

[72] Inventor **Eugene A. Acks**
Euclid, Ohio
 [21] Appl. No. **817,862**
 [22] Filed **Apr. 21, 1969**
 [45] Patented **June 29, 1971**
 [73] Assignee **Addressograph-Multigraph Corporation**
Cleveland, Ohio

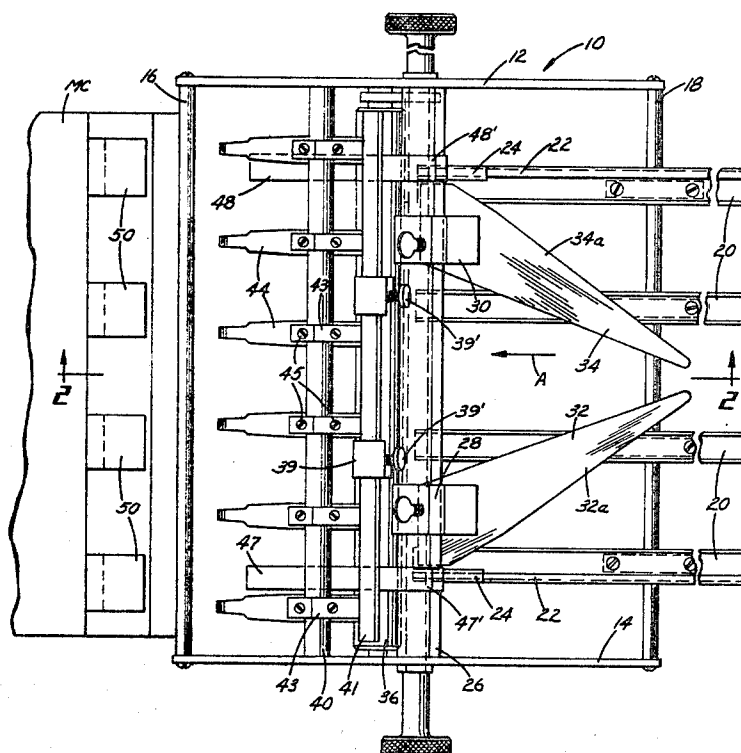
[56] **References Cited**
UNITED STATES PATENTS
 2,090,849 8/1937 Morrison..... 101/132.5
 2,598,795 3/1952 Holterhoff..... 26/54
 3,196,723 7/1965 Cohn..... 26/55

Primary Examiner—Richard E. Aegerter
Attorneys—Russell L. Root, Ray S. Pyle and William H. Nau

[54] **DEVICE FOR FEEDING CURLED SHEET MATERIAL**
2 Claims, 2 Drawing Figs.

[52] U.S. Cl..... **101/228,**
101/232
 [51] Int. Cl..... **B41f 13/54**
 [50] Field of Search..... **101/132.5,**
228; 26/54; 242/76; 271/8, 51; 34/143; 211/64

ABSTRACT: A device for uncurling sheet material, such as moist duplicating masters, includes a pair of blades having diverging outer edges disposed just above a guideway for introducing master sheets. The fingers extend from approximately the center of the sheet guideway diagonally to its side edges so that as the sheet is moved along the guideway it is progressively uncurled and flattened. Retainer strips overlie the margins of the flattened sheet after it leaves the blades to maintain the sheet in its flattened condition to facilitate its attachment to the master cylinder of a duplicating machine.



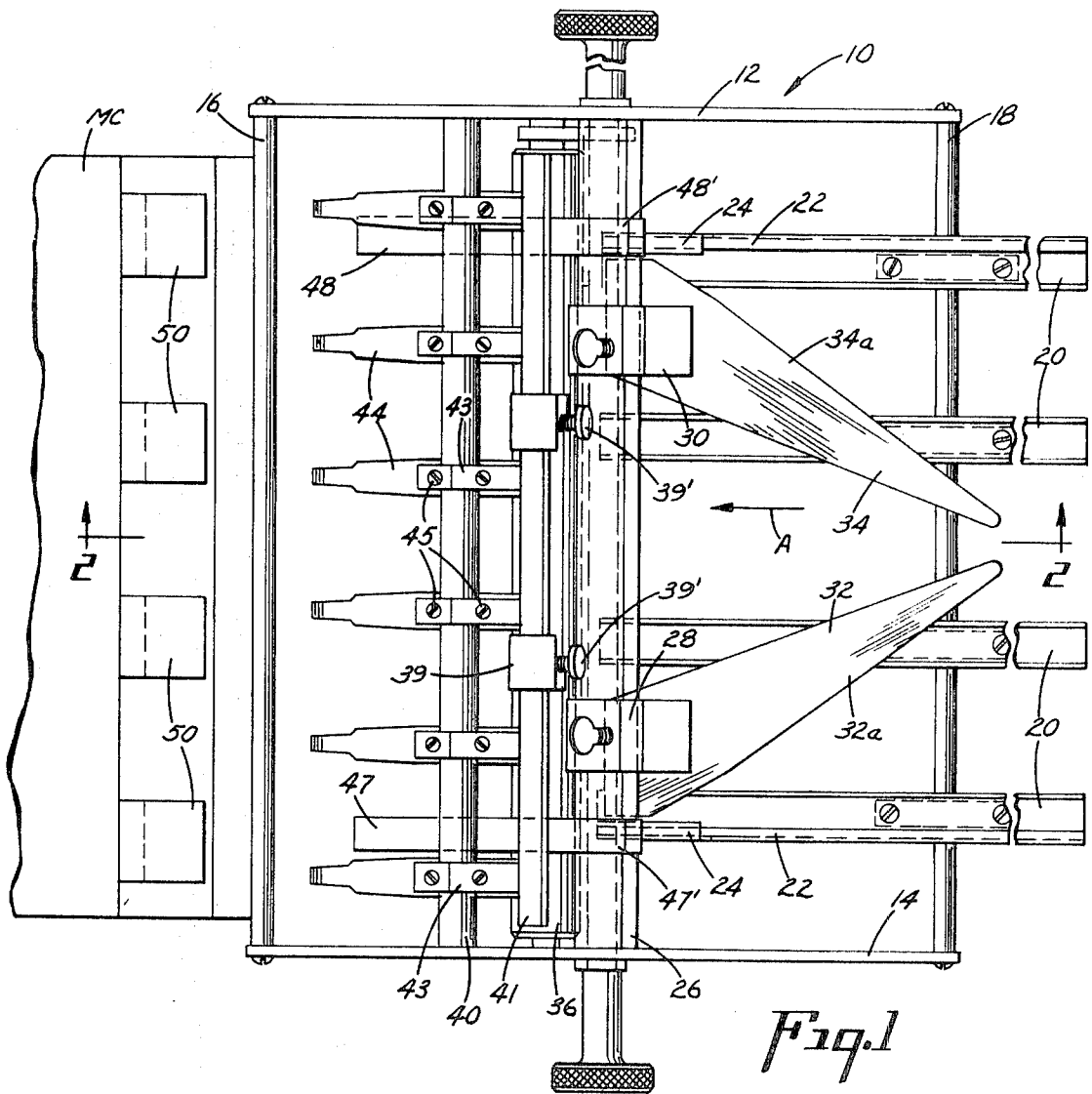


Fig. 1

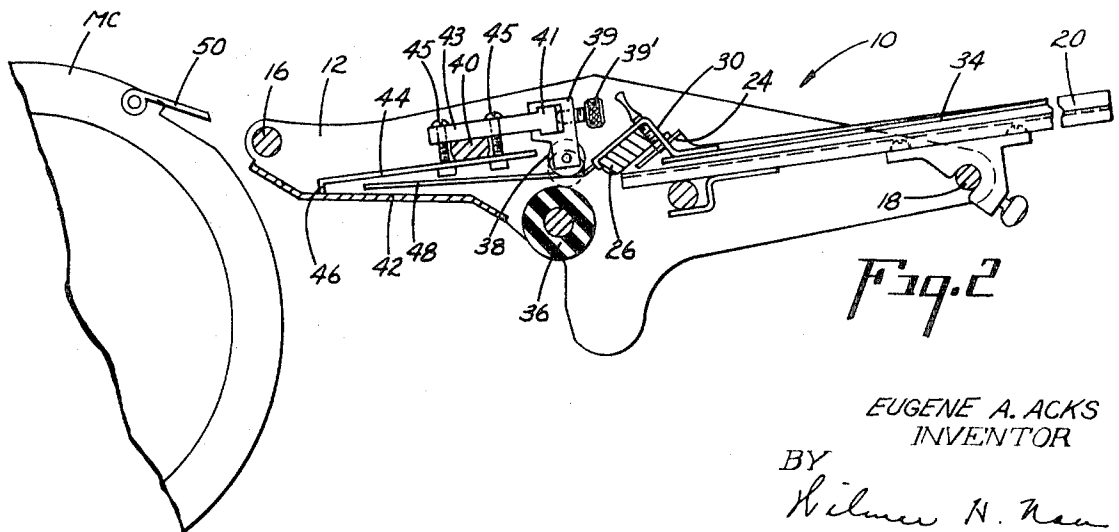


Fig. 2

EUGENE A. ACKS
INVENTOR
BY
Hilmer N. New
AGENT

DEVICE FOR FEEDING CURLED SHEET MATERIAL

BACKGROUND OF THE INVENTION

This invention relates to the feeding or advancing of sheet material and particularly material which has become curled or has departed from its normal flat state.

Various types of paper and paper base materials such as surface-coated paper, for example, are subject to such curling due to absorption of moisture through high-humidity conditions, deliberate application of moisture, or for other reasons.

Such curling on occasion occurs in the case of lithographic duplicating masters to which moisture is applied by automatic means prior to the time the masters are ready for attachment to the master cylinder of a lithographic duplicating machine, and the invention will be described in association with a lithographic duplicating master since it is believed the importance of the flattening device disclosed will be realized to a greater extent in such an environment. However, it should be understood that the utility of the device will become apparent whether paper, paper base, or similar material is concerned, so long as it is understood that the primary purpose of the device is to flatten out normally flexible material which has acquired a curl.

After an image has been applied to the lithographic duplicating master, it may be desirable to condition the master by moistening the same independently of the duplicating machine operation. An advantage of such practice is that the moistening or conditioning may take place while the duplicating machine is running copy from a previously treated master, thus enabling the master to be dampened and made ready without stopping the machine or interrupting its work cycle. The same advantage is apparent in instances where a duplicating master receives an image by means of the electrostatic copying process and is thereafter treated with a liquid prior to attachment to the master cylinder to convert its surface to a condition compatible with lithographic duplicating.

Lithographic duplicating masters usually are comprised of a base of fibrous material, such as paper or the like, and include a coating which is applied thereto to provide a surface which is receptive to conventional lithographic inks and wetting solutions. Automatic application of moisture to such masters may be conveniently and advantageously achieved by a roller and reservoir arrangement such as, for example, that shown in U.S. Pat. No. 3,306,255. However, the structure of the moistening means may take other forms and for the purpose of the invention it is deemed sufficient to point out that the moisture apparently causes the fibrous base material to expand, thus creating upward curling of the longitudinal edges of the master, or the edges which are parallel to the direction of movement of the master as it is moved forward toward the master cylinder.

It is, therefore, a primary object of the invention to flatten out or uncurl moistened sheets, such as duplicating masters and present their lead margins in flattened condition to facilitate their attachment to the master cylinder of the machine.

Another object of the invention is to perform the flattening operation automatically while the master is in motion so as to conserve the time required to effect attachment of the master to the cylinder.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan showing a means for effecting uncurling of the sheet or duplicating master; and

FIG. 2 is a section, taken substantially on line 2-2 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings there is shown a duplicating master feeding and advancing device, indicated generally by the reference numeral 10, including sideplates 12 and 14 which are rigidly held by tie rods 16 and 18. Mounted between the sideplates

are a series of guide members 20 jointly forming a guideway along which the duplicating masters are fed in the direction of arrow A. The two outer guide members have turned-up flanges 22, 22 which serve to limit sidewise movement of the masters, and folded-over lips 24, 24 which provide funnels for the lead corners of the masters as they move into the feeding station.

Also mounted between sideplates 12 and 14, and affixed thereto in conventional manner, is a bar or support member 26 on which are movably mounted a pair of brackets 28 and 30, to which are secured sheet uncurling or flattening means, or blades 32 and 34 respectively. As shown in FIG. 1, the free ends of blades 32 and 34, i.e. the ends remote from support member 26, converge toward each other to establish what may be termed a master entrance area, and provide the fingers with angularly disposed diverging outer edges 32a and 34a. Blades 32 and 34 are closely spaced above, and generally parallel to, guideway 20 and project cantilever fashion so as to provide a confining passage for the master and an open throat into which the master may be inserted. Separate blades, as shown, are preferable because of the flexibility of positioning the blades independently of each other on support member 26, so as to accommodate masters of various widths. However, it is within the realm of the invention to utilize configurations other than individual blades. For example, a one-piece, somewhat triangularly shaped member would serve the purpose so long as it presented the equivalent of the angularly disposed outer edges 32a and 34a. The reason for such an arrangement will become apparent as the description proceeds.

While initial feeding of the masters is accomplished manually, as will be described hereinafter, means are provided for automatically advancing the masters, from a ready position on through to a master cylinder MC of the duplicating machine. With reference to FIG. 2, the master advancing means may comprise a lower feed roller 36 which is continuously rotated by a conventional drive means, not shown. Cooperating with roller 36 are upper or holddown rollers 38 (only one of which is shown in FIG. 2). Rollers 38 are mounted on slides 39, and the slides are adjustably positioned on a bar 41 so that they may be clamped in their laterally adjusted positions by screws 39' in the manner shown. A series of support arms 43 project from the bar 41 across the top operating shaft 40, and corresponding stop fingers 44 extend rearwardly from beneath the shaft 40. Each set, including an arm 43 and a finger 44, is clamped to the shaft 40 by screws 45 in driving relation thereto, preferably by means of mating flats formed on the shaft at suitable locations, as seen in FIG. 2. Each of the stop fingers 44 has a depending lip 46 so positioned as to provide a locating stop for the front edge of a manually inserted sheet when the parts are in the FIG. 2 position. The fingers 44 cooperate with a second guideway 42 to form a confined channel or chute which guides the leading edge of an incoming master up to and against the stop lips 46, and thence onto the surface of the master cylinder MC at the appropriate time.

The holddown rollers 38 are shown in full lines in FIG. 2 in their upper or inactive position, i.e. the position occupied when a master is being manually moved into place. However, when a master has entered the ready position and is in engagement with the stop lips 46, the rollers 38 are lowered, by means provided for the purpose, to the position shown in broken lines so as to press the master into contact with lower feed roller 36, to thereby advance the master between the rollers toward the master cylinder MC to be clamped thereto. Raising and lowering of rollers 38 and simultaneous lowering and raising of the stop fingers 44 are effected by rocking shaft 40. Such rocking action is controlled by a cam arrangement on the master cylinder in a known manner so as to time the feeding forward of the master with the availability of the master cylinder clamp, indicated at 50.

Substantially spanning the distance between the bar 26 and the stop lips 46 at either side, so as to overlie the margins of a flattened master, are retainer strips 47 and 48. Such retainer

strips are clipped onto support member 26, as seen at 47' and 48' in FIG. 1, so as to be slideable thereon and preferably are positioned on the support member so as to overlie the side margins of the master from the time the master is released from the flattening action of blades 32 and 34, thereby maintaining the master in its flattened condition and preventing the lead corners from recurving as the master is forwarded along the second guideway toward ready position.

In operating the device, the two outer guide members 20 are positioned to match the width of the sheets or masters to be fed. In like manner, flattening blades 32 and 34 are so positioned on support member 26 that the terminations of the outer edges 32a and 34a at the fixed ends of the blades are in close proximity to the folded-over lips 24, 24 of the outer guide members 20. Guide strips 47 and 48 are then adjusted along the bar 26 until they overlie the lips 24 and substantially about the outer extremities of blades 32 and 34. With the guide members and fingers thus set, a duplicating master which has previously been moistened is placed on top of guide members 20 with the central portion of the leading edge of the master positioned at the open throat underneath the tips of the free ends of blades 32 and 34. At this point, if the master has assumed a curl, the leading edge of the master will somewhat resemble the letter "U," with the bottom of the "U" resting between the free ends of blades 32 and 34 and portions of guide members 20.

After the above-described preliminary positioning of the master has taken place, it is ready to be moved manually into ready position. Such movement is initiated with the master being forwarded in the direction of arrow A, FIG. 1. Because of the diverging arrangement of outer edges 32a and 34a of fingers 32 and 34, movement of the master under the blades 32 and 34 causes the master to spread and be progressively flattened out, starting from the approximate center of the master and working out to the longitudinal edges thereof, thereby uncurling the master. As the master is moved along under fingers 32 and 34, the corners of the leading edge pass first into the funnels provided by lips 24, 24. Then as the leading edge of the master approaches feed roller 36 its now decurled condition permits the longitudinal edges of the master to be guided under retainer strips 47 and 48 which hold the sheet flattened until the lead edge is in contact with the stop lips 46. At the appropriate time the rollers 36 and 38 take

over the feeding of the master and advance it for attachment to master cylinder MC.

Prior to the existence of the arrangement disclosed herein, the feeding of a moist, curled duplicating master was a difficult chore, and involved considerable time and dexterity for an operator to manually level out the leading edge of a curled master, while at the same time holding it straight and guiding it into the machine. With the arrangement as above disclosed, the operation is quite simple, requires no particular dexterity, and can in fact be substantially a one hand operation.

What I claim is:

1. In a lithographic duplicator in combination with a master cylinder having a clamp thereon, means to guide into cooperative relationship with the cylinder clamp a moistened paper base duplicating master sheet, whose margins parallel to the direction of motion towards the cylinder are curled upwardly from the surface thereof, comprising:

a master supporting guideway along which the master sheet is slid towards the cylinder to be engaged thereby;

blade means positioned above and generally paralleling the guideway in closely spaced relationship thereto, and spanning the same to provide a confining passage for the master sheet, said blade means being supported from the sides of the guideway at its downstream end and projecting cantilever fashion upstream of the guideway so that the free end of the blade means forms with the guideway an open throat into which the leading edge of the master sheet may be inserted, said blade means having a narrow upstream end portion positioned centrally of the guideway for entering between the curled margins of the master sheet as its leading edge is introduced into the throat of the confining passage, said narrow end portion of the blade means merging with diagonal edge portions thereof sloped towards the sides of the guideway and located in a position to encounter the curled edge portions of the master sheet and progressively uncurl them to thereby flatten the master sheet against the guideway as it is pushed progressively into the throat and towards the master cylinder.

2. Apparatus as set forth in claim 1 in which the blade means comprises two oppositely disposed uncurling blades mounted for adjustment laterally of the guideway to accommodate master sheets of varying widths.