Feb. 26, 1957 E. A. TOMLIN 2,783,043

DUPLICATING MACHINES

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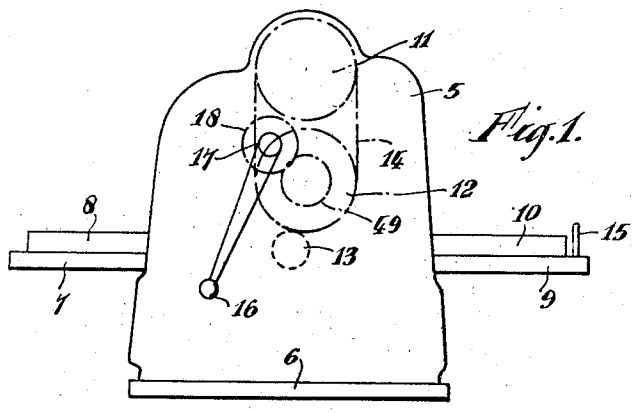


Fig. 1.

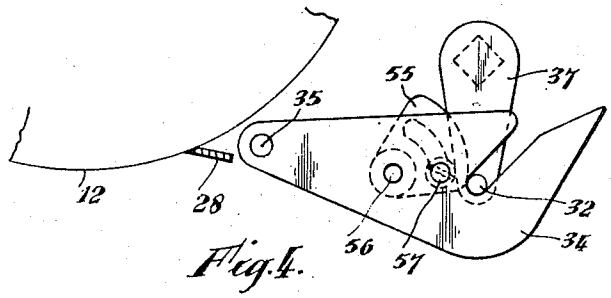


Fig. 4.

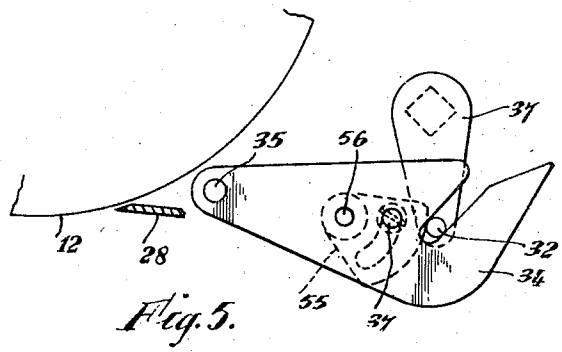


Fig. 5.

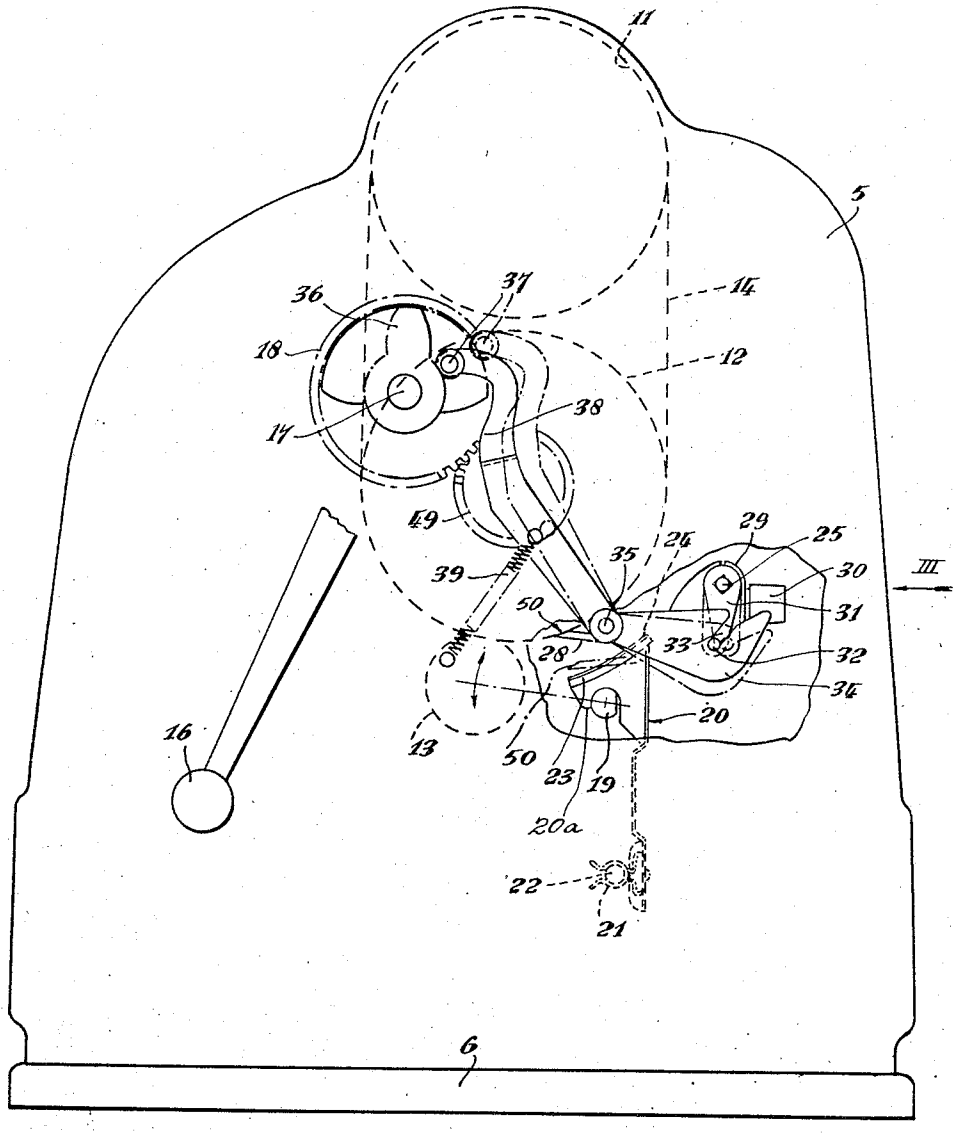
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Fig. 2.



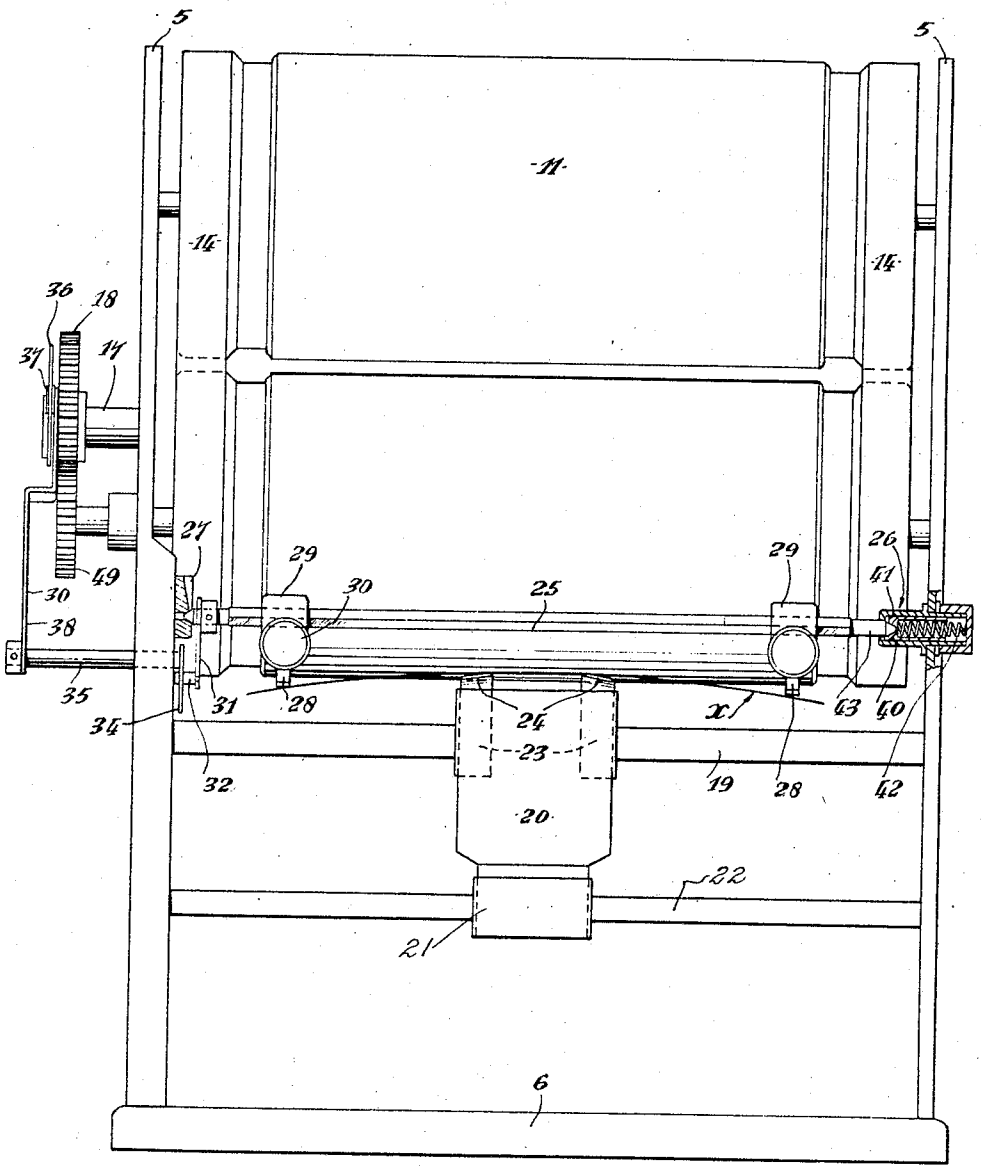
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Fig. 3.



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United States Patent Office 2,783,043 Patented Feb. 26, 1957

2,783,043

DUPLICATING MACHINES

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Application October 8, 1953, Serial No. 384,981

Claims priority, application Great Britain August 4, 1953

2 Claims. (Cl. 271—63)

This invention concerns duplicating machines, more particularly machines in which a stencil travels around a top and bottom cylinder and the sheets of paper are fed in succession between the bottom cylinder and a pressure roller which presses the sheets against the travelling stencil, the sheets being delivered from between the bottom cylinder and the pressure roller to a tray or platform to build up a stack of copies thereon.

It is found more especially with very thin paper, that the copies being delivered to the stack are pushed across the inked face of the topmost copy and consequently that the copies become smudged, and this disability becomes more pronounced as the rate of feed through the machine is increased.

It is known, in order to overcome this disability, to bow the sheets as they are delivered from the machine about an axis extending in the general direction of delivery with a concave face downwardly directed so that a certain rigidity is imparted to the sheets with the result that the copies are carried over the topmost copy of a stack and the present invention is concerned with an improved arrangement whereby such bowing may be effected.

Broadly the object of the present invention is to provide a stencil duplicating machine which incorporates an attachment for bowing sheets as they are delivered, said attachment being readily removable from the machine for ease of maintenance and repair.

A practical application of the present invention will now be described, by way of example only, with reference to the accompanying drawings of which:

Figure 1 is a diagrammatic side view of a duplicating machine in accordance with the present invention.

Figure 2 is a view similar to Figure 1 showing a part of the machine to a larger size and with a cover plate removed to show certain of the details of the machine,

Figure 3 is a view, partly in section, in the direction of the arrow 3 of Figure 2,

Figure 4 is a side view showing a detail of construction of the mechanism of Figure 2, and to a larger size, and

Figure 5 is a view similar to Figure 4 and showing the mechanism in another operative position.

Referring to Figure 1, the machine comprises a frame 5 supported on a base 6, a platform 7 upon which a stack 8 of paper is placed to be fed through the machine, a delivery platform 9 upon which the stack 10 of copies is built on delivery of the copies from the machine, a top cylinder 11, a bottom cylinder 12, a pressure roller 13 and means, generally indicated at 14, which passes around cylinders 11, 12 and to which there is secured a silk screen and a stencil for movement around the cylinders in any well known manner. The copies are delivered from the machine on to the stack 10 against a stop 15 carried by the platform 9. The machine is driven by a handle 16 mounted on a shaft 17 which carries a spur gear 18 meshing with a pinion 49 supported on the shaft of the bottom cylinder 12.

The sheets of paper are fed into the machine in conventional manner to between the bottom cylinder 12 and

the pressure roller 13. The latter is supported upon a bar 19 which is oscillated by a mechanism (not shown but of conventional construction) whereby the roller 13 is moved towards and away from the bottom cylinder 12. The silk screen and stencil referred to are secured to the means 14 by bars and plates which project beyond the outer face of the stencil and the roller 13 is oscillated to clear such projections. When a sheet of paper from the stack 8 is fed on to the stencil the roller 13 is brought into engagement with the paper to press it against the stencil. The mechanism for oscillating the roller 13 does not form part of the present invention and is therefore not described in detail.

A member, generally indicated by the reference numeral 20, is hooked at 20*a* over the bar 19 and comprises a spring clip 21 to engage a spindle 22 by which the member is supported immediately in front of the region in which the copies are delivered from the cylinder 12. The member 20 comprises a pair of spaced, upwardly inclined guides 23 against which the copies are fed, the copies being directed upwardly along the guides and over the top edges 24 thereof. It will be evident that the member 20 is readily disengaged from the spindle 22 and may then be unhooked from the bar 19.

As shown in Figure 3 the member 20 is centrally disposed of the cylinders 11 and 12.

There is provided a stripper mechanism to ensure that the copies, which have a tendency to stick to the stencil, disengage the stencil immediately after they are delivered from between the cylinder 12 and the roller 13. The stripper mechanism comprises a bar 25 (Figure 3) supported in bearings 26, 27 carried by the frames 5 of the machine, and a pair of stripper blades 28 supported from the bar 25. The blades have inclined ends, as at 50 (Figure 2) the ends being adapted to approach the cylinder 12 at a tangent. As more clearly shown in Figure 3, the blades 28 are mounted on blocks 29 which carry knurled nuts 30 for securing the blocks against movement to the bar 25. When the knurled nuts are released the blocks, and the stripper blades 28, are capable of adjustment lengthwise of the bar, i. e. lengthwise of the cylinder 12 and across the width of the sheet of paper. One end of the bar 25 carries a lever 31 having a pin 32 (Figure 2) which enters a slot 33 in a rocking member 34 which is pivotally supported at 35. As the member rocks, the engagement of the pin 32 and the slot 33 results in the bar 25 being oscillated so that the stripper blades 28 are adjusted from the full line position to the chain-dotted position shown in Figure 2. A cam 36 is mounted on shaft 17 and is engaged by a cam follower 37 carried by lever 38, the follower being held in engagement with the cam by a spring 39. The cam imparts a rocking movement to the member 34.

The bearing 26 comprises a casing 40, a plunger 41 within the casing and a spring 42 urging the plunger 41 towards the left as seen in Figure 3. The end of the casing 40 has a hole to receive the rounded part 43 of the bar 25. When the bar 25 is forced to the right to compress the spring 42 the bar can disengage the bearing 27 and be taken out from the machine.

In use: a sheet of paper as it is delivered from between the cylinder 12 and the roller 13 is engaged on its upper surface and at its forward edge by the blades 28 which strip the copy from the stencil, the copy being forced to travel beneath the stripper blades—which therefore engage the upper surface of the copy towards the marginal edges thereof as shown in Figure 3. After the leading edge of the copy is stripped from the stencil, it engages the guides 23 and is carried up and over the tops 24 thereof. The guides 23 engage the under surface of the paper between the blades 28 and it will be seen from Figure 3 that the

top edges **24** of the guides **23** are vertically above the stripper blades **28** with the consequence that the copy is bowed about an axis parallel with the direction of travel of the sheet, the concave surface being downwardly directed. As a consequence of the bowing there is imparted to the sheet a certain rigidity which ensures that it is carried above the stack **10** until the leading edge of the sheet strikes the stop **15** whereupon the copy descends on to the stack and there is therefore no risk of the ink on the topmost copy of the stack being smudged upon the delivery of the next succeeding copy. The bowed sheet is shown at *x* in Figure 3.

The purpose of oscillating the blades **28** is to ensure that, as also is required in the case of the pressure roller **13**, they clear the projections of the means **14** which secure the silk screen and stencil to the cylinders **11** and **12**.

The blades **28** are required closely to approach the stencil but not to engage therewith and in Figures 4 and 5 there is shown means for adjusting the extent of oscillation of the blades towards the lower cylinder **12** for this purpose. An outer face cam **55** pivotally carried, at **56**, on member **34** and lockable against movement by screw **57** engages pin **32**. Figure 4 shows cam **55** in its fully raised position and with the lowest part of its cam face engaged by pin **32** so that the pin may enter fully into the slot in member **34** whereby blades **28** are raised to their greatest extent—as shown. In Figure 5 cam **55** has been adjusted so that the highest part of its cam face will be engaged by pin **32** which is consequently prevented from fully entering the slot of member **34** with the result that the blades **28** are held off to some extent from cylinder **12** as shown in Figure 5.

As the blades **28** may be swung away from the stencil, the cam follower **37** being thereby moved away from cam **36** against the action of spring **39**, if a sheet of paper is inadvertently brought between the blades and the stencil, or if an obstruction is encountered by the blades when oscillating them towards the stencil, it is ensured that the blades resiliently ride over the sheet of paper or the obstruction.

I claim:

1. In a stencil duplicating machine comprising a pair of side frames, two vertically spaced-apart members extending across between the frames, a pair of rollers supported by, and extending between, the side frames, sheets of paper being fed in succession between the rollers for duplication of the copies, and a pair of blades to engage the side margins of the sheets and strip the copies from the stencil, the provision of a device comprising an upwardly inclined guide to engage beneath, and raise, the central region of the sheets relatively to the stripper blades as the sheets are stripped from the stencil, a hook below the guide for attaching the device to the upper of said vertically spaced-apart members and a spring catch below said hook to engage the lower of said vertically spaced-apart members said hook and catch securing said device to the machine in a readily removable manner, said vertically spaced-apart members being so disposed with respect to the said rollers and stripper blades that the said device bows the sheets in the direction of travel of the copies during delivery from the rollers.

2. In a stencil duplicating machine comprisng a pair of side frames, two vertically spaced-apart members extending across between the frames, a pair of rollers supported by, and extending between, the side frames, sheets of paper being fed in succession between the rollers for duplication of the copies and a pair of blades to engage the side margins of the sheets and strip the copies from the stencil, the provision of a device comprising an upright, plate-like part, a pair of upwardly inclined guides carried by the plate-like part, said guides being spaced apart axially of the rollers and presenting their concave surface to the stencil, a hook beneath each guide to rest on the upper of said vertically spaced-apart members and a spring catch carried towards the bottom of the plate-like part to clip over the lower of said vertically spaced-apart members and prevent disengagement of the hook, said vertically spaced-apart members being so disposed with respect to the said rollers and stripper blades that the said device bows the sheets in the direction of travel of the copies during delivery from the rollers.

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