

June 30, 1942.

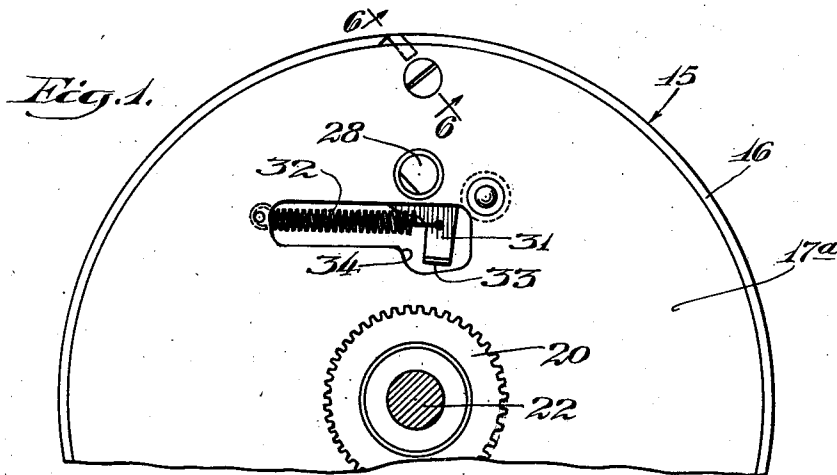
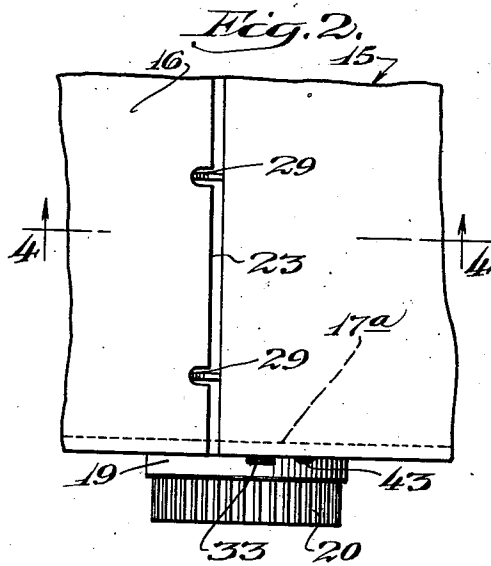
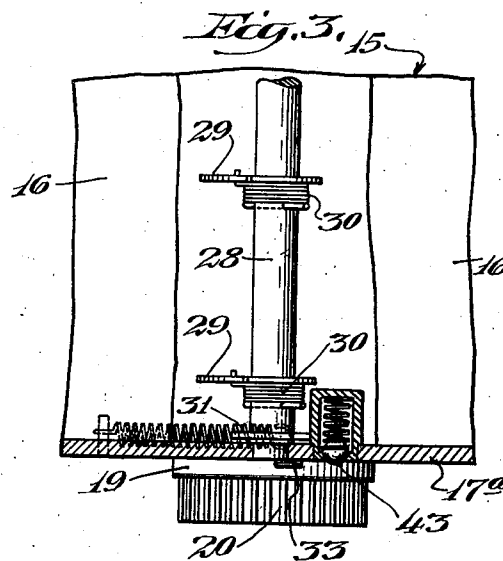
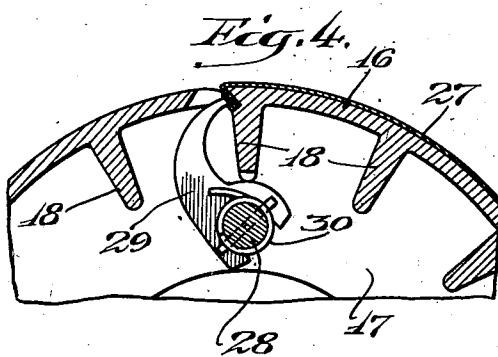
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2,288,290

SHEET CLAMPING MEANS FOR DUPLICATING MACHINES

Original Filed March 9, 1940

2 Sheets-Sheet 1



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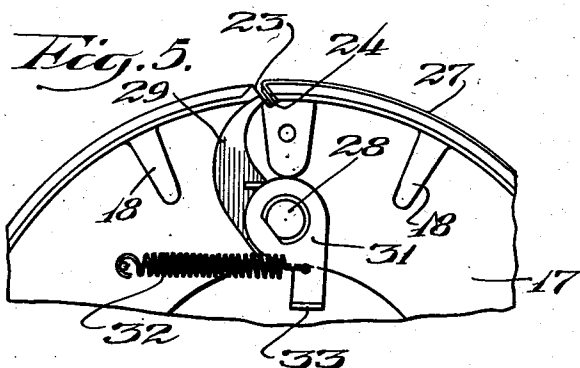
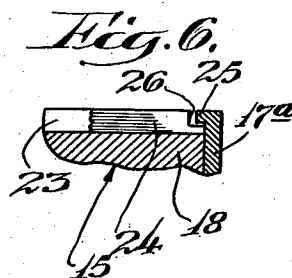
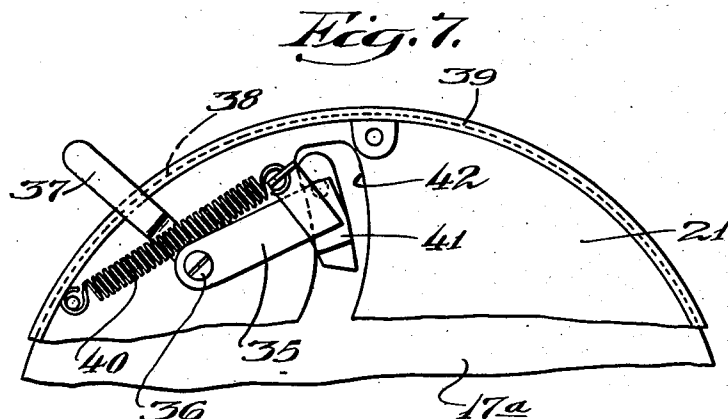
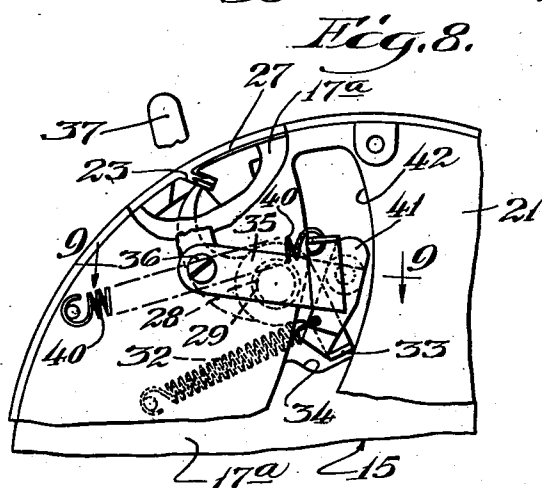
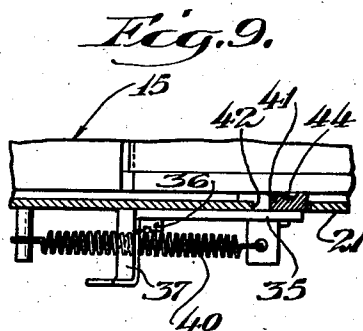
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2,288,290

SHEET CLAMPING MEANS FOR DUPLICATING MACHINES

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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SHEET CLAMPING MEANS FOR
DUPLICATING MACHINES

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Original application March 9, 1940, Serial No.
323,164. Divided and this application July 16,
1941, Serial No. 402,570

11 Claims. (Cl. 101—409)

This invention relates to sheet clamping means and particularly to an improved arrangement of parts by which a sheet may be releasably secured in position on a drum so as to be carried around thereby and so as to be readily releasable from the drum whenever desired. The invention is designed particularly for use in connection with the drum of a liquid process duplicating machine, this application being filed as a division of my co-pending application Serial No. 323,164, filed March 9, 1940.

In the improved arrangement of my present invention, the drum of a duplicating machine is provided with a groove in its face extending longitudinally of the drum, into which groove the leading edge of a master sheet is adapted to be inserted between the wall defining one face of the groove and a light flexible bar loosely mounted in the groove. Spring pressed fingers bear on the bar for pressing it at a plurality of points therealong tightly against the end portion of a master sheet for clamping the sheet securely in position on the drum.

In the preferred arrangement, the gripper fingers are mounted on a rock shaft which is rotatably mounted in the drum in such manner that upon rotation of the shaft the fingers are moved in unison into and out of operative pressure relationship to the gripper bar. The means for opening the gripping mechanism comprises a trip member pivotally mounted on the frame on which the drum is mounted and adapted to be moved manually either in to position for operative engagement with the shaft as the drum rotates or alternatively into position so as to clear the shaft. The engagement between the trip member and the shaft is preferably effected through the medium of an arm carried by the shaft and arranged so that the shaft is automatically rotated for moving the fingers out of pressure relationship with the bar at a predetermined point in the revolution of the drum following the movement of the trip member into operative position. Means is preferably provided for holding the trip member releasably in its operative position for expediting the release of the sheet from the drum.

It is another object of this invention to improve sheet clamping means of this type in sundry details hereinafter pointed out. The preferred means by which the several objects have been attained are illustrated in the accompanying drawings, in which—

Fig. 1 is an end view of the drum of a duplicating machine embodying the invention, being

partially broken away for clearness of illustration;

Fig. 2 is a top plan view of a fragmentary portion of the drum of Fig. 1;

Fig. 3 is a view similar to Fig. 2 but with a portion of the drum broken away for showing clearly certain of the parts inside of the drum;

Fig. 4 is a vertical sectional view taken substantially at the line 4—4 of Fig. 2;

Fig. 5 is a view of the drum as shown in Fig. 1 but with the end plate of the drum removed so as to show the interior construction;

Fig. 6 is a fragmentary sectional view taken substantially at the line 6—6 of Fig. 1;

Fig. 7 is a view of a fragmentary portion of the drum and the supporting frame plate for the drum as seen from one end thereof;

Fig. 8 is a view similar to Fig. 7 but showing a changed position of the parts, and showing also some of the mechanism carried by the drum; and

Fig. 9 is a view of a fragmentary portion of the drum and supporting plate as seen from above in Fig. 8, being partially a section at the line 9—9 of said Fig. 8.

Referring now to the several figures of the drawings, in which corresponding parts are indicated by the same reference characters, 15 indicates a drum comprising a cylindrical wall portion 16 with an end plate 17 at one end and an end plate 17a at the opposite end removably secured therein, the cylindrical wall portion 16 being preferably in the form of a casting with strengthening ribs 18 on its inner face, as is best shown in Fig. 4. The drum 15 in the arrangement shown is supported by means of bearing members 19 on the outer faces of the end plates of the drum (only one of said members being shown), the bearing member 19 being provided with a driving pinion or gear 20 fixedly mounted on its outer face. The bearing members 19 at opposite ends of the drum are supported by frame plates 21 so as to be arranged to be driven by a central shaft 22, as is clearly shown in Fig. 1.

At one side of the drum, it is provided with an outwardly open groove 23 cut in the cylindrical wall portion 16 adjacent to one of the strengthening ribs 18, as is best shown in Fig. 4. Within this groove, a bar 24 is loosely mounted, being held in position by circumferentially extending ribs or lugs 25 carried by the end plates of the drum, as is clearly shown in Fig. 6, the lugs 25 being in engagement with notches 26 in the ends of the bar. In the arrangement shown, the bar

24 is in the form of a light thin flexible strip of metal, being of such width as to cause its outer edge to be substantially flush with the cylindrical outer face of the drum. The arrangement is such that the bar 24 is adapted to be pressed into holding engagement with the end of a master sheet 27 inserted in the groove 23 so as to hold the master sheet strongly in position on the drum.

The means employed for pressing the bar 24 against the face of the groove 23 comprises a rock shaft 28 rotatably mounted between the end plates of the drum adjacent to the groove, such rock shaft being provided with fingers 29 mounted thereon in spaced relation to each other along the shaft. Each of the fingers 29 is normally pressed lightly in clockwise direction with respect to the shaft 28, as shown in Fig. 4, by means of coiled springs 30 which bear on the shaft and on the several fingers. At the near end of the drum as shown in Fig. 3, the shaft 28 is provided with an arm 31 which extends inwardly from the shaft, as is best shown in Fig. 5, such arm 31 being normally drawn toward the left in Fig. 5 by means of a coiled spring 32 so as to normally cause the fingers 29 to press the bar 24 into gripping relationship to the face of the groove 23. As is best shown in Figs. 1 and 5, the inner end of the arm 31 is turned at right angles to provide a longitudinally extending lug 33 extending outwardly through an opening 34 in the end plate 17a of the drum, as is best shown in Fig. 1.

Means is provided for rotating the shaft 28 against the action of the spring 32 for carrying the fingers 29 out of pressure relationship to the master sheet clamping bar 24 at a predetermined point in the rotation of the drum 15. This means comprises a trip lever 35 pivotally mounted by means of a machine screw 36 secured by screw-threads in the frame plate 21, as is best shown in Fig. 7. The lever 35 comprises a handle portion 37 at one end extending outwardly through a notch 38 in a flange 39 about the supporting plate 21. A coiled spring 40 connected with the lever 35 and with the plate 21 serves normally to hold the lever swung outwardly to the limit of its motion, as shown in Fig. 7. The arrangement is such however that when the lever 35 is moved to the limit of its motion in the opposite direction, the spring 40 passes the line of centers so as to serve for holding the lever swung to the changed position as shown in Fig. 8.

At the opposite end of the lever 35 from that at which the handle 37 is located, a crossbar portion 41 is provided rigidly connected with the lever and adapted to be carried by the lever inwardly and outwardly along a slot 42 in the supporting plate 21, as is clearly shown in Figs. 7 and 8. The arrangement of the parts is such that when the lever is moved inwardly into the position as shown in Fig. 8, the crossbar portion 41 is brought into position for engaging the lug 33 carried by the arm 31 mounted upon the shaft 28, as the drum rotates in counterclockwise direction in Fig. 8. When the lever 35 is held in the position as shown in Fig. 8 and the drum is rotated in counterclockwise direction in said figure, the engagement of the lug 33 with the inner end of the crossbar portion 41 causes the arm 31 to swing in counterclockwise direction for rotating the shaft 28 so as to carry the fingers 29 out of pressure relationship to the flexible bar 24. When the crossbar 41 and lug 33 are disengaged from each other, the spring 32 serves of course to return the fingers 29 again into pres-

sure relationship with respect to the bar 24 for holding a master sheet in position on the drum.

In the construction illustrated, means is provided for holding the trip lever 35 and the drum 15 in operative relationship to each other, as shown in Fig. 8. This means comprises a spring pressed detent 43 carried by the end plate 17a of the drum in position to engage a recess 44 in the inner face of the crossbar portion 41 of the trip lever 35. The arrangement is such that when the lever 35 is held by the spring 40 in the position as shown in Fig. 8, the detent 43 carried by the drum is adapted to engage the recess 44 of the bar 41 so as to hold the drum in operative position with respect to the supporting plate 21 and so as to assist in holding the trip lever 35 in the position as shown in said Fig. 8. After a master sheet has been inserted into operative position in the groove 23 of the drum, the lever 35 can be retracted manually against the holding power of the detent 43, after which the spring 32 will be free to return the fingers 29 to their operative pressure positions. If desired, the lug 33 and the crossbar portion 41 of the trip lever may be released for a return movement to their normal positions by a slight rotary movement of the drum 15 in counterclockwise direction.

By the use of the construction and arrangement as above described, a very simple and inexpensive structure is provided which can be used to very good advantage for securing a master sheet upon the drum of a liquid process duplicating machine. The arrangement is very convenient and can be used to advantage by any intelligent operator with very little experience in connection with machines of this type. The arrangement is such that the wear on the parts is very limited so as to enable the mechanism to remain in operative condition through long periods of use.

While the arrangement as shown is preferred, the invention is not to be limited thereto except so far as the claims may be so limited, it being understood that changes might well be made in the form and arrangement of parts without departing from the invention.

I claim:

1. In a mechanism of the type described, the combination of a drum comprising a cylindrical wall portion supported between end plates with an outwardly open groove in the outer face of the cylindrical wall portion longitudinally of the drum, a bar mounted loosely in said groove adjacent to the face of the drum with its outer face portion notched at the ends, circumferentially extending lugs on said end plates adapted by engagement with the notches in the bar to hold the bar loosely in position, and means normally pressing said bar against one face of the groove for holding a master sheet releasably in position in the groove.

2. In a mechanism of the type described, the combination of a drum having an outwardly open groove in its face longitudinally of the drum, a light flexible metal bar mounted loosely in said groove with its outer edge adjacent to the face of the drum, a rock shaft rotatably mounted in said drum adjacent to said groove, fingers yieldingly mounted on said rock shaft at a plurality of points therealong in position for engaging said bar, and yielding means normally holding said shaft in position for causing said fingers to press said bar into holding relationship with one face of said groove.

3. In a mechanism of the type described, the combination of a drum having an outwardly open groove in its face longitudinally of the drum, a bar mounted loosely in said groove adjacent to the face of the drum, means normally pressing said bar against one face of the groove for holding a master sheet releasably in position in the groove, and movably mounted means made effective by movement to operative position to act automatically for relieving the pressure on said bar at a predetermined point in continuous forward revolution of said drum for releasing the master sheet from said groove.

4. In a mechanism of the type described, the combination of a drum having an outwardly open groove in its face longitudinally of the drum, a bar mounted loosely in said groove adjacent to the face of the drum, means normally pressing said bar against one face of the groove for holding a master sheet releasably in position in the groove, movably mounted means made effective by movement to operative position to relieve the pressure on said bar at a predetermined point in the revolution of said drum for releasing the master sheet from said groove, yielding means adapted normally to hold said movably mounted means in inoperative position, and other means for holding said movably mounted means releasably in operative position.

5. In a mechanism of the type described, the combination of a drum having an outwardly open groove in its face longitudinally of the drum, a bar mounted loosely in said groove adjacent to the face of the drum, means normally pressing said bar against one face of the groove for holding a master sheet releasably in position in the groove, a trip lever pivotally mounted adjacent to the drum effective when in operative position to relieve the pressure on said bar at a predetermined point in the revolution of said drum for releasing the master sheet from said groove, yielding means adapted normally to hold said trip lever in inoperative position, and other means for holding said trip lever releasably in operative position.

6. In a mechanism of the type described, the combination of a drum having an outwardly open groove in its face longitudinally of the drum, a bar mounted loosely in said groove adjacent to the face of the drum, means normally pressing said bar against one face of the groove for holding a master sheet releasably in position in the groove, movably mounted means made effective by movement to operative position to relieve the pressure on said bar at a predetermined point in the revolution of said drum for releasing the master sheet from said groove, yielding means arranged in a passing centers relationship to said movably mounted means for holding said movably mounted means alternatively in either its operative position or its inoperative position, and auxiliary holding means adapted to assist in holding said movably mounted means releasably in operative position.

7. In a mechanism of the type described, the combination of a drum having an outwardly open groove in its face longitudinally of the drum, a light flexible metal bar mounted loosely in said groove with its outer edge adjacent to the face of the drum, a rock shaft rotatably mounted in said drum adjacent to said groove, fingers yieldingly mounted on said rock shaft at a plurality of points therealong in position for engaging said bar, yielding means normally holding said shaft in position for causing said

fingers to press said bar into holding relationship with one face of said groove, and trip means movably mounted in position adjacent to said drum adapted in adjusted operative position to have operative engagement with said shaft whereby upon rotary movement of the drum the shaft is rotated for relieving the pressure of said fingers on said bar.

8. In a mechanism of the type described, the combination of a drum having an outwardly open groove in its face longitudinally of the drum, a bar mounted loosely in said groove, a rock shaft rotatably mounted in said drum adjacent to said groove, fingers mounted on said rock shaft at a plurality of points therealong in position for engaging said bar, yielding means normally holding said shaft in position for causing said fingers to press said bar into holding engagement with one face of said groove, an arm fixedly mounted on said shaft adapted by movement backwardly as compared with the normal rotary movement of the drum to give said shaft a rotary movement for relieving the pressure of said fingers on said bar, and trip means movably mounted in position adjacent to said drum adapted in adjusted operative position to have operative engagement with said arm as the drum rotates for swinging the arm backwardly for retracting said fingers with respect to the bar.

9. In a mechanism of the type described, the combination of a drum having an outwardly open groove in its face longitudinally of the drum, a bar mounted loosely in said groove, a rock shaft rotatably mounted in said drum adjacent to said groove, fingers mounted on said rock shaft at a plurality of points therealong in position for engaging said bar, yielding means normally holding said shaft in position for causing said fingers to press said bar into holding engagement with one face of said groove, an arm fixedly mounted on said shaft adapted by movement backwardly as compared with the normal rotary movement of the drum to give said shaft a rotary movement for relieving the pressure of said fingers on said bar, trip means movably mounted in position adjacent to said drum adapted in adjusted operative position to have operative engagement with said arm as the drum rotates for swinging the arm backwardly for retracting said fingers with respect to the bar, and yielding means adapted when said trip means has operative engagement with said arm to hold the trip means releasably in operative adjusted position for holding said fingers in retracted position with respect to the bar.

10. In a mechanism of the type described, the combination of a drum having an outwardly open groove in its face longitudinally of the drum, a bar mounted loosely in said groove, a rock shaft rotatably mounted in said drum adjacent to said groove, fingers mounted on said rock shaft at a plurality of points therealong in position for engaging said bar, yielding means normally holding said shaft in position for causing said fingers to press said bar into holding engagement with one face of said groove, an arm fixedly mounted on said shaft adapted by movement backwardly as compared with the normal rotary movement of the drum to give said shaft a rotary movement for relieving the pressure of said fingers on said bar, trip means movably mounted in position adjacent to said drum adapted in adjusted operative position to have operative engagement with said arm as the

drum rotates for swinging the arm backwardly for retracting said fingers with respect to the bar, and a spring pressed detent adapted by releasable engagement with said trip means when the trip means is in operative position with respect to said arm to hold the trip means releasably in operative adjusted position for holding the fingers retracted with respect to the bar.

11. In a mechanism of the type described, the combination of a drum having an outwardly open groove in its face longitudinally of the drum, a bar mounted loosely in said groove, a rock shaft rotatably mounted in said drum adjacent to said groove, fingers mounted on said rock shaft at a plurality of points therealong in

5 position for engaging said bar, a trip lever pivotally mounted in position adjacent to said drum adapted to swing inwardly to have operative engagement with said arm as the drum rotates for swinging the arm backwardly for retracting said fingers with respect to the bar, a coiled spring normally holding said trip lever swung outwardly out of the path of said arm, and yielding means adapted when said trip lever has operative engagement with said arm in its backwardly swung position to hold the trip lever releasably in its inwardly swung position for holding said fingers releasably in retracted position with respect to the bar.

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