

Feb. 11, 1941.

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2,231,291

DUPLICATING MACHINE AND BLOCK-OUT MEANS THEREFOR

Filed Sept. 2, 1939

3 Sheets-Sheet 1

Fig. 1.

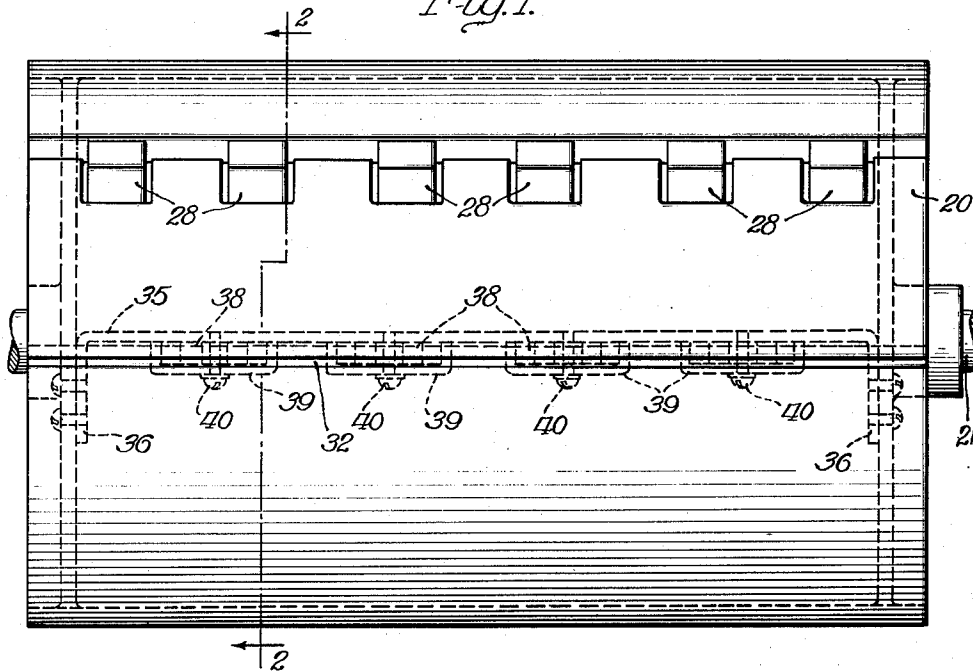
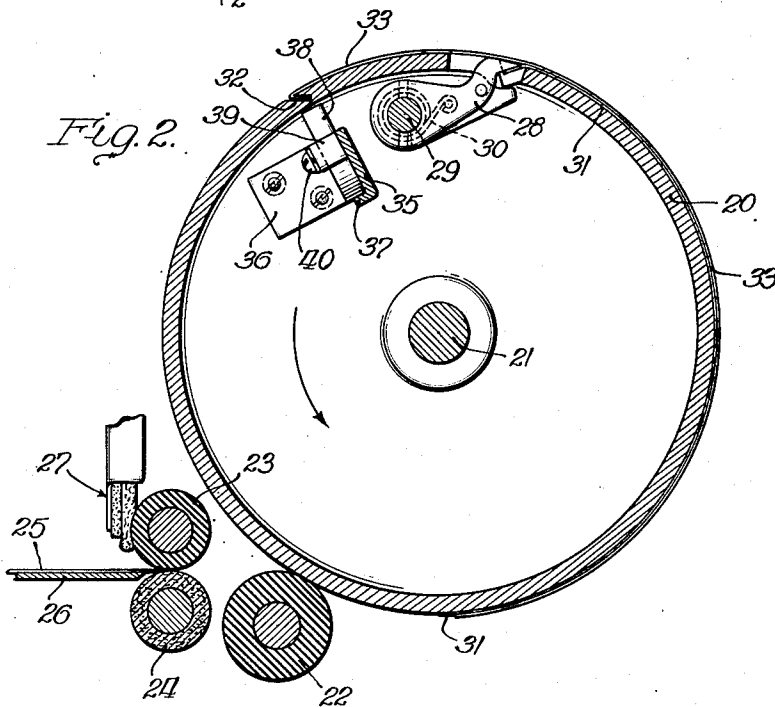


Fig. 2.



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Fig. 3.

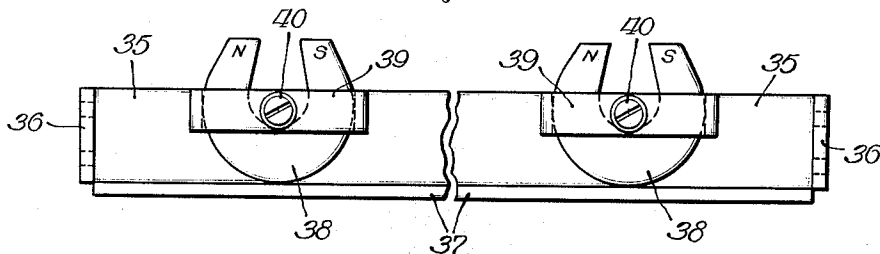


Fig. 6.

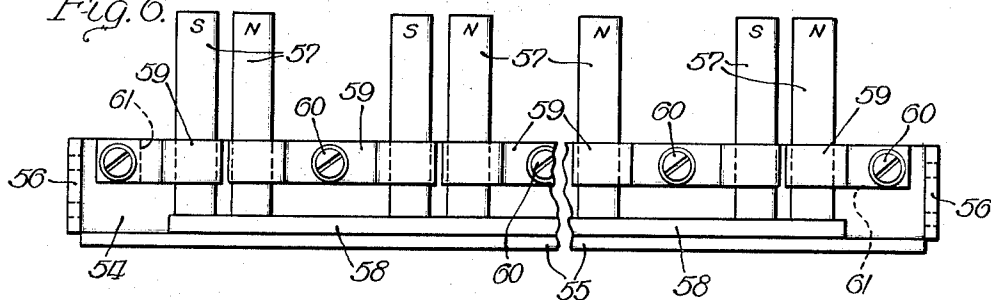


Fig. 7.

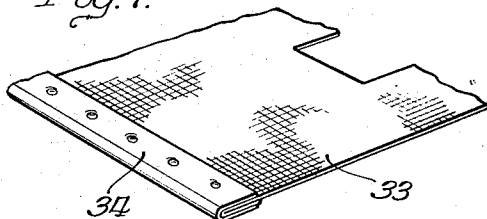


Fig. 9.

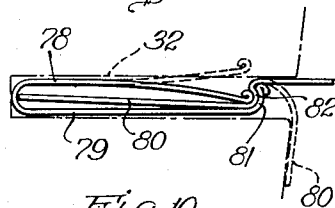


Fig. 10.

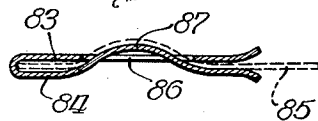


Fig. 11.

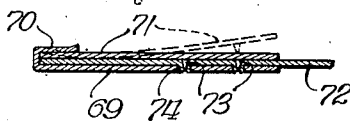


Fig. 8.

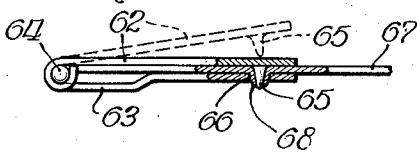
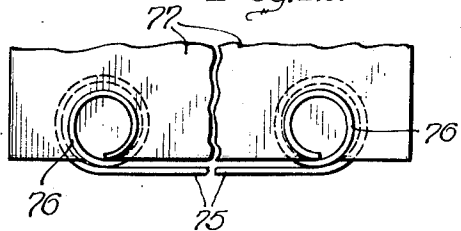


Fig. 12.



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Fig. 4.

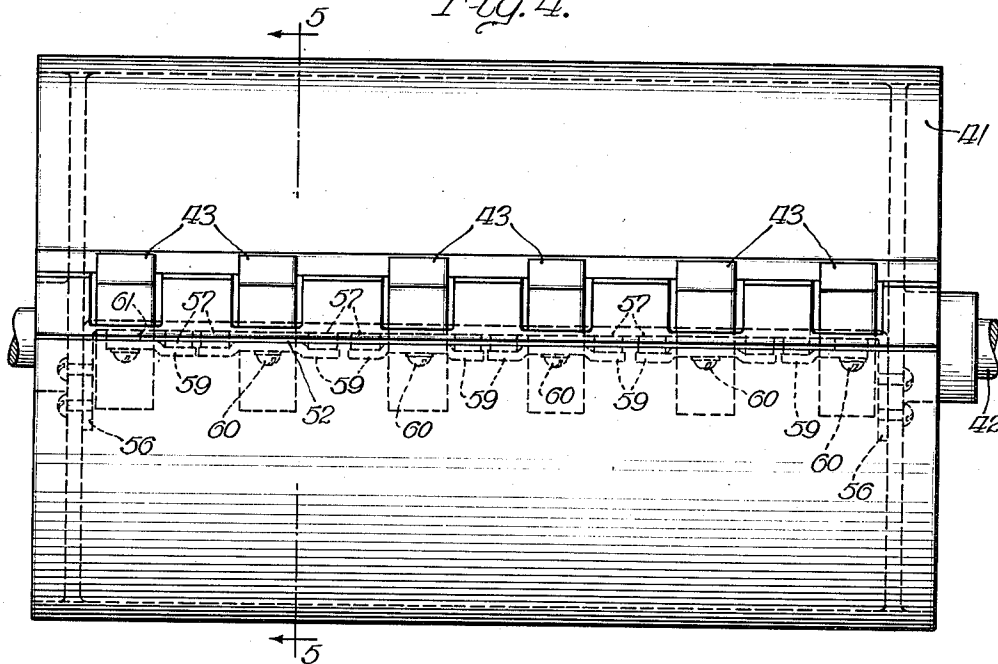
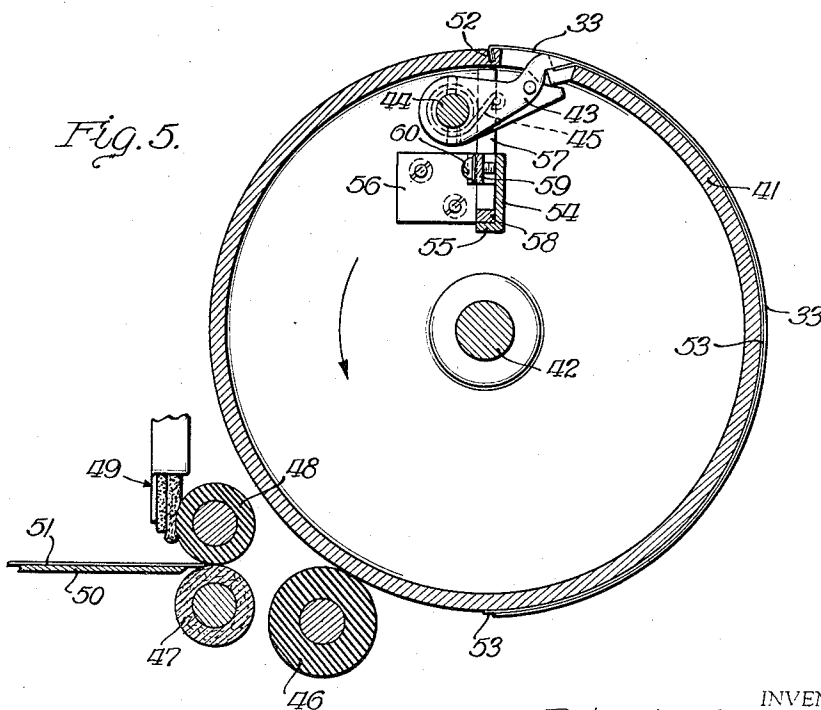


Fig. 5.



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UNITED STATES PATENT OFFICE

2,231,291

DUPLICATING MACHINE AND BLOCK-OUT
MEANS THEREFORRobert F. Morrison, Oak Park, Ill., assignor to
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Application September 2, 1939, Serial No. 293,157

8 Claims. (Cl. 101—415.1)

This invention relates to duplicating machines of the liquid process type and it has for its object the provision of a new and improved form and arrangement of parts by which a block-out sheet may be held in any desired adjusted position longitudinally of the drum by which the master sheet is carried around into engagement consecutively with a series of copy sheets. In many types of work with a duplicating machine, it is often desirable to make copies of portions only of the subject matter carried by the master sheet, and for accomplishing this purpose block-out sheets have been used for covering the portions of the master sheet not to be copied. It is the object of this invention to provide improved means for holding a block-out sheet in position on the drum for covering the desired portions of the master sheet.

In the arrangement shown, for accomplishing the ends sought, a block-out sheet is employed having a clip of some approved type formed of magnetic material and secured on the leading end of the sheet, the wall of the drum being provided with an outwardly open groove located in advance of the leading edge of the master sheet, into which groove the block-out sheet and the clip thereon are capable of being inserted so as to be slidable along the groove for varying the position of the block-out sheet transversely of the master sheet. For preventing the clip and the attached block-out sheet from slipping out of adjusted position in the groove, magnets are provided on the drum in position to attract the clip inwardly with sufficient force to prevent its accidental disengagement from the groove, while at the same time permitting the quick and easy removal of the clip and the block-out sheet when desired. It is one of the objects of the invention to provide a novel arrangement of magnets and cooperating parts by which the desired results shall be attained to advantage.

It is another object of the invention to provide improved forms of block-out sheets comprising magnetic clip means therefor, and to provide improved forms of clips which may be removably secured upon a block-out sheet without the use of tools or special apparatus.

It is another object of the invention to provide improved means of this type for holding any sheet other than a block-out sheet in position on a drum, such for example as the master sheet of this machine which also is releasably secured in position.

It is another object of the invention to improve arrangements of this type in sundry details hereinafter pointed out. The preferred means by

which the several objects have been attained are illustrated in the drawings, in which—

Fig. 1 is a face view of the drum of a duplicating machine with the improved arrangement of block-out holding means embodied therein;

Fig. 2 is a vertical cross sectional view taken substantially at the line 2—2 of Fig. 1 but with the drum turned to a changed angular position;

Fig. 3 is a face view of a mounting bar with a plurality of magnets mounted thereon as seen from the left in Fig. 2 but with the intermediate portion of the bar broken away;

Fig. 4 is a view similar to Fig. 1 but showing a modified construction of the parts;

Fig. 5 is a vertical cross sectional view taken substantially at the line 5—5 of Fig. 4 but with the drum turned to a changed angular position;

Fig. 6 is a face view of the form of mounting bar employed in the Fig. 4 construction, having a plurality of magnets mounted thereon as seen from the left in Fig. 5, with a portion of the bar broken away;

Fig. 7 is a perspective view of one of the preferred forms of block-out sheet;

Fig. 8 is an enlarged showing of the clip portion of a block-out sheet, shown partly in section, embodying a modified construction;

Fig. 9 is an enlarged view showing another modified form of clip, with the groove of the drum indicated by dotted lines;

Figs. 10 and 11 are cross sectional views of other modified forms of clips secured in position on the leading edges of block-out sheets; and

Fig. 12 is a face view of still another modified form of clip in position on the edge of a block-out sheet.

Referring now to Figs. 1, 2 and 3, in which one preferred form of the drum and cooperating parts is shown, 20 indicates a drum of any approved type rotatably mounted in position by means of a heavy shaft 21. A platen or impression roller 22 is provided in impression relationship with the drum 20 at its lower face. Forwarding rollers 23 and 24 of any approved type are provided adjacent to the drum at the left in Fig. 2 so as to receive a copy sheet 25 moving forwardly toward the right in said figure upon a table 26. A moistening device 27 of any suitable type is provided for supplying a film of solvent to the upper forwarding roller 23. A series of grippers 28 are mounted upon a rock shaft 29 in spaced relation to each other longitudinally of the drum, as is clearly shown in Fig. 1, spring means 30 being provided tending normally to hold the grippers in operative engagement with the wall of the drum

for holding a master sheet 31 in position on the drum as shown in Fig. 2.

At the side of the drum 20 just ahead of the position at which the grippers 28 hold the leading edge of the master sheet 31 (at the left in Fig. 2), an outwardly open groove 32 is provided for the reception of a block-out sheet 33 which is of any approved form provided with a clip 34 of magnetic sheet metal on its leading edge, as is clearly shown in Fig. 7. Adjacent to the inner face of the drum opposite to the groove 32, a supporting bar 35 of aluminum or other non-magnetic material is mounted in position by means of turned end lugs 36, such supporting bar being provided at its inner edge with a flange 37. Upon the supporting bar 35 and flange 37, a series of permanent horseshoe magnets 38 are mounted with their poles located closely adjacent to the inner face of the wall of the drum 20 directly opposite to the groove 32, the drum 20 being formed of aluminum or other non-magnetic material. As is best shown in Fig. 3, the magnets 38 are held in position by means of keeper bars 39, also of non-magnetic material, secured by means of screws 40.

The arrangement is such that the permanent horseshoe magnets 38 attract the magnetic clip 34 of the block-out device so as normally to hold the clip in position in the groove 32 for holding the block-out sheet 33 in the desired position with respect to the master sheet 31, as is clearly shown in Fig. 2. The arrangement is such that the clip 34 can be readily moved to any desired extent along the groove 32 longitudinally of the drum for positioning the block-out sheet 33 at any desired point transversely of the master sheet 31, as is desired in machines of this type.

It has been found in practice that the horseshoe magnets 38 in the position as shown and described are effective for preventing accidental movement of the clip 34 out of position in the groove 32. At the same time, the block-out sheet can be very easily removed from position when desired by a direct pull on the sheet. The clip 34 is also very easily adjusted to any desired position and is held effectively in the adjusted position by the attraction of the magnets 38 thereon.

In the arrangement shown in Figs. 4, 5 and 6, a drum 41 similar to the drum 20 is mounted in position by means of a shaft 42, being provided with grippers 43 carried by a rock shaft 44 and being held normally in gripping position by spring means 45. An impression roller 46, forwarding rollers 47 and 48, a moistening device 49 and a table 50 are provided corresponding to the parts as above described in connection with Figs. 1, 2 and 3, the rollers 47 and 48 being adapted to carry a copy sheet 51 forwardly toward the right in Fig. 5 to the bite of the platen 46 and the drum 41.

At a point closely adjacent to the openings through which the grippers 43 extend, an outwardly open groove 52 is provided in the outer face of the wall of the drum, such groove being adapted to receive therein the clip of a block-out sheet 33 as above described so as to overlap a master sheet 53 held in position on the drum by the grippers 43.

A modified form of magnetic means is shown for holding the block-out sheet 33 in position. This means comprises a supporting bar 54 of non-magnetic metal provided with a flange 55 along its inner edge and being held in position by means of turned end lugs 56 which are secured by any suitable fastening means upon the inner

faces of the end walls of the drum so as to position the supporting bar 54 directly opposite to the groove 52 inside of the row of grippers 43.

Upon the supporting bar 54, a series of permanent bar magnets 57 are mounted, with a bar 58 of soft iron or other magnetic material between the magnets and the flange 55 of the supporting bar, the magnets 57 being of such length as to extend into close proximity to the inner face of the wall of the drum, as is clearly shown in Fig. 5. The magnets 57 are arranged in cooperative relation to each other for exerting a maximum attractive effect upon the magnetic clip of the block-out sheet 33 for preventing accidental removal of the clip from the groove 52, being held in position by means of keeper bars 59 secured by screws 60, as is clearly shown in Figs. 5 and 6. At opposite ends of the row of magnets, the keeper bars 59 are of decreased length to accommodate their use with a single magnet, spacing blocks 61 being preferably provided for supporting such shortened keeper bars in operative position.

By the arrangement of the magnets 57 in spaced relation to each other between the correspondingly spaced grippers 43, I have been enabled to place the groove 52 in much closer relationship to the leading edge portion of the master sheet 53 held in position by the grippers 43 as shown in Fig. 5, this result being effected without detracting in any way from the effectiveness of the magnets for holding the magnetic clip of the block-out device in position in the groove 52.

A plurality of modified forms of block-out devices are shown, such changes being attained by the provision of different types of clips upon the leading edge portions of the block-out sheets. In the arrangement shown in Fig. 8, the clip comprises two plates 62 and 63 pivotally connected together by means of a pivot pin 64, the plate 62 being provided with pins 65 thereon in position to extend through openings 66 in the plate 63. In the use of the device, a block-out sheet 67 is inserted between the plates which are then pressed together for forcing the pins 65 through the sheet and into the openings 66. The arrangement is such that a portion of the material of the sheet 67 is displaced so as to be gripped between the pin 65 and its opening 66 so as to hold the pins frictionally in position, as shown in solid lines in Fig. 8, for holding the clip effectively in position upon the block-out sheet. In the arrangement shown, the displaced portions of the sheet are indicated by the reference character 68. By the provision of this type of clip, with one or both of the plates 62 and 63 formed of magnetic material, any ordinary piece of paper or other suitable sheet material may be employed for making the block-out sheet 67, the clip being very readily and quickly attached thereto as above described.

In the alternative form of construction as shown in Fig. 11, a plate 69 is shown having its edge portion turned backwardly for providing a flange 70 in position to receive a plate 71 and a block-out sheet 72 in position therein, the plate 71 being provided with pins 73 in registry with openings 74 in the plate 69. One or both of the plates 69 and 71 are made of magnetic material so as to be effectively acted upon by the magnetic means of either of the constructions above described. The plates 69 and 71 have sufficient inherent resiliency to cause the flange 70 to resiliently grip the edge portions of the plate 71 and the sheet 72 and to cause the plate 71 nor-

mally to stand in the position as shown in solid lines in Fig. 11 when the parts are assembled as above described.

In the arrangement shown in Fig. 12, a bar 75 of magnetic material is provided at its end portions with spring clip devices 76 of any approved type so as to enable the bar to be secured releasably upon a block-out sheet 77 of any suitable type.

10 In the arrangement shown in Fig. 9, the clip comprises plates 78 and 79 formed integrally with each other from magnetic material, being arranged so as to provide a channel between them into which the edge portion of a block-out sheet 80 is inserted. The plate 79, in the arrangement shown, is provided with a turned lug portion 81 at its outer edge which is adapted to have latching engagement with the edge of the plate 78 so as to crimp the sheet 80 at 82 for causing the desired tight grip of the clip on the sheet. The arrangement is such that the clip is readily insertable into the groove 32 of the drum as shown in Fig. 9.

25 In the arrangement illustrated in Fig. 10, two plates 83 and 84 are formed of magnetic material into channel formation so as to receive a block-out sheet 85 into position between them. At intervals therealong, the plate 83 is provided with openings 86 into which offset arms 87 of the plate 84 are movable for forcing portions of the sheet 85 into crimped engagement with the adjacent parts so as normally to prevent withdrawal of the sheet from the channel.

35 In each of the forms of sheet shown in Figs. 7 to 12 of the drawings, a mounting member is provided in the form of a metal bar attached to the edge portion of the sheet, such bar being held by magnetic attraction in the groove of the drum. The invention broadly is not to be limited to this arrangement, however, but includes rather any arrangement by which a bar-like member of magnetic material may be applied to the edge of a sheet so as to hold the sheet in operative position when the bar-like member is drawn inwardly in the groove. The invention in its broadest phases also is not to be limited to the arrangement in which the magnet is positioned inside of the drum so as to attract a mounting bar of magnetic material on the sheet, since it will be understood that other arrangements might well be worked out by which a bar is forced inwardly by magnetic attraction toward the center of the drum so as to hold a sheet removably in position on the drum.

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

I claim:

65 1. In a liquid process duplicating machine adapted to employ therewith a flexible sheet formed of non-magnetic material having mounting means of magnetic material arranged along one edge of the sheet, the combination of a drum having its wall made of non-magnetic material with an outwardly open narrow groove in its face longitudinally of the drum for the reception of the magnetic mounting means of a sheet of the type mentioned, and magnetically-acting means adapted normally to hold the magnetic mounting means of a sheet as specified in said groove 75 comprising other parts of magnetic material

cooperating with said magnetic mounting means for providing a magnetic circuit whereby said magnetic mounting means is drawn inwardly by magnetic attraction.

2. In a liquid process duplicating machine adapted to employ therewith a flexible sheet 5 formed of paper with a mounting bar of magnetic material secured along one edge of the sheet, the combination of a drum having its wall made of non-magnetic material with an outwardly open narrow groove in its face longitudinally of the drum for the reception of the mounting bar of a sheet of the type mentioned, and magnetically-acting means comprising a magnetic circuit formed in part by the mounting bar of a sheet as specified adapted normally to hold the mounting bar releasably in said groove. 10

3. In a liquid process duplicating machine, the combination of a drum having an outwardly open narrow groove in its face longitudinally of the drum for the reception of an edge portion of a block-out sheet device, means for attaching a master sheet releasably in position on the face of the drum independently of said groove, and magnetically-acting means comprising a member formed of magnetic material pressed inwardly in said groove by magnetic attraction adapted by engagement with said block-out sheet in said groove to hold said block-out sheet adjustably in position with respect to said master sheet and arranged for permitting the ready adjustment of the block-out sheet while the master sheet is held rigidly in position on the drum. 20

4. In a liquid process duplicating machine adapted to employ therewith a flexible sheet 35 having an elongated mounting member of magnetic material secured along one edge of the sheet, the combination of a drum having its wall made of non-magnetic material with an outwardly open narrow groove in its face longitudinally of the drum for the reception of the mounting member of a sheet of the type mentioned, and magnetically-acting means comprising a permanent magnet on the drum arranged for causing a substantial proportion of the magnetic lines of force through the magnet to pass also through the magnetic mounting member of a sheet as specified in said groove for drawing the mounting member by magnetic attraction into said groove. 40

5. In a liquid process duplicating machine, the combination of a drum having an outwardly open narrow groove in its face longitudinally of the drum, a flexible sheet, an elongated mounting member of magnetic material secured along one edge of the sheet adapted to pass loosely into said groove, and magnetically-acting means comprising a magnet on the drum arranged for causing a substantial proportion of the magnetic lines of force through the magnet to pass also through said magnetic mounting member in said groove for drawing the mounting member by magnetic attraction into said groove. 55

6. In combination, a drum having an outwardly open narrow groove in its face longitudinally of the drum, a bar-like mounting member of magnetic material adapted to be inserted readily into said groove, and magnetic means on said drum adapted by cooperation with said mounting member in said groove to cause a flow of magnetism through said mounting member for holding it releasably in position in said groove. 70

7. In combination, a drum having its wall made of non-magnetic material with an out- 75

- wardly open narrow groove in its face longitudinally of the drum, a bar-like mounting member of magnetic material adapted to be inserted readily into said groove, and a permanent magnet carried by said drum with its poles positioned closely adjacent to said groove for causing a substantial flow of magnetism through a portion of said mounting member for holding it releasably in position in said groove.
- 5 8. In combination, a drum having its wall made of non-magnetic material with an outwardly open narrow groove in its face longitudinally of the drum, a bar-like mounting member of magnetic material adapted to be inserted readily into said groove, a bar of magnetic material mounted on the inner face of the drum opposite to said groove, and a plurality of permanent bar magnets arranged in cooperative relation to each other with their inner ends engaging said bar and their outer ends positioned closely adjacent to the inner edge of said groove so as to cause a substantial flow of magnetism through a portion of said mounting member for holding it releasably in position in said groove.
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