

Dec. 10, 1957

L. I. KRAMER
SIGNATURE DEFLECTING MECHANISM FOR A
SIGNATURE BUNDLING MACHINE

2,815,950

Filed March 4, 1954

3 Sheets-Sheet 1

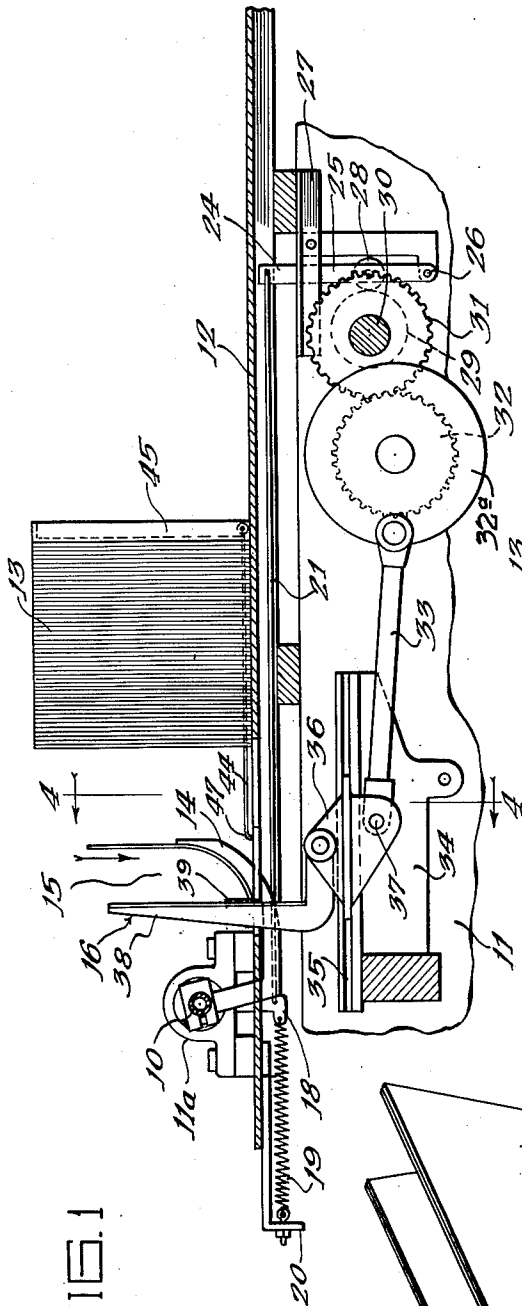


FIG. 1

FIG. 2

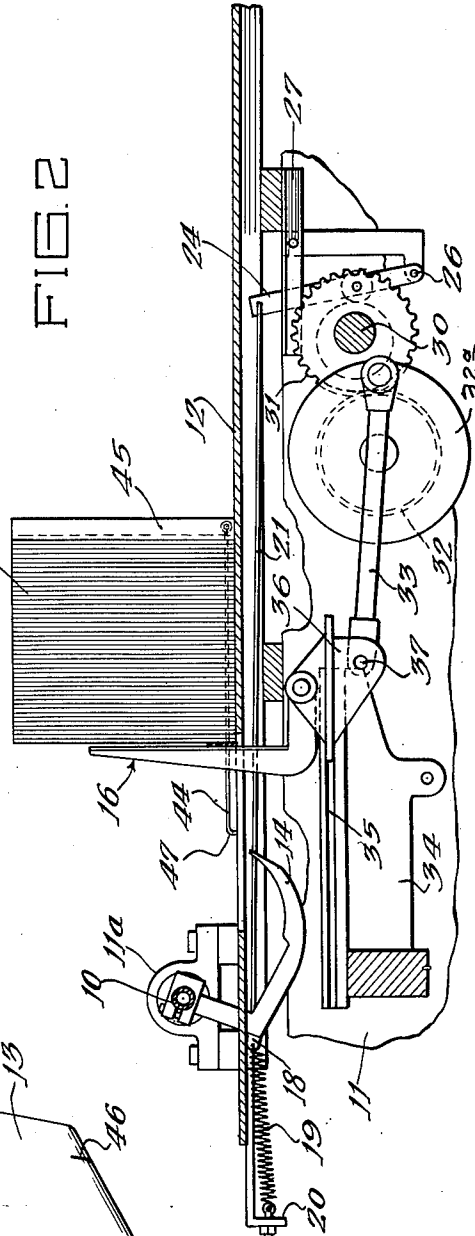
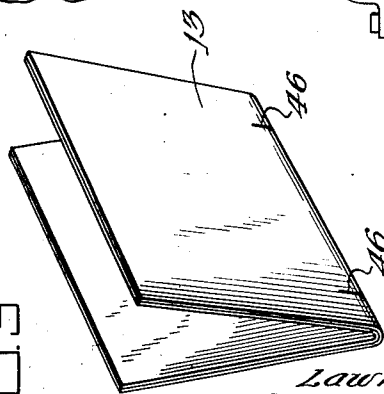


FIG. 3



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FIG. 4

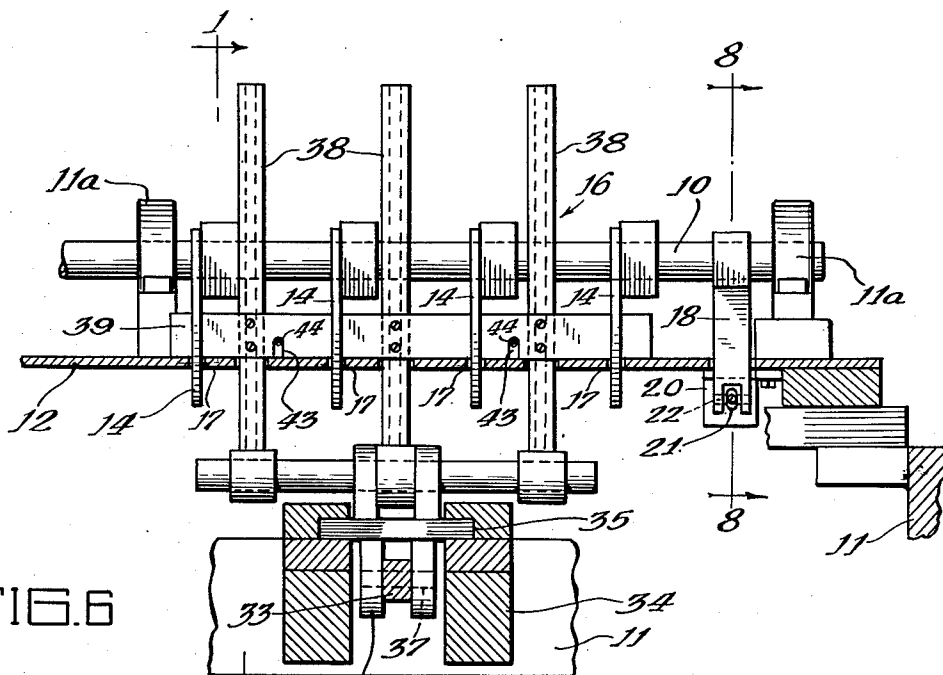


FIG. 6

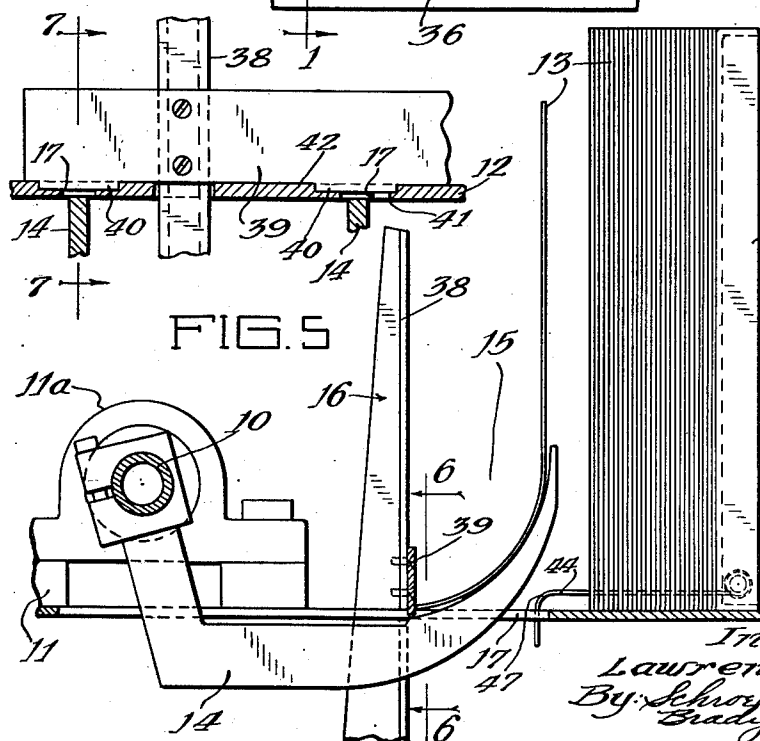
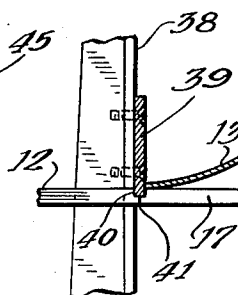


FIG. 7



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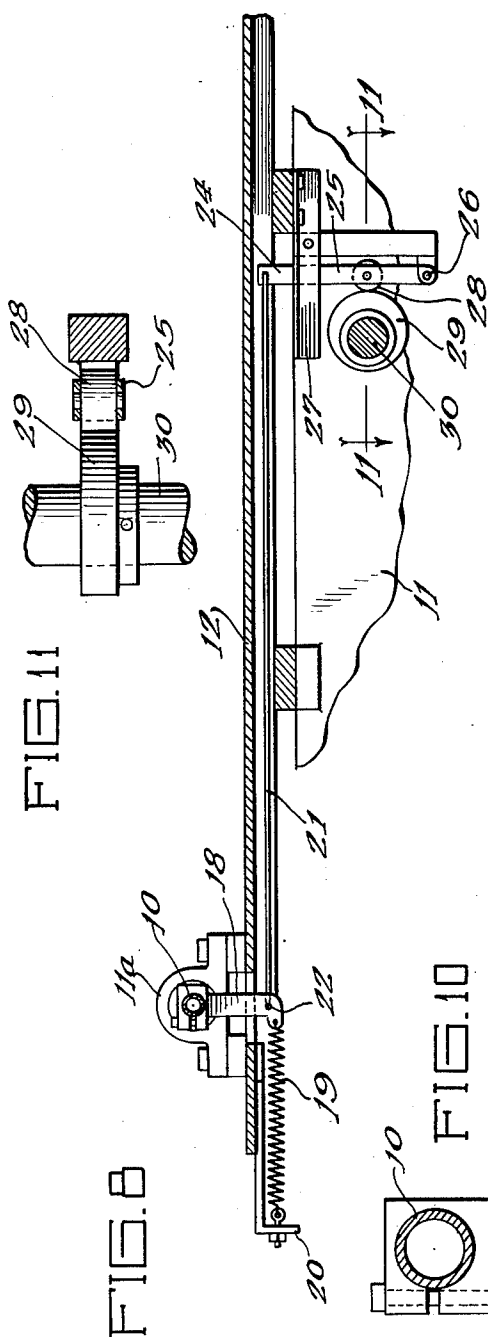
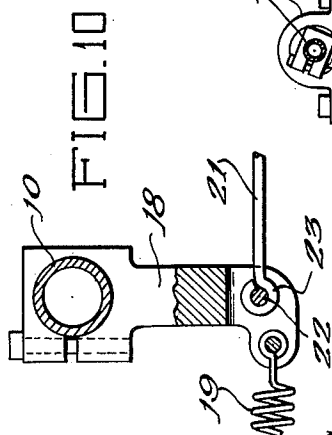
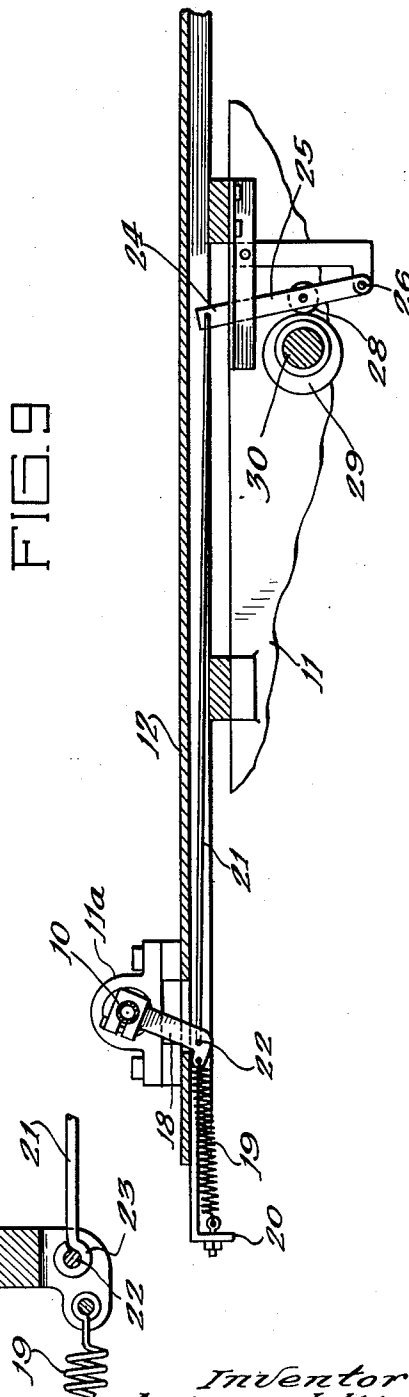
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SIGNATURE DEFLECTING MECHANISM FOR A SIGNATURE BUNDLING MACHINE

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Application March 4, 1954, Serial No. 414,205

8 Claims. (Cl. 271—87)

This invention relates to a signature bundling machine for assembling printed signatures into signature bundles as they leave the printing and folding machine, and more particularly to an improved deflecting mechanism extending into a signature receiving pocket of the machine to deflect signatures dropped from the printing and folding machine into the pocket so that they may be correctly curved for addition to the signature pack.

The usual practice in making up a catalog of the type used by mail order houses and the like has been to print certain pages on a printing press and process them through a folder, which may be integral with the printing press or a separate machine, and automatically fold the sheets into page size units which are known as signatures. The signatures are delivered one at a time at a fast rate from the folding unit and are then picked up by hand, jogged into alignment and placed on platforms, pallets, or in trucks, for removal to storage or to subsequent processing operations. As the signatures delivered by one folder represent but a small portion of the final assembly, it is necessary to bring other packs (or groups) of signatures from other folders to the assembly operation. As there are physical limitations to the size of the package a worker can conveniently handle, a great deal of unskilled manual labor is required to get the signatures from the folders to the subsequent processing operations.

The present invention is for use with a signature bundling machine which forms individual signatures into logs or bundles of varying sizes to obviate much of the labor previously involved in removing signatures to storage or subsequent processing operations. The signature bundles may weigh as much as three hundred pounds and be handled by special conveyors.

A signature bundle is formed from a plurality of individual signatures, each provided preferably with a pair of slits in its folded margin. Each of the signature slits is separated and pushed upon a pair of taut wires which are anchored to an abutment plate. After the signature is on the wires, its slits tend to close into frictional gripping engagement with each of the wires. Additional signatures pushed upon the wire pack the signatures tightly and increase the frictional engagement between the slit portion of the signature and the wire. When a bundle or log of the desired size has been formed, another abutment plate is added so that the signatures are held compactly between the two plates.

The primary object of the present invention is to provide a new and improved deflecting mechanism for a signature bundling machine in which a deflecting arm on a rock shaft is moved into and out of a signature-receiving pocket in timed relation to a pusher plate closing the pocket.

Another object of the present invention is to provide a new and improved driving means for imparting oscillatory movement to the deflector arms of the signature bundling machine.

The invention is illustrated in a preferred embodiment in the accompanying drawings, in which:

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Fig. 1 is a fragmentary longitudinal sectional view taken as indicated on line 1—1 of Fig. 4 with the deflector arm supporting a signature;

Fig. 2, a view similar to Fig. 1 showing the deflector arm in retracted position;

Fig. 3, a perspective view of a slitted signature;

Fig. 4, a fragmentary sectional view taken as indicated on line 4—4 of Fig. 1;

Fig. 5, an enlarged fragmentary sectional view of a portion of Fig. 1 showing a signature in the pocket with its slit margin positioned against the pusher plate;

Fig. 6, a fragmentary sectional view taken as indicated on line 6—6 of Fig. 5;

Fig. 7, a fragmentary sectional view taken as indicated on line 7—7 of Fig. 6;

Fig. 8, a fragmentary sectional view taken as indicated on line 8—8 of Fig. 4 showing the position of the rocker arm when the deflector arm is advanced;

Fig. 9, a view like Fig. 8 showing the position of the rocker arm when the deflector arm is retracted;

Fig. 10, an enlarged fragmentary sectional view of a portion of Fig. 8; and

Fig. 11, a fragmentary sectional view taken as indicated on line 11—11 of Fig. 8.

In the embodiment illustrated, a rock shaft 10 is journaled in a pair of bearings 11a which are mounted on a table 12 on which a signature pack 13 is assembled. Several similar deflector arms 14 are keyed to, and spaced along, the rock shaft 10.

Actuating means is provided to oscillate the arms 14 from a retracted position below the surface of the table 12 to an extended position in a signature-receiving pocket 15 formed between the pack 13 and the pusher plate 16. Longitudinally extending slots 17 in the table 12 permit movement of the deflector arms 14 to their extended positions. The actuating means includes a bifurcated rocker arm 18 fixed to, and depending from, the rock shaft 10. A tension spring 19 joins the free end of the rocker arm 18 to an ear 20 on the frame 11. The tension in the spring 19 normally pivots the rocker arm 18 in a clockwise direction, as viewed in Figs. 8 and 9, to urge the deflector arms 14 out of extended position in the pocket 15. A connecting rod 21 is secured within the free end of the rocker arm 18 by a pin 22 passing through an eyelet 23 in one end of the rod 21. The other end of the rod is connected to the free end 24 of a link 25 which is pivotally secured to the frame 11 at point 26. A pair of link guides 27 project outwardly of the frame 11 on either side of the link 25 to confine the oscillations of the link to substantially a single plane. A roller 28 is preferably journaled in the middle portion of the link 25 so that it may bear upon a cam member 29 eccentrically mounted on a drive shaft 30.

As best seen in Fig. 8, when the cam member 29 is rotated by the drive shaft 30 so that the enlarged portion of the cam bears against the roller 28, the link 25 is pivoted clockwise, causing the connecting rod 21 to pivot the rocker arm 18 counterclockwise and move the deflector arms 14 into their extended position in the pocket 15. As the cam continues to rotate, the roller 28 rides off the enlarged portion of the cam, permitting the tension spring 19 to pivot the rocker arm 18 clockwise and withdraw the deflector arms 14 from the pocket 15.

The drive shaft 30 also actuates the pusher plate 16 in timed relation to the oscillatory movement of the deflector arms 14. A gear 31 is keyed to the drive shaft 30 and intermeshes with a second gear 32 which drives an eccentric 32a to which one end of a driving link 33 is connected. A bracket member 34 on the frame 11 has a pair of opposed grooves 35 forming a guideway for a cross head 36 which supports the pusher plate 16. The driving link 33 is pivotally connected to the cross

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head 36 at 37 and causes reciprocation of the cross head when the drive shaft 30 is actuated.

The pusher plate may include a series of upstanding elements 38 joined together by a cross-bar 39 which slides upon the surface of the table 12. A series of shoulders 40 ride in channels 41 cut into the main table surface 42. As best seen in Fig. 5, the shoulders prevent the slit portions of signatures from becoming lodged between the bottom edge of the cross-bar 39 and the table surface 42.

The cross-bar 39 is provided with a pair of notches 43 to accommodate the wires 44 which extend parallel to the table 12 and are secured to the abutment plate 45. A tensioning device, not shown, beneath the surface of the table, maintains tautness in the wire and yet permits additional wire to be fed out as the signature pack recedes under the action of the pusher plate, adding signatures to the pack.

When a signature is dropped into the pocket 15, the deflector arms 14 guide the bottom slit portion of the signature forwardly against the cross-bar 39 on the pusher plate 16, causing the signatures to bulge rearwardly. At about this time the pusher plate starts its rearward movement to close the pocket, and the deflector arms begin their withdrawal from the pocket. The pusher plate forces the slits 46 about the bent portion 47 in the wires 44 so that the slit portion frictionally grips the wire. After closing the pocket 15, the pusher plate then recedes, and the deflector arms 14 once again start their movement toward extended position in the pocket. The sequence of movements is then repeated.

The foregoing detailed description is given for clearness of understanding only and no unnecessary limitations should be understood therefrom, for some modifications will be obvious to those skilled in the art.

I claim:

1. In a signature bundling machine having a table for a growing signature pack at the front of which is a signature receiving pocket defined by the pack and by a pusher plate which may reciprocate to open and close the pocket and force the slit portion of a signature onto a wire extending parallel to said table on which said pack is formed, deflecting mechanism for directing the slit portion of a signature in the pocket forwardly against the pusher plate, comprising: a rock shaft journaled on the table; a deflector arm secured to said rock shaft and adapted for movement between a retracted position and an extended position in said pocket, said deflector arm having an upper face inclined forwardly and downwardly when in the pocket so as to deflect toward said pusher plate the slit portion of a signature inserted in the pocket; and actuating means operably connected to said rock shaft for oscillating said shaft to move said deflector arm between its retracted and extended positions in timed relation with the reciprocation of the pusher plate.

2. The deflecting mechanism of claim 1 in which the actuating means includes spring means urging said deflector arm toward one of said positions, and driving means urging said deflector arm toward the other of said positions.

3. The deflecting mechanism of claim 2 in which the spring means urges said deflector arm toward retracted position, and the driving means urges said deflector arm toward extended position.

4. The deflecting mechanism of claim 1 in which the

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actuating means includes spring means urging the deflector arm toward one of said positions, and driving means urging the deflector arm toward the other of said positions, said driving means comprising a drive shaft for actuating the pusher plate and the deflector arm, a cam member mounted on said shaft, and link means connected to the rock shaft and having a portion riding on the cam member so that rotation of said cam member turns said rock shaft and moves said deflector arm toward said other position.

5. The deflecting mechanism of claim 4 in which the link means includes a link pivotally connected at one end to the frame and having its middle portion riding on the cam member, and a connecting rod joining the other end of the link to the rock shaft.

6. The deflecting mechanism of claim 4 in which the link means includes a link pivotally connected at one end to the frame, a roller journaled on the middle portion of said link and bearing on the cam member, and a connecting rod joining the other end of the link to the rock shaft.

7. The deflecting mechanism of claim 4 in which the link means includes a link pivotally connected at one end to the frame and having its middle portion riding on the cam member, a connecting rod joining the other end of the link to the rock shaft, and a link guide secured to the frame, a portion of said guide being positioned adjacent the link to confine the movement of the link to substantially a single plane so that said link is maintained in lateral alignment with the cam member.

8. In a signature bundling machine having a table for a growing signature pack at the front of which is a signature receiving pocket defined by the pack and by a pusher plate which may reciprocate to open and close the pocket and force the slit portion of a signature onto a wire extending parallel to said table on which said pack is formed, deflecting mechanism for directing the slit portion of a signature in the pocket against the pusher plate, comprising: a drive shaft for actuating the mechanism; a cam member eccentrically mounted on said shaft; a link pivoted at one end to the table, said link having an intermediately mounted roller riding on the cam member; a rock shaft supported on the table; a plurality of parallel deflector arms on said rock shaft which move between a retracted position and an extended position in said pocket with oscillation of the rock shaft, the upper faces of said deflector arms being inclined forwardly and downwardly when in the pocket to deflect an inserted signature toward said pusher plate causing said signature to bulge rearwardly; a rocker arm extending outwardly from said rock shaft; spring means secured to said rocker arm normally to urge said deflector arms toward retracted position; and a connecting rod joining said rocker arm to said link so that rotation of said cam member acts through said link, connecting rod and rocker arm to move said deflector arms to extended position in timed relation to the closing of the pocket by the pusher plate.

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