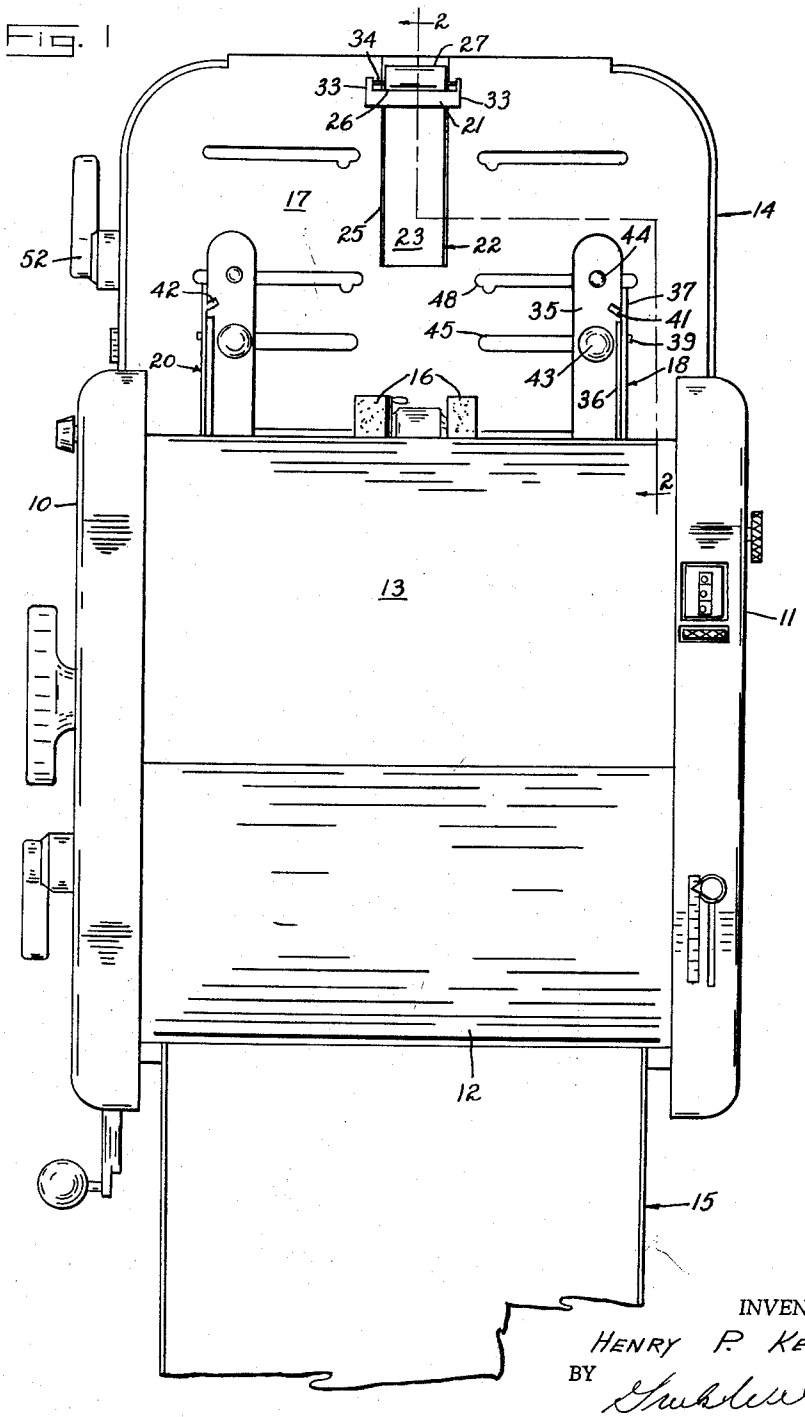
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PAPER GUIDE FOR THE FEEDING TRAY OF A DUPLICATING MACHINE

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Fig. 1



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Fig 2

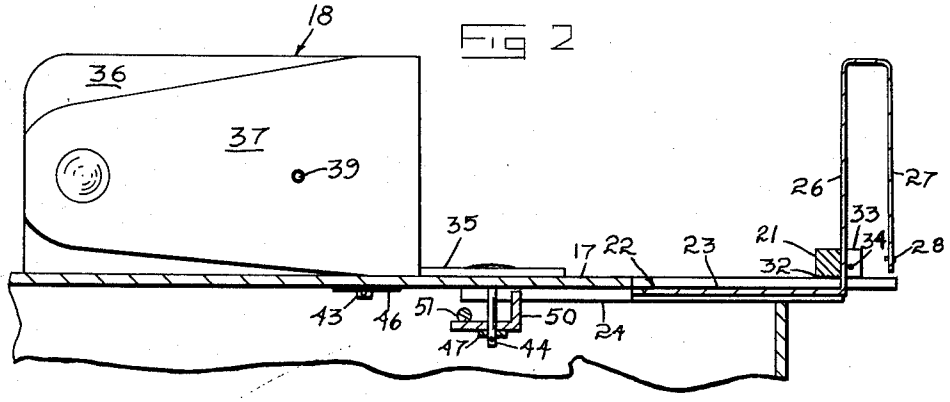


Fig 3

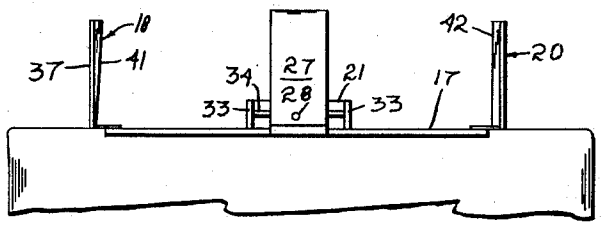


Fig 4

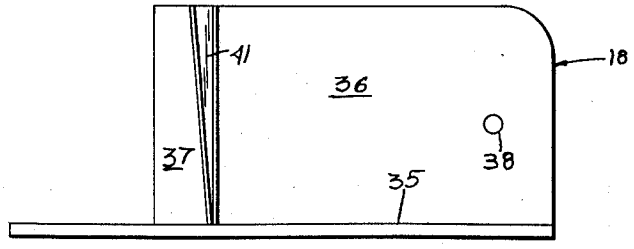
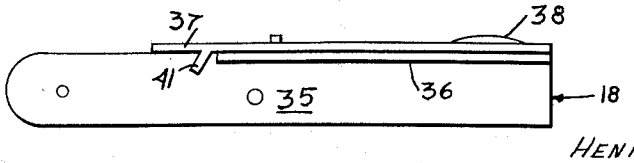


Fig 5



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FIG 8

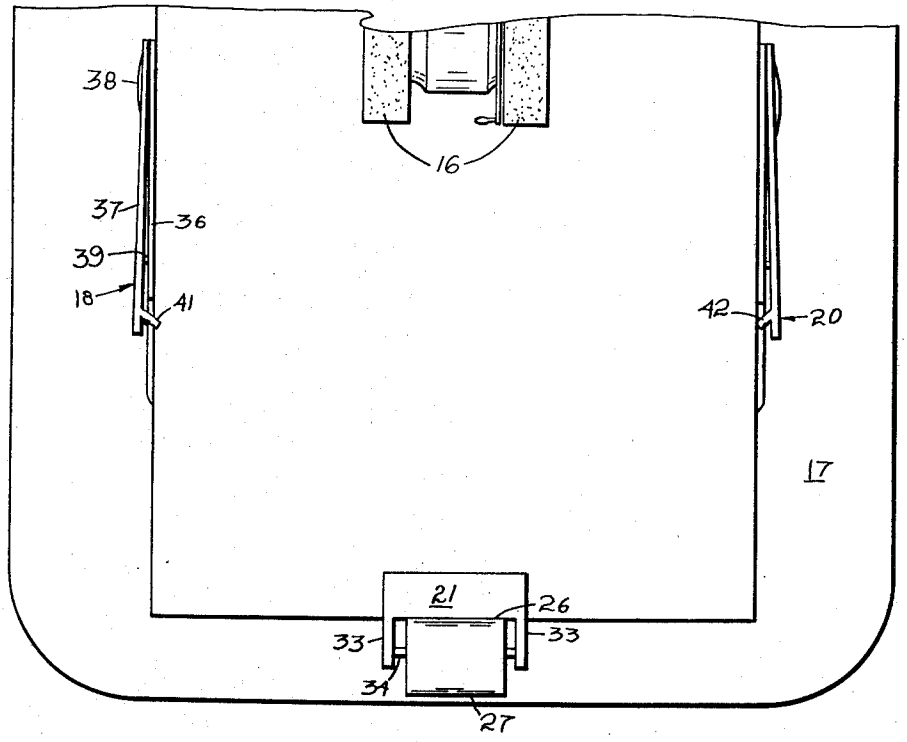


FIG 9

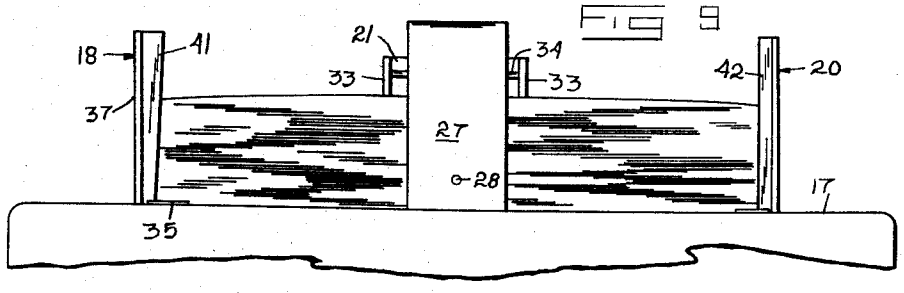


FIG 6

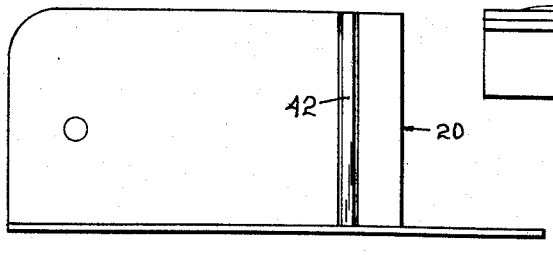
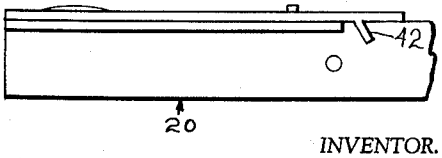


FIG 7



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United States Patent Office 3,069,159
Patented Dec. 18, 1962

3,069,159

PAPER GUIDE FOR THE FEEDING TRAY OF A DUPLICATING MACHINE

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Filed Mar. 7, 1960, Ser. No. 13,052
2 Claims. (Cl. 271—61)

This invention relates to a novel paper guide for the feeding tray of a duplicating machine. The use of high speed automatic electric duplicating machines proposes several problems in feeding copy sheets into the machine. A feed tray must be able to accommodate a large number of sheets in order to be practical, since the total output of a machine depends upon both the speed of the machine and the number of times it must sit idle during reloading of the feed tray. The feed tray must hold the copy sheets so that only one sheet will be fed into the machine at a time. It must therefore minimize the frictional contact between sheets while securely gripping all but the top sheet in the stack. It is also desirable to slightly bow each sheet in a longitudinal direction as it is being fed into the machine to add rigidity to the sheet, which is first pulled and then pushed by the feed mechanism.

It is an object of this invention to meet the requirements just stated, using simple guides requiring no accurate adjustment, which are adaptable to present machines.

It is another object of this invention to hold the sheets on the feed tray by means of an end weight having a serrated lower surface which acts as a drag on succeeding copy sheets when the top sheet is released from its grip.

It is a further object to provide easily accessible means for preventing any gripping by the side by providing a pin as a guide for spring mounted side guides. This pin is adapted to serve a second purpose as a stop to hold the pivotal spring biased guide out of contact with the copy sheets when desired. This feature is also an aid to loading.

It is another object of the invention to utilize spring-biased side guides to positively grip the side edges of the copy sheets. The drag exerted on the lower copy sheets is increased by directing the contact edges of the side guides in an inclined direction opposed to the direction of feed.

These and still further objects will be evident from a study of the following specification and the enclosed drawings, which show a preferred form of this invention. This specific arrangement is meant to be an example only, and is not intended to limit the invention, which is accurately defined by the claims following the specification.

In the drawings:

FIGURE 1 is a top plan view of a duplicating machine equipped with the invention, with a portion of the receiving tray broken away;

FIGURE 2 is an enlarged fragmentary sectional view taken along line 2—2 in FIGURE 1;

FIGURE 3 is an end view of the feed tray shown in FIGURE 1;

FIGURE 4 is an enlarged side view of the left hand side guide shown in FIGURE 3;

FIGURE 5 is a top view of the side guide shown in FIGURE 4;

FIGURE 6 is an enlarged side view of the right hand side guide shown in FIGURE 3;

FIGURE 7 is a top view of the side guide shown in FIGURE 6;

FIGURE 8 is a fragmentary top view of the feed tray showing copy sheets in place; and

FIGURE 9 is an end view of the feed tray as shown in FIGURE 8.

Referring now to the drawings, the invention is shown applied to a liquid process duplicating machine of the

type shown in detail in my United States Patent No. 2,856,847, issued on October 21, 1958. A top view of such a machine is shown in FIGURE 1. The machine comprises two side frames **10** and **11**, a rotatable drum **12** which mounts a master sheet, a hinged cover **13**, a feed tray generally designated as **14**, and a receiving tray **15**. In this machine, copy sheets are individually fed from the feed tray **14** by means of two soft rubber rollers **16** which are intermittently driven by the machine at the beginning of each printing cycle. The apparatus by which this motion is obtained is clearly explained in by above-cited patent.

The elements of the feed tray, with which this invention is concerned, are a flat supporting plate **17**, a left hand guide **18** (as seen in FIGURE 3) and a right hand guide **20**, plus a front end weight **21**. The designation of left and right hand sides throughout this specification shall conform to a view of the feed tray as seen in FIGURE 3. The designation of front and rear of the machine shall follow the flow of paper. As seen in FIGURE 1, the top portion of the machine is the front, the bottom portion is the rear.

The feed tray **14** supports a front end weight **21** which is carried by a slidable plate **22**. Plate **22** has a horizontal portion **23** which is slidably carried beneath plate **17** by means of an enclosure **24** and a slot **25** cut through the front end of plate **17**. Plate **22** may be shifted forward or rearward depending upon the size of the copy sheets being used. The forward end of plate **22** is provided with two vertical portions **26** and **27** which are formed in an inverted U-shaped configuration. The bottom end of the forward vertical portion **27** is provided with a fixed pin **28** which acts as a stop member.

The front end weight **21** is carried by vertical portions **26** and **27** of plate **22**. Weight **21** is formed of a solid block **31** having a serrated edge **32** and two side ears **33** between which is mounted a pin **34**. Pin **34** is not adjacent to the surfaces of plate **22** so as to allow clearance when the weight **21** is moved over the inverted U-shaped configuration joining vertical portions **26** and **27**. Weight **21** in use will rest upon the top copy sheet as shown in FIGURES 8 and 9. When not in use, or during loading of feed tray **14**, weight **21** will merely rest upon pin **28**, which prevents it from falling off portion **27** when plate **22** is extended forwardly of plate **17**.

The left hand side guide **18** consists of a flat base **35** having joined to it a vertical plate **36**. Plate **36** mounts a flexible spring guide **37** which is joined to plate **36** in a pivotal fashion by means of a rivet **38**. A pin **39** formed on the outer surface of plate **36** normally protrudes through an aperture **40** cut through the spring guide **37**. A protruding blade **41** is formed on the inner surface of spring guide **37**. Blade **41** is tapered from a maximum width at the top to a minimum at the bottom and is inclined toward the front of guide **18**. Spring guide **37** may be forced outwardly against its inherent spring force. By forcing spring guide **37** outwardly and then pivoting it about rivet **38**, blade **41** may be maintained beyond the inner surface of plate **36**.

The right hand side guide **20** is very similar to the preceding element, but is formed as a mirror image with a straight blade **42**, in the place of the tapered blade **41**. The remainder of guide **20** is evident from the description of guide **18**.

The manner in which the guides **18** and **20** are mounted upon plate **18** is identical. Therefore, the following description of the mounting of left hand side guide **18** shall suffice as to both guides. The flat base **35** has two apertures cut through it. These apertures receive two flat headed pins **43** and **44**. Pin **43** is merely a guide pin and extends through a transverse slot **45** cut into the flat supporting plate **22** of feed tray **14**. The lower portion

of pin 43 is capped by a washer 46. Pin 44 is an elongated pin and is capped by a washer 47. It protrudes through a second transverse slot 48 cut into plate 17 and also is received in an angle locking element 50. A rod 51 controls the position of element 50 to lock or release guide 18. Rod 51 is manually set by means of handle 52 and may release both guides 18 and 20, or may lock guide 20 above or may lock both guides 18 and 20, depending upon its angular position. The details of this locking mechanism are fully described in my United States Patent No. 2,808,262, issued on October 1, 1957.

The elements of my feed tray guides are thus seen to be relatively simple in construction, yet they are amazingly efficient in practical usage. As seen in FIGURES 8 and 9, a stack of copy sheets 53 are placed on the flat supporting plate 17. During loading the spring guides 37 may be held out of contact with the copy sheets by means of pins 39, and weight 21 may rest on pin 28. This status may be preserved if hand loading is to be used. The plates 36 will then serve as effective guides for the stack of copy sheets 53. For automatic feeding, the serrated edge 32 of weight 21 is placed upon the forward end of the top copy sheet 53, and spring guides 37 are released by allowing pins 39 to protrude through apertures 40. Since the plates 36 are normally positioned adjacent to the side edges of the flat copy sheets 53, the compressive force exerted by blades 41 and 42 due to spring guides 37 tends to bow the copy sheets 53 along a longitudinal plane (see FIGURE 9). Due to the taper of blade 41, this bowed effect is most pronounced at the top of the stack of copy sheets 53 and gradually diminishes toward the bottom of the stack. This variance in the bow of each sheet 53 in relation to adjacent sheets tends to separate the individual sheets. The separation of adjacent sheets enables them to be fed individually by means of rollers 16.

The inclination of blades 41 and 42 toward the front of the machine gives the blades a "bite" into the side edges of the copy sheets 53 which acts as a drag upon the lower copy sheets to prevent them from being fed into the machine along with the top sheet. This drag is uniform along blade 42 and varies along blade 41 due to its taper. The combination of the inclined blades 41, 42 with one being tapered has been proven to be most effective in practice.

The weight 21 serves to maintain the stack of copy sheets 53. The serrated edge 32 of weight 21 acts as a further drag upon the second copy sheet 53 which the top sheet 53 is being pulled by rollers 16.

The bowing of copy sheets 53 is useful in a secondary manner, since it prevents bending of the paper as its rear edge is being pushed into the machine. The semi-rigidity of the copy sheet serves to insure its proper entry into the machine rollers.

It can therefore be seen that I have devised a simple feed tray guide apparatus which may be adapted to any duplicating machine by obvious modification. The results of this invention are most useful and are proven to be effective under high-speed automatic working conditions. The feed tray is easily loaded, with no adjustments being necessary once the guides have been set for a certain size of copy sheets. The exact scope of the invention is defined in the following claims.

Having thus described my invention, I claim:

1. A guide apparatus for the feed tray of a duplicating machine adapted to hold a stack of copy sheets in preparation for feeding rearwardly into the machine, comprising a pair of opposed laterally adjustable vertical support members located on each side of the feed tray adapted to abut the lateral sides of a stack of copy sheets, a pair of spring-biased vertical abutments mounted respectively upon each of said support members projecting toward one another adjacent to said support members, each of said abutments including a straight edge adapted to engage the edges of the copy sheets, each of said abutments being inclined angularly toward one another and toward the front of the machine in opposition to the direction of feed of the copy sheets one of said abutments having a tapered width increasing upwardly from a narrow dimension adjacent the feed tray, the feed tray being provided with a slidable tongue mounted for longitudinal motion at the front of the machine, an upwardly directed vertical section bent at the front end of the tongue extending above the feed tray, a weight member slidably mounted upon said vertical section, said weight member having a serrated lower surface adapted to rest upon the top surface of the stack of copy sheets to resist movement of the copy sheet with which it is engaged.

2. A guide apparatus for the feed tray of a duplicating machine adapted to hold a stack of copy sheets in preparation for feeding rearwardly into the machine, comprising a pair of laterally positionable supports each formed with a base adapted to engage the surface of the feed tray, means operatively connected with each base adapted to position it and lock it in place on the feed tray; each support further comprising a vertical backing member integrally joined to its base having an inner vertical surface adjacent a stack of copy sheets on the feed tray and an opposed outer vertical surface, an adjacent leaf spring guide member pivotally joined about a transverse horizontal axis to the outer surface of the backing member at its rearward portion and extending forwardly beyond the front edge of said backing member, and an inwardly directed abutment formed on said leaf spring guide member forward of the backing member; one of said abutments being tapered upwardly, increasing in width from a narrow lower portion, the remaining abutment being of constant width, each of said abutments being inclined angularly toward one another in vertical planes directed toward the front of the feed tray, the feed tray further being provided with a slidable tongue, mounted for longitudinal motion at the front of the machine, an upwardly directed vertical section bent at the front end of the tongue extending above the feed tray, a weight member slidably mounted upon said vertical section, said weight member having a serrated lower surface adapted to rest upon the top surface of the stack of copy sheets to resist movement of the copy sheet with which it is engaged.

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