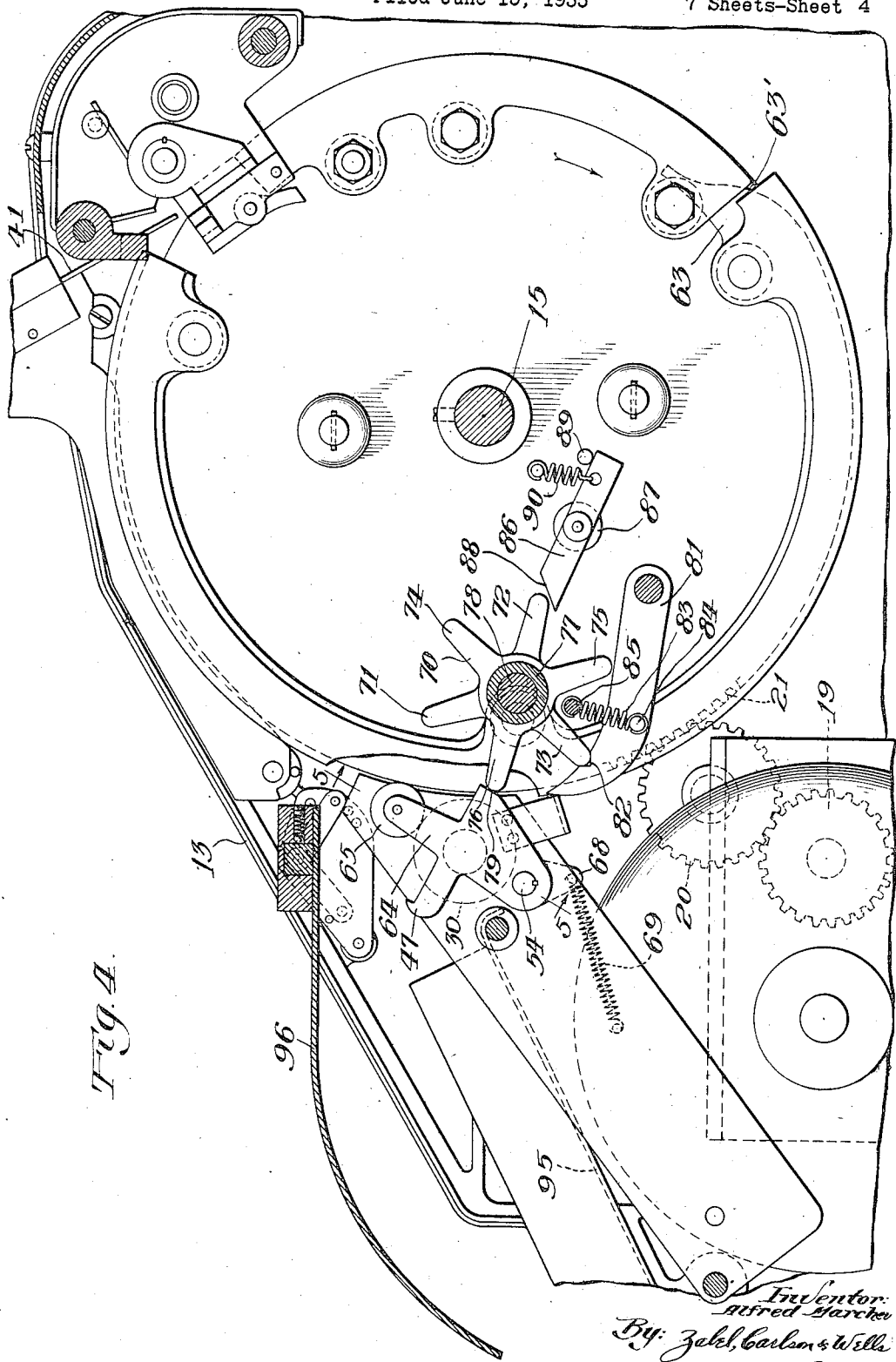
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DUPLICATING MACHINE

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7 Sheets-Sheet 4



March 10, 1936.

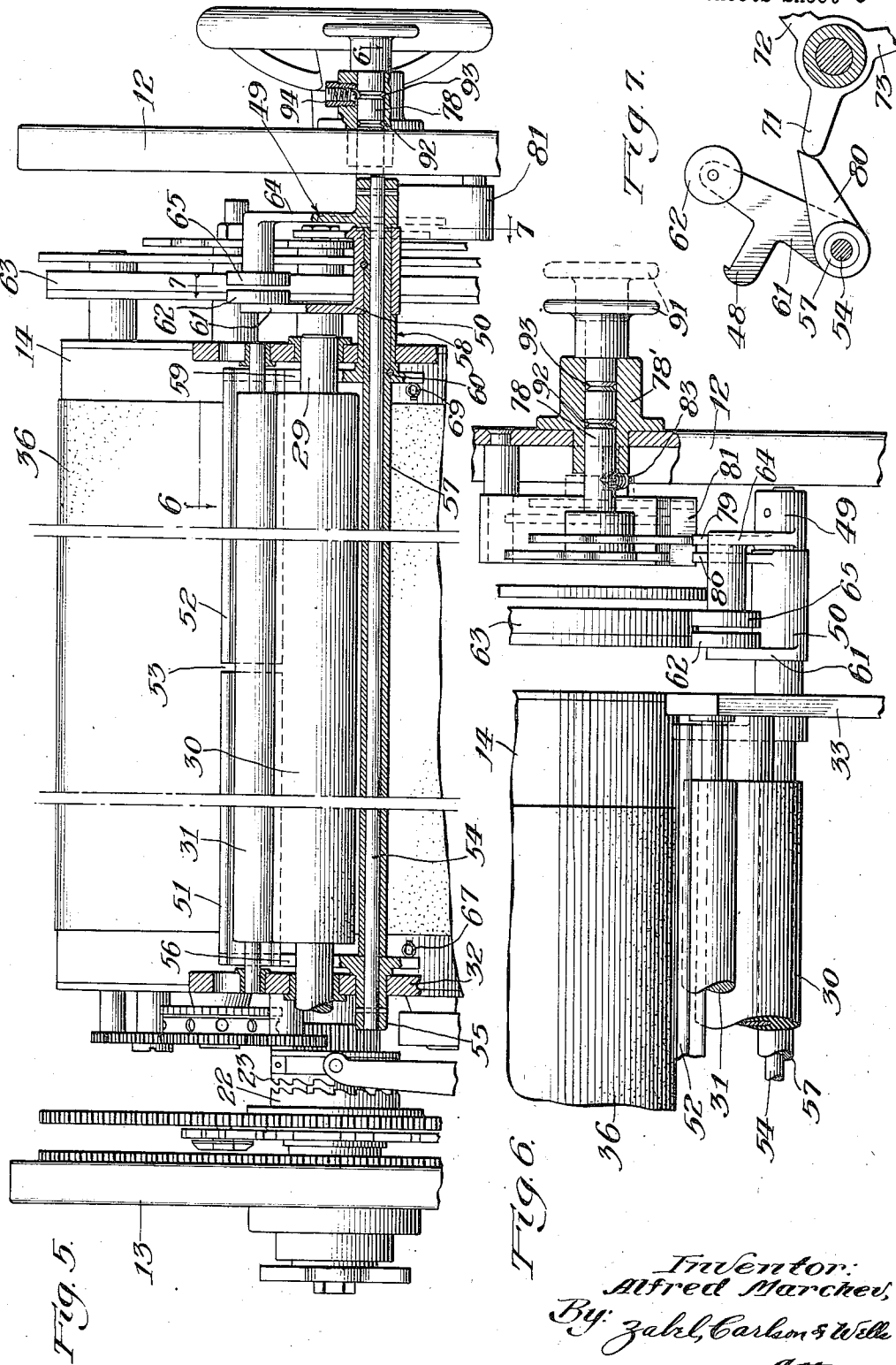
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DUPLICATING MACHINE

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7 Sheets-Sheet 5



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2,033,383

DUPLICATING MACHINE

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7 Sheets-Sheet 6

Fig. 8.

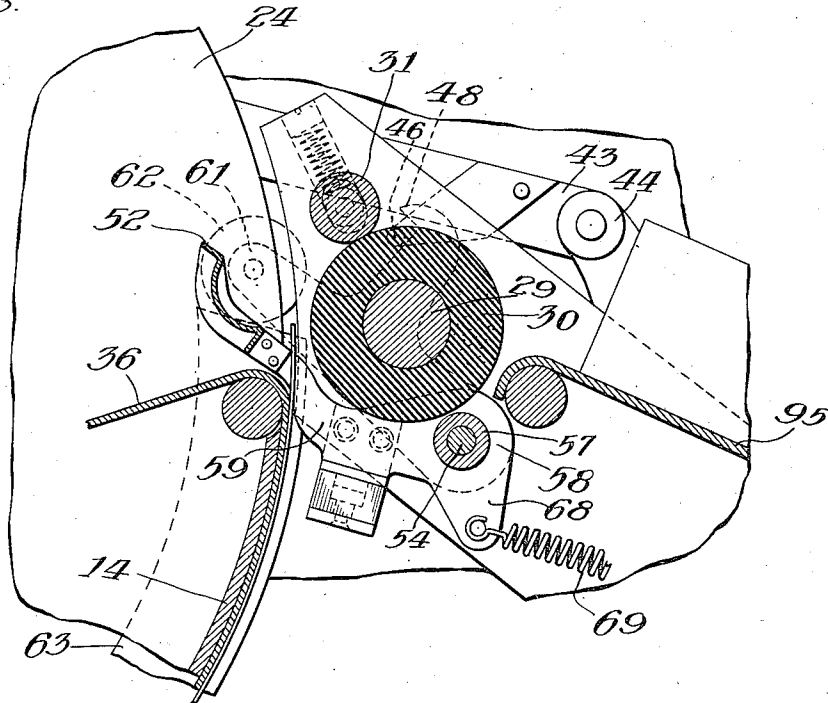
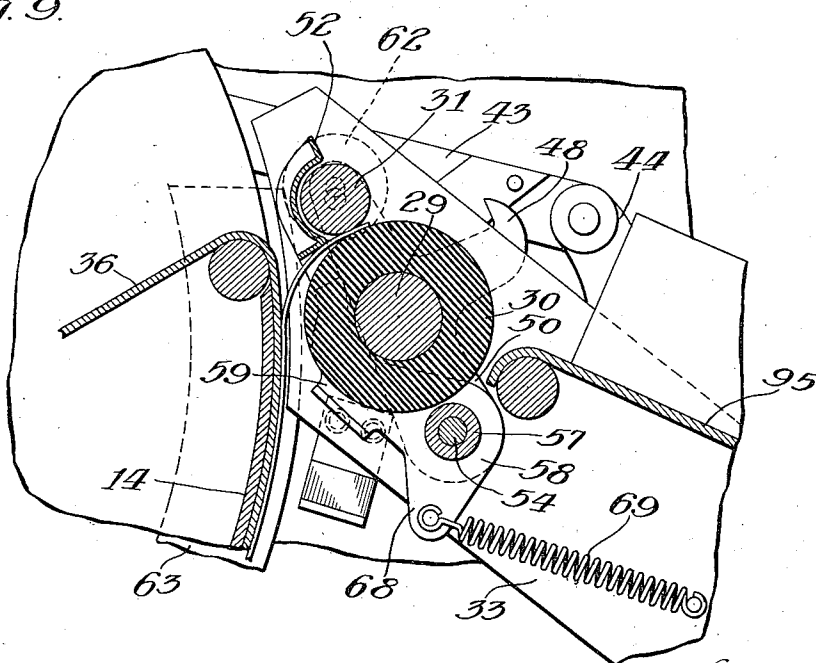


Fig. 9.



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DUPLICATING MACHINE

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7 Sheets-Sheet 7.

Fig. 10.

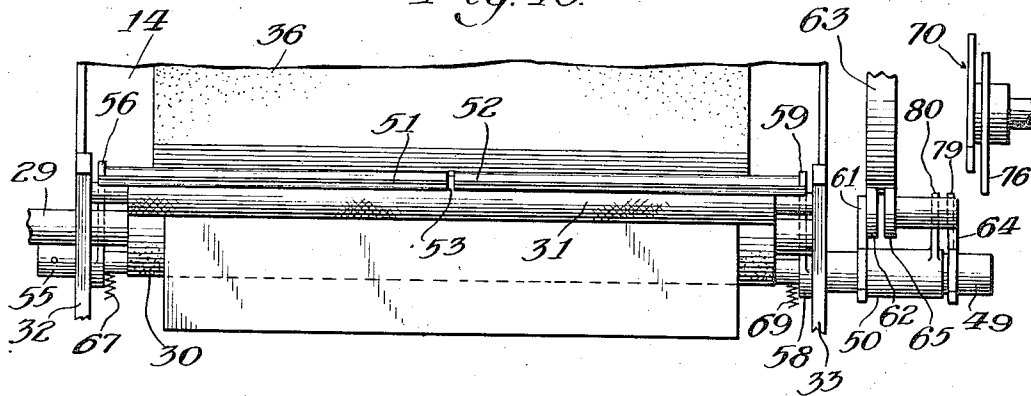


Fig. 11.

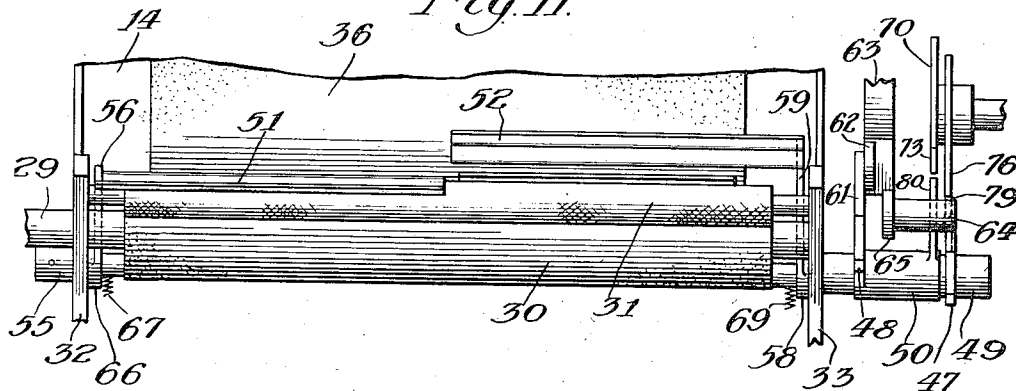
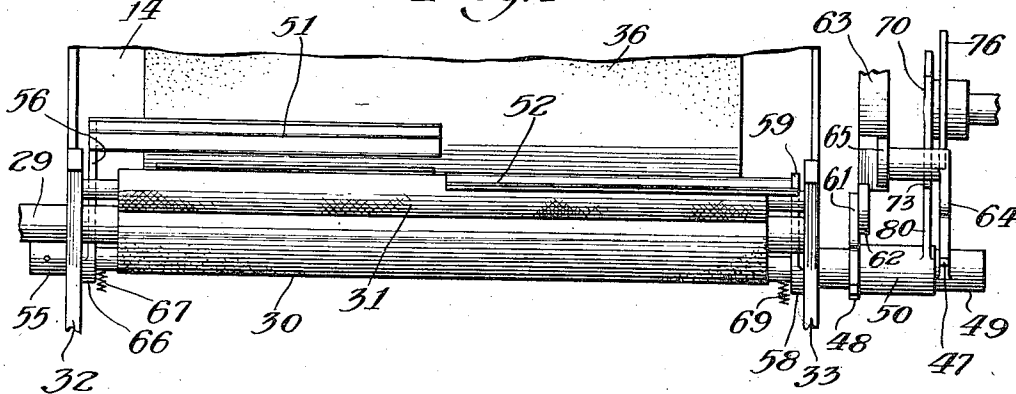


Fig. 12.



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UNITED STATES PATENT OFFICE

2,033,383

DUPLICATING MACHINE

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Application June 15, 1935, Serial No. 26,714

17 Claims. (Cl. 101—132)

This invention relates to duplicators and more particularly to duplicators of the rotary type such for example as that shown in the co-pending application 713,590, filed March 1, 1934, by John W. Hernlund, Alfred Marchev, and Robert S. Morrison.

In the general operation of the machine disclosed in this application, it is very much the same as the machine disclosed in the prior application just mentioned.

While the invention of the present application is disclosed in connection with a machine of the type shown in the prior application, it is to be understood that the invention is not limited to use with that machine only, but may be employed with advantage in duplicating machines of other types and in printing devices as a general class.

The invention contemplates the provision in a duplicating machine of a novel stripping mechanism whereby separate sheets laid on the duplicating drum may be stripped at different times in order that the entire surface of a long drum may be utilized although the sheets applied thereto are much narrower than the length of the drum.

To this end, the invention contemplates the provision of a stripping mechanism made up in a plurality of sections which sections may operate at different times during the rotation of the drum to strip the sheets from the drum. In the particular form of the invention disclosed, a pair of stripping members are employed in conjunction with stripping rollers, and these stripping members are alternately operable upon each rotation of the drum so as to strip from the drum the narrow sheet aligned therewith.

Other objects and features of the invention will become apparent from the following description, reference being had to the accompanying drawings in which—

Fig. 1 is a plan view of a duplicating machine which embodies the invention;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary sectional view taken on the line 5—5 of Fig. 4;

Fig. 6 is a fragmentary plan view partly in section of a portion of a stripping mechanism;

Fig. 7 is a fragmentary sectional view on the line 7—7 of Fig. 5;

Fig. 8 and Fig. 9 are fragmentary sectional

views taken on the line 8—8 of Fig. 1 and showing the alternative positions of the stripping members;

Figs. 10, 11, and 12 are fragmentary side elevations demonstrating the operation of the stripping members together and separate.

Referring first to Figs. 1, 2, 3, and 4, there is shown a duplicating machine of the type disclosed in the prior application above mentioned. This duplicating machine preferably comprises a cabinet 10 upon which a frame 11 is mounted, the duplicating mechanism proper being mounted in the frame 11. The frame 11 comprises two side frames 12 and 13 suitably secured together and providing a support for duplicating drum 14. The drum 14 is supported upon a pair of stub shafts 15 and 16 as described in the prior application, these shafts being suitably journaled in the side frames 12 and 13. The power for rotating drum 14 is obtained from an electric motor 17 through a gear reducing box 18 and gears 19 and 20 to gear 21. Gear 21 is rotatable upon shaft 16, but is adapted to be connected to the shaft 16 by means of clutch members 22, 23 so as to rotate the shaft 16 therewith. End members 24 and 25 of the drum 14 are secured to shafts 15 and 16 directly so that, upon rotation of shaft 16, drum 14 will be rotated therewith. Shaft 15 has an operating handle 26 for manually turning the drum whenever desired for positioning it. Shaft 16 has a gear 27 thereon which meshes with a gear 28 on a shaft 29 which shaft carries a stripping roll 30. Stripping roll 30 and its companion roll 31 are journaled in a pair of auxiliary side frames 32 and 33 as described in the prior application hereinbefore mentioned.

The drum 14 has mounted therein a pair of spindles 34 and 35 for receiving a gelatin band 36 which is stretched around the drum 14 to provide a duplicating surface thereon. As indicated most clearly in Fig. 2, drum 14 is open on its surface from the point 37 to a point 38. This opening is utilized in connection with the stripping mechanism although it is a common structure in duplicating machines of this character.

A suitable gearing mechanism indicated at 39 in Figs. 2 and 3 has been provided for moving the gelatin band on the drum, but this mechanism forms no part of the present invention and will, therefore, not be further described.

The machine is also provided with a platen roller 40 and a paper feeding mechanism including a paper feed table 41. This mechanism, however, also is of no importance to the present in-

vention and, therefore, will not be further described.

The general operation of the paper feed mechanism and the drum is substantially the same as that disclosed in the prior application and, for the purposes of this invention, I will just generally describe the feeding of a sheet to the drum and the operation after that through to the stripping of the sheet in order that the present invention may be fully understood.

When a sheet of paper is fed from the feed table 41, it is applied to the gelatin band with its forward end projecting over the point 38 where the gelatin band enters the drum when the drum is rotated in the direction of the arrow indicated in Fig. 2. Platen roller 40 presses the sheet down upon the band. When the master sheet is applied, this sheet is held on the drum any desired amount of time and passed underneath the platen roller several times if desired by utilizing an operating lever 42 to prevent stripping of the master sheet from the drum.

Referring now to Figs. 8 and 9 in connection with Fig. 1, this action will be more clearly understood. Operating lever 42 is connected to a link 43 which in turn is connected to an arm 44 pivoted at 45 to the side frame 12. Link 43 carries a pin 46 (see Fig. 1) which pin is adapted to engage hooks 47 and 48 on members 49 and 50 holding these members back so as to position a pair of stripping bars 51 and 52 connected to members 49 and 50 respectively back over the upper stripping roll 31 in the position shown most clearly in Figs. 2 and 9 so that the stripping bars are out of the path of the forward end of a master sheet on the drum.

Stripping bars 51 and 52 are mounted for separate movement. A shaft 54 is keyed to a member 55 which is journaled in the frame 32, and this member 55 has an arm 56 thereon which arm carries the stripping bar 51. Bar 51 extends from the arm 56 parallel to the stripping rolls toward the center of the drum. Stripping bar 52 extends from the other end of the drum toward the center thereof, the two bars being slightly spaced at the center as indicated at 53 in Fig. 5. A sleeve 57 surrounds the shaft 54, and, where the sleeve and shaft pass through the auxiliary frame member 33, a member 58 surrounding them is journaled in the frame 33 and carries an arm 59 upon which the stripper bar 52 is mounted. A pin 60 keys the member 58 and the sleeve 57 together. Beyond the end of the drum toward the side frame 12, sleeve 57 has the member 50 keyed thereto, and the shaft 54 has the member 49 keyed thereto. An arm 61 on the member 50 carries a roller 62 for engagement with a cam 63 fixed to the end 24 of the drum 14. Member 49 has an arm 64 which carries a roller 65 also riding upon the cam 63. Member 55 has a depending arm 66 to which a spring 67 is secured for yieldingly urging the stripping bar 51 toward the drum, and the member 58 carries a depending arm 68 to which a spring 69 is secured for yieldingly urging stripping bar 52 toward the drum. It is understood, of course, that springs 67 and 69 are secured to the frame members 32 and 33, respectively.

Tracing now briefly the structure described, it will be seen that stripper bar 51 is connected by means of arm 56 to member 55 and urged toward the drum by spring 67. Member 55 in turn is connected by means of shaft 54 to member 49 and arm 64 so that roller 65 riding on cam 63 prevents movement of stripping bar 51 into stripping position or engagement with the duplicat-

ing surface of drum 14. Similarly, stripping bar 52 is carried by arm 59 and yieldingly urged toward the drum by spring 69. Sleeve 57 connects member 58 and member 50 so that roller 62 carried on arm 61 holds stripping bar 52 away from the duplicating surface when roller 62 is on the cam 63. So long as nothing is interposed to prevent their operation, rollers 62 and 65 will strike the end of cam 63 in the position illustrated in Fig. 8 so that the stripper bars 51 and 52 will move outwardly as the rollers ride over the end of cam 63 into the position shown in Fig. 9, stripper bars 51 and 52 moving in unison in this operation so as to provide a stripping bar substantially throughout the length of the drum 14.

Means are provided to hold bars 51 and 52 in the position shown in Fig. 9 through a complete revolution of the drum when desired. This means consists of a star wheel 70 (see Figs. 4, 7, and 10 to 12). Star wheel 70 is made up with three points 71, 72, and 73 lying in one plane while the other three points 74, 75, and 76 lie in another plane closer to the end frame 12 of the machine. Both sets of points are mounted upon a common hub 77 which hub is fixed to a shaft 78 rotatably and slidably mounted in a bearing 78' on the frame 12. Points 74, 75, and 76 are, in the normal operating position of star wheel 70, in alignment with arm 64 which is provided with a shoulder at 79 adapted to engage one of the points 74, 75, and 76 as illustrated in Fig. 4. Points 71, 72, and 73 are aligned with a projecting member 80 on the member 50.

It is evident that, when one of the points 71 to 76 is in engagement with its respective member 79 or 80 as shown in Fig. 4 or Fig. 7, the point will operate to hold member 49 or member 50 in position to prevent movement of the stripper bars 51 and 52 into the drum. A pawl member 81 (see Figs. 4 to 6) is pivoted upon side frame 12 and is notched at 82 to form a stop means for the points on the star wheel 70. A spring 83 connected to pawl 81 at one end by means of a pin 84 and connected to side frame 12 at its other end by means of a pin 85 yieldingly urges the pawl against the points of the star wheel.

Means is provided on the drum 14 for advancing the star wheel 70 one step, that is, one-sixth of a revolution for each rotation of the drum in its normal direction of operation. This means consists of a spring pressed pawl 86 pivotally secured upon a post 87 projecting from end face 24 of the drum. This pawl 86 has the face 88 for engagement with one of the points of the star wheel as the drum rotates so as to cause advancement of the star wheel one step. A stop pin 89 limits movement of the pawl 86 in one direction, and a spring 90 yieldingly opposes movement of the pawl in the opposite direction so that the drum may be reversed in direction without rotating star wheel 70, it being obvious that the pawl 86 will ride over the points of the star wheel when the drum is rotated in the reverse direction from that shown in Fig. 4.

When it is desired to free the stripping mechanism of the influence of star wheel 70, the star wheel is moved toward the frame 12 by sliding shaft 78 in its bearing 78'. A handle 91 is provided on the end of shaft 78 for this purpose. Also shaft 78 is provided with a pair of spaced grooves 92 and 93 (see Figs. 5 and 6) to be engaged by a spring pressed ball 94 mounted in the bearing 78' so as to hold shaft 78 either in operative or inoperative position.

Referring now to Fig. 10 in conjunction with

Figs. 8 and 9, there is illustrated the manner of operation of the two stripping bars 51 and 52 when a wide sheet is being used on the drum. In this case both rollers 62 and 65 engage upon cam 63, and star wheel 70 is out of the line of the arms 79 and 80 so that, when rollers 62 and 65 move off the end of cam 63 which is curved as indicated at 63' in Fig. 4, both stripper bars 51 and 52 move into the open side of the drum, and, when rollers 65 and 62 strike the advancing face of cam 63, both stripping bars are moved outwardly in the manner illustrated in Figs. 8 and 9 to strip the wide sheet from the duplicating surface of the drum.

Now, however, when it is desired to alternately strip narrow sheets from the drum as illustrated in Figs. 10 and 11 of the drawings, the star wheel 70 is moved into operative position so that its points are aligned with the members 79 and 80. Two narrow sheets are fed to the drum side by side, and, during the first rotation of the drum, one of the points 74, 75, or 76 will engage the portion 79 which is connected to arm 64 carrying roller 65 and hold this roller from dropping down into the path of the cam 63. This prevents the shaft 54 from turning and prevents stripping bar 51 from entering the drum. Therefore, only stripping bar 52 will function and only one sheet will be stripped from the machine in the first rotation.

On the second rotation of the drum, another sheet is fed onto the side from which the sheet was just stripped, and, upon this second rotation of this drum, one of the points 71, 72, and 73 has been positioned by pawl 86 moving the star wheel to engage with the arm 80 and thus hold cam roller 62 out and prevent stripper bar 52 from returning into the drum after it has stripped its sheet. The action of the drum is continued in this fashion with the stripping mechanism operating to alternately strip the narrow sheets from the drum, each sheet remaining on the drum for two revolutions thereof, and a new narrow sheet being fed at each revolution of the drum, but to alternate sides thereof. When it is desired to return to stripping wide sheets, it is only necessary to pull out on the handle 91 to move star wheel 70 out of position, and the two bars 51 and 52 then function as a single stripping bar in the same fashion as the stripping bar in the prior application above referred to.

The stripping rollers deliver the sheet to a receiving tray 95 beneath guide bar 96 which are substantially like that shown in the prior application. The mechanical operation of the drum and its associated parts including the guide bar 96 and the feeding mechanism for feeding sheets to the drum as well as the means for controlling the rotation of the drum may well be precisely the same as illustrated in the prior application above referred to. The description of this mechanism, therefore, has not been placed in the present application since it is believed to be unnecessary to the understanding of the present invention.

While one 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.

What I claim as new and desire to secure by Letters Patent is:

1. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, and stripping means for stripping sheets from said drum, said stripping means comprising a pair of members spaced lengthwise of the drum and operable at different times to separately strip sheets laid side by side on said drum.

2. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, and stripping means for stripping sheets from said drum, said stripping means comprising a pair of members spaced lengthwise of the drum and operable at different times to separately strip sheets laid side by side on said drum, and means to operate said members together to strip a single wide sheet from said drum.

3. In a duplicating machine, a frame, an impression drum rotatably journaled therein, a pair of stripping rollers adjacent said drum, a pair of stripping members spaced lengthwise of said drum and movable into and out of position to direct sheets from said drum to said rollers, said members being operable at different times to separately strip sheets laid side by side on said drum.

4. In a duplicating machine, a frame, an impression drum rotatably journaled therein, a pair of stripping rollers adjacent said drum, a pair of stripping members spaced lengthwise of said drum and movable into and out of position to direct sheets from said drum to said rollers, said members being operable at different times to separately strip sheets laid side by side on said drum, and means synchronized with said drum operating said members alternately.

5. In a duplicating machine, a frame, an impression drum rotatably journaled therein, a pair of stripping rollers adjacent said drum, a pair of stripping members spaced lengthwise of said drum and movable into and out of position to direct sheets from said drum to said rollers, and means for alternately operating said members in synchronism with the rotation of said drum whereby to alternately strip sheets laid side by side on said drum.

6. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, and stripping means for stripping sheets from said drum, said stripping means comprising a pair of members spaced lengthwise of the drum and operable at different times to separately strip sheets laid side by side on said drum, said members comprising a pair of stripping bars carried by said frame and movable toward and away from said drum.

7. In a duplicating machine, a frame, an impression member therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, said stripping mechanism being provided with separately operable stripping members, and means to operate said stripping members individually to strip sheets from said impression member.

8. In a duplicating machine, a frame, an impression member therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, said stripping mechanism being provided with separately operable stripping members, and means to operate said stripping members individually to strip

sheets from said impression member, said stripping members being spaced longitudinally along said impression member whereby to remove sheets from separate portions of said duplicating surface.

9. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, said stripping mechanism being provided with separately operable stripping members, and means to operate said stripping members individually to strip sheets from said drum.

10. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, said stripping mechanism being provided with separately operable stripping members, and means synchronized with said drum to operate one of said stripping members upon each rotation of said drum.

11. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, said stripping mechanism being provided with separately operable stripping members, and operating means for said stripping members comprising cam means rotatable with said drum, control means individual to each stripping member engaging said cam means to control the stripping movement of its stripping member, and a second member actuated by rotation of said drum to prevent one of said control means from engaging the drum on each rotation thereof.

12. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, said stripping mechanism being provided with separately operable stripping members, springs urging said members toward the drum, a cam rotatable with the drum, means connected with the stripping members and engaging said cam to periodically move said stripping members outwardly from said drum, and means actuated by the drum for alternately holding said members away from the drum for one rotation of the drum independently of said cam.

13. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, said stripping mechanism being provided with separately operable stripping members, springs urging said members toward the drum, a cam rotatable with the drum, means connected with the stripping members and engaging said cam to periodically move said stripping members outwardly from said drum, and means actuated by the drum for alternately holding said members away from the drum for one rotation of the drum independently of said cam, and manually operable means for rendering said last named means functionally inoperative.

14. In a duplicating machine, a frame, an im-

pression drum rotatably journaled therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, said stripping mechanism being provided with separately operable stripping members, springs urging said members toward the drum, a cam rotatable with the drum, means connected with the stripping members and engaging said cam to periodically move said stripping members outwardly from said drum, and means actuated by the drum for alternately holding said members away from the drum for one rotation of the drum independently of said cam, manually operable means for rendering said last named means functionally inoperative, and a second manually operable means for holding said stripping members out of functionally operative position.

15. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, comprising a pair of stripping rollers, stripping bars mounted for independent movement for directing sheets from said surface to said rollers, means including a cam on said drum for causing stripping movement of said bars, and means actuated by said drum for preventing stripping movement of one bar upon each rotation of the drum.

16. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, comprising a pair of stripping rollers, stripping bars mounted for independent movement for directing sheets from said surface to said rollers, means including a cam on said drum for causing stripping movement of said bars, and means actuated by said drum for preventing stripping movement of one bar upon each rotation of the drum, said last named means comprising a star wheel mounted on said frame, means on the drum for advancing the star wheel one step for each rotation of the drum, and means fixed to said bars for alternately engaging the points of said star wheel.

17. In a duplicating machine, a frame, an impression drum rotatably journaled therein and having a duplicating surface thereon, stripping mechanism for stripping sheets from said surface, comprising a pair of stripping rollers, stripping bars mounted for independent movement for directing sheets from said surface to said rollers, means including a cam on said drum for causing stripping movement of said bars, and means actuated by said drum for preventing stripping movement of one bar upon each rotation of the drum, said last named means comprising a star wheel mounted on said frame, means on the drum for advancing the star wheel one step for each rotation of the drum, and means fixed to said bars for alternately engaging the points of said star wheel, and manually operable means for moving said star wheel out of alignment with said last named means.

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