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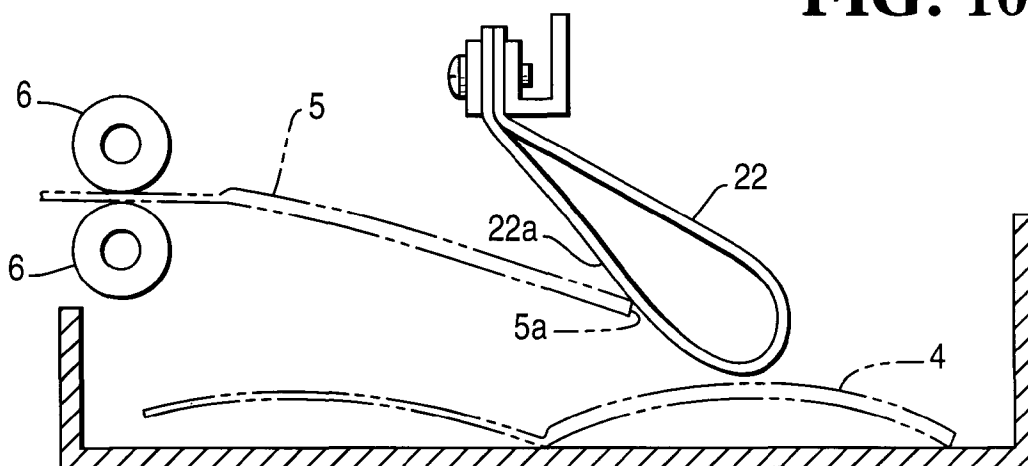
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(54) Booklet receiving device

(57) A booklet receiving device (10) of simple construction receives passbooks or other booklets in an opened state without jamming. The receiving device (10) includes a booklet presser (22) and a container (12). The presser (22) is of pear-shaped configuration, and is formed by bending resilient sheet material, such as polyester film, into this configuration, the tapered end

of the presser (22) being fixed. An opened booklet fed into the container (12) is guided along a side surface of the presser, pushing and changing the shape of presser (22) by its end, whereby the opened booklet is guided into a desired position in the container (12) without being caught at the central bending portion of a previously received booklet.

FIG. 10

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Description

The present invention relates to a receiving device for opened booklets such as passbooks in automatic teller machines (ATMs); for example, such a device may receive passbooks which bank clients have failed to recover.

When bank clients use a passbook for withdrawing money from, or depositing money in, an ATM, they sometimes fail to recover the passbook which was inserted into the machine. Also, it is sometimes necessary for an ATM to retain passbooks in the case of unauthorized use. Passbooks which are left unrecovered in a return slot of an ATM or which must necessarily be retained are carried backward from the return slot through the passbook feeding channel to the passbook receiving device in the ATM.

As the recent tendency is to multiply the functions of an ATM and to decrease its size, the space provided for installing the machine is very limited. While a conventional method of receiving passbooks is to drop them randomly into a receiving container, a recent method is to pile them up in a smaller device.

The structure of a conventional receiving device 50 and the operation thereof are explained with reference to Figs. 14 - 16. The receiving device 50 is comprised of a passbook pressing portion 52 and a receiving container 58. The pressing portion 52 is comprised of a support member 54 and a presser 56. The presser 56 is made of thin stainless steel plate because an appropriate bending angle and an appropriate strength for bending are required. The support member 54 is fixed to a fixing member of the main body of the machine which is not illustrated in the drawings. The presser 56 has elasticity so that it can guide a passbook 2.

After a first passbook 2 is received in the container 58, a second passbook 3 is carried into the container 58 by feed roller means 6. When coming into contact with the presser 56, the passbook 3 pushes and bends the presser 56. Then the passbook 3 moves forward under the bent presser 56 and above the first passbook 2 which has been previously received in the container 58. When the trailing end of the passbook 3 been previously received in the container 58. When the trailing end of the passbook 3 passes through the feed roller means 6, the trailing half of the passbook 3 is pressed downward by the return force of the presser 56. As result thereof, the passbook 3 is deposited on the first passbook 2. Third and successive passbooks are piled up on previously received passbooks in the container 58 in the same manner as the second passbook 3. Normally, the receiving device 50 has a structure sufficient to receive about 5 passbooks.

However, the conventional receiving device 50 for receiving passbooks piled up in an opened state has had the following problems which are explained with reference to Figs. 15 and 16.

Generally speaking, passbooks vary as regards the

strength of paper used, the bending characteristics, the condition of edges or the number of pages in left and right halves when opened. If there is only one passbook, the passbook rarely jams in the receiving device 50. However, as is shown in Fig. 15, when receiving second and further passbooks 3, it sometimes happens that the leading end 3a of a passbook 3 is pressed downward by the presser 56 and, after sliding over the trailing half of the passbook 2, the passbook 3 is caught at the centre bending portion 2f of the passbook 2. Particularly, if the previously received passbook is new and has a strong inclination to close or to bend, or, if the leading half 2c of the passbook 2 has many pages and is thicker, there is more probability that the passbook 3 will be caught at the centre bending portion 2f of the passbook 2.

When the passbook 3 is caught at the centre bending portion 2f of the previously received passbook 2, the trailing half 3d of the passbook 3 is carried forward by the feed roller 6. Then the passbooks 2 and 3 move together in the direction of the arrow X in Fig. 15. After the leading end 2a of the passbook 2 reaches the side wall 58a of the container 58, the leading half 2c of the passbook 2 is bent upward as is shown in Fig. 16. The the passbook 3 is further carried into the container 58 by the feed roller means 6, so that the passbooks 2 and 3 are received in passbooks 2 and 3 have been received in a distorted condition, a jam may occur and either the third passbook may be distorted or the presser 56 may be deformed. When a jam is sensed by a sensor (not shown), which is installed before or after the roller means 6, the ATM stops and the jam has to be rectified manually or some parts may have to be repaired.

It is an object of the present invention to alleviate the above-mentioned problems and to provide a booklet receiving device which is of simple structure and easy to manufacture, and which can reliably collect and receive booklets such as passbooks.

According to the invention there is provided a booklet receiving device, including a container for receiving a plurality of opened booklets, and a booklet presser arranged to press against an opened booklet as the booklet is moved into the container so as to guide the booklet into a desired position in the container, characterized in that said presser is of pear-shaped configuration and is formed by bending resilient sheet material into said configuration, the tapered end of said presser being fixed and being remote from an opened booklet when this booklet is in said desired location in said container.

In a preferred embodiment of the invention, the presser changes its shape as it guides received booklets in the opened state along its outer surface. Synthetic resin film may be used as the flexible material in the form of a thin plate.

One embodiment of the invention will now be described by way of example with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view showing the composi-

tion of a receiving device in accordance with the present invention;

Figs. 2-7 are schematic views used to explain the manner in which a first booklet is received by the receiving device;

Figs. 8-13 are schematic views used to explain the manner in which a second booklet is received by the receiving device; and

Figs. 14-16 are schematic views used to explain the manner in which passbooks are received in a conventional (prior art) receiving device.

A preferred embodiment of a booklet receiving device 10 in accordance with the present invention is described with reference to Fig. 1. The receiving device 10 is comprised of feed roller means 6, a booklet pressing portion 20 and a container 12. The booklet pressing portion 20 is comprised of a support 24, a pear-shaped presser 22, a fixer plate 26 and screws 28. The tapered end of the presser 22 is sandwiched between the support 24 and the fixer plate 26 and is fixed by the screws 28. Further, the support 24 is fixed to a bracket of the main body of an ATM which is not shown in the drawings. The presser 22 is formed by pressing together opposite ends of a rectangular sheet of resilient flexible material having a smooth surface so that when these ends are secured to the support 24 as described above, with the presser 22 extending downwardly, the presser 22 takes the shape of a pear with a rounded lower portion. A pear shape made in this manner has the characteristics that it is weak against pressure from the side but is strong against pressure from beneath. In the present embodiment, the presser 22 is made of synthetic resin film (polyester film) having a thickness of 0.3 to 0.5 millimetre. Alternatively, the presser 22 may be made of other thin film-like materials such as paper or thin metal plate, provided the material has a smooth surface and has appropriate flexibility and strength. Furthermore, the presser 22 may be of laminated construction, comprising two or more layers of thin material. In the present embodiment, the material from which the presser 22 is formed is rectangular, but other shapes may be used.

The manner in which a first passbook or other booklet 4 and a second passbook or other booklet 5 is received in the receiving device 10 will now be described with reference to Figs. 2 - 13. Figs. 2 - 7 show the process for receiving the first booklet 4. Before the first booklet 4 is carried into the container 12 by the feed roller means 6, there is space between the lowermost portion 22c of the presser 22 and the base of the container 12 (Fig. 2). The leading end 4a of the booklet 4 first engages and pushes the presser 22 at an approximate halfway point 22b of a side surface 22a. As a result of this pushing force, the presser 22 is pivoted about its tapered end 22d and its shape is changed by becoming more elongated (Fig. 3). While the shape of the presser 22 changes, the leading end 4a of the booklet 4 is further moved

forward (to the right in Fig. 4) by the feed roller means 6, with the leading end 4a moving along the side surface 22a of the presser 22 (Fig. 4). When the leading end 4a of the received booklet 4 has passed the side surface 22a of the presser 22 (Fig. 5), the booklet 4 is pressed downward against the base of the container 12 by the return force of the presser 22 (Fig. 6). When the trailing end 4b (Fig. 7) of the booklet 4 has passed through the feed roller means 6, the trailing (left hand) half 4d of the booklet 4 drops into the container 12 and is pressed by the lowermost portion 22c of the presser 22 when the presser 22 substantially returns to its initial rest position and shape. Thus, in this manner the first opened booklet 4 is guided by the presser 22 into its desired location in the container 12, with the tapered end of the presser 22 being remote from the opened booklet 4.

The manner in which the second booklet 5 is received on top of the first booklet 4 will now be described with reference to Figs. 8 - 13. The second booklet 5 is carried into the container 12 by the feed roller means 6 in the same manner as the first booklet 4 (Fig. 8). Unlike the case when there was no booklet previously received in the container 12, the presser 22 is in engagement with the previously received opened booklet 4. When the leading end 5a of the second opened booklet 5 first engages and pushes the presser 22 at the approximate halfway point 22b of its side surface 22a, the shape of the presser 22 is changed significantly with the side surface 22a being bent inwardly as shown in Fig. 9. The booklet 5 is further carried forward by the feed roller means 6, with the leading end 5a moving over the side surface 22a, thereby progressively changing the shape of the presser 22. The booklet 5 continues to move over the side surface 22a of the presser 22 even after the presser 22 is pushed out of contact with the booklet 4 (Fig. 10). When the leading end 5a of 22 is pushed out of contact with the booklet 4 (Fig. 10). When the leading end 5a of the booklet 5 moves out of engagement with the side surface 22a, the leading end 5a has moved past the centre bending portion 4f of the booklet 4, the booklet 5 at this time advancing between the presser 22 and the booklet 4 (Fig. 11). When the return force of the presser 22 becomes stronger than the firmness of the booklet 5, the booklet 5 is bent at the bending portion 5f and the leading (right hand) half 5b of the booklet moves over the surface of the leading (right hand) half 4b of the booklet 4 (Fig. 12). The booklet 5 is further moved by the feed roller means 6 and when the trailing end 5b of the booklet 5 passes through the feed roller means 6, the trailing half 5d of the booklet 5 falls on the trailing half 4d of the booklet 4. As shown in Fig. 13, after the trailing half 5d of the booklet has fallen into engagement with the trailing half 4d of the booklet 4, the booklet 5 is held in position against the booklet 4 under the pressure exerted by the lowermost portion 22c of the presser 22 which has substantially returned to its initial rest position. In this way, the booklet 5 is guided by the presser 22 into its desired location in the container 12, the book-

let 5 being positioned in a pile on top of the booklet 5. Third and more booklets will be received in a pile in the same manner as the second booklet 5 on previously received booklets. The location of the roller means 6 for feeding booklets into the container 12 is determined in accordance with conditions such as the material, shape and size of the presser 22 and the configuration of the container 12.

By virtue of arranging the presser 22 of the receiving device 10 in accordance with the present invention to be formed from flexible sheet material into a pear shape, it is possible for the receiving device 10 to receive booklets which have various physical characteristics without jamming. Also, by preventing a jam, it is unnecessary to stop the ATM to remove jammed passbooks, thereby resulting in increased operating efficiency. Further, the pear shape of the presser 22 can be obtained by bending and pressing together opposite ends of a thin plate of a certain shape, without any special bending means or special bending process being required, whereby the cost of manufacturing parts for the receiving device 10 is reduced.

(6) arranged to feed opened booklets (4,5) one by one into said container (12) whereby the leading end of each booklet engages said presser (22) so as to bring about pivotal movement of said presser about said tapered end away from a rest position for said presser, said leading end moving over the surface of said presser away from said tapered end after coming into engagement with said presser.

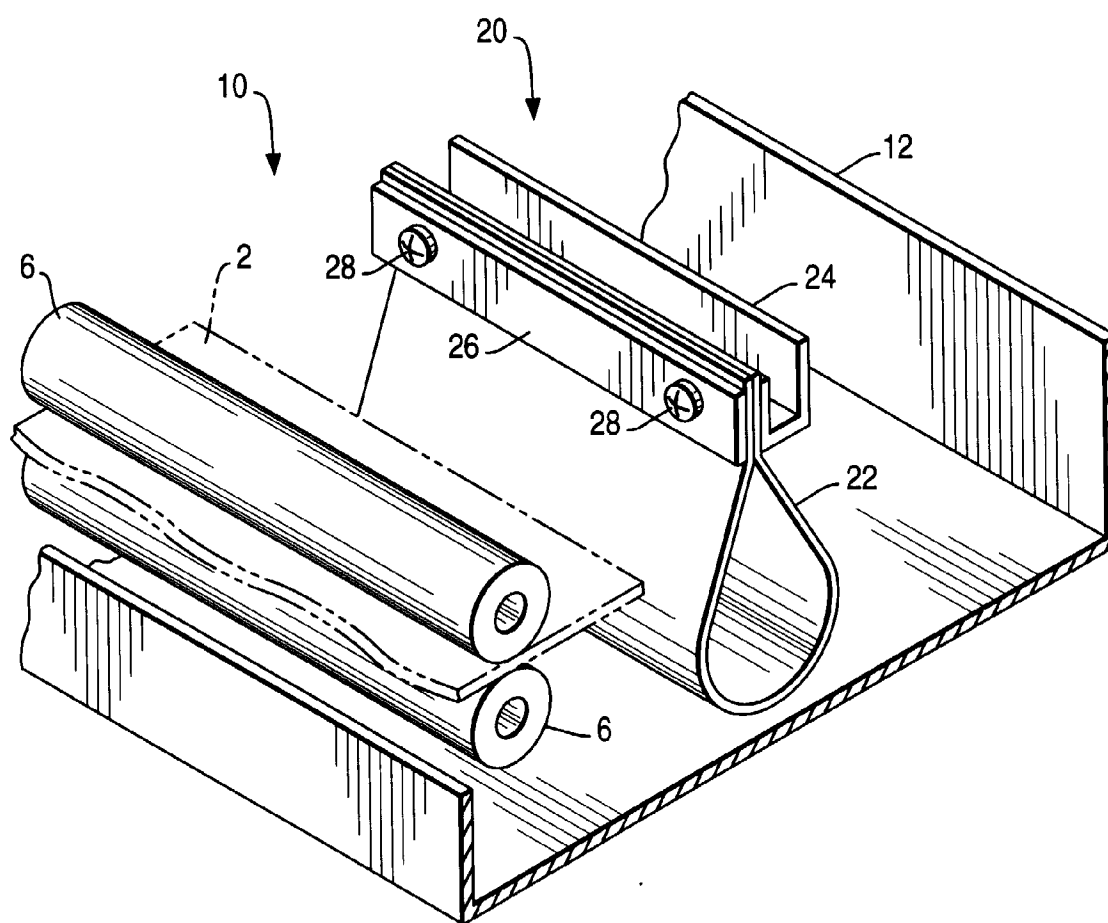
6. A booklet receiving device according to claim 5, characterized in that the shape of said presser (22) changes during said pivotal movement.

7. A booklet receiving device according to either claim 5 or claim 6, characterized in that said presser (22) is arranged to have pivoted back to a rest position after an opened booklet which engaged said presser has been guided into its desired location in said container (12).

Claims

1. A booklet receiving device, including a container (12) for receiving a plurality of opened booklets (4,5), and a booklet presser (22) arranged to press against an opened booklet as the booklet is moved into the container so as to guide the booklet into a desired position in the container, characterized in that said presser (22) is of pear-shaped configuration and is formed by bending resilient sheet material into said configuration, the tapered end of said presser (22) being fixed and being remote from an opened booklet when this booklet is in said desired location in said container (12).
2. A booklet receiving device according to claim 1, characterized in that said presser (22) is arranged to press a first opened booklet (4) received in said container (12) against a base portion of said container, and to press each subsequent opened booklet (5) received in said container against the opened booklet received immediately prior thereto.
3. A booklet receiving device according to claim 2, characterized in that the shape of said presser (22) varies in dependence on the number of opened booklets in said container (12).
4. A booklet receiving device according to either claim 1 or claim 2, characterized in that said presser (22) is formed of synthetic resin film.
5. A booklet receiving device according to any one of the preceding claims, characterized by feed means

FIG. 1



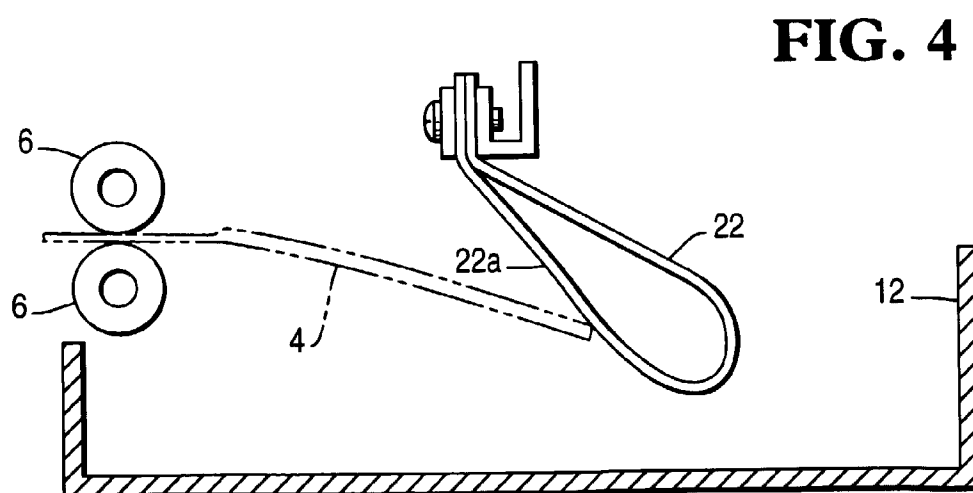
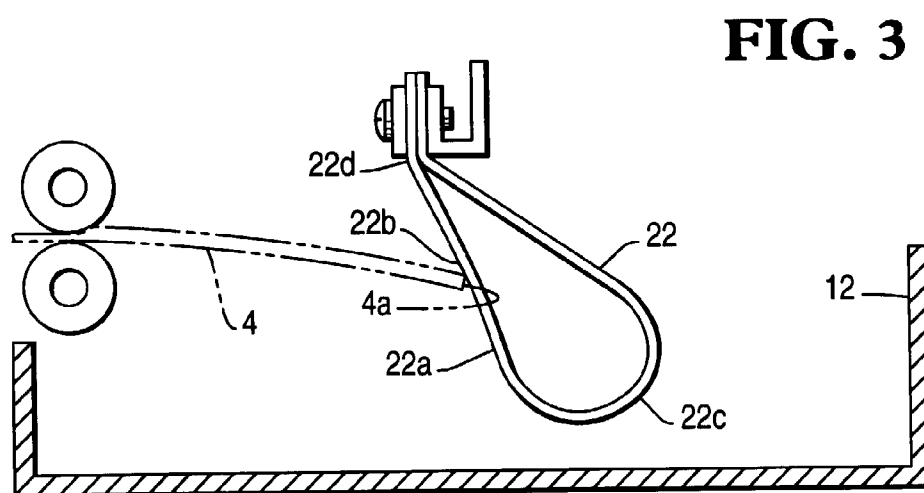
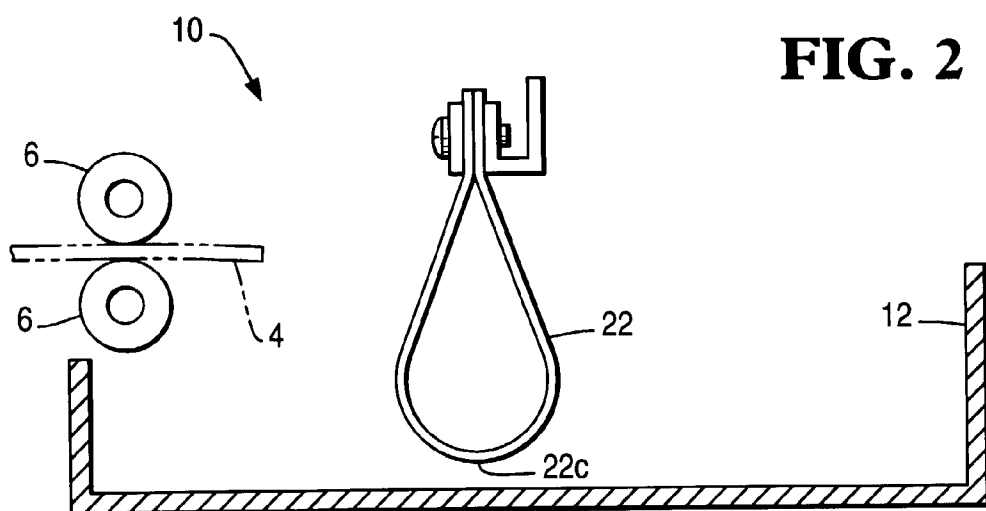


FIG. 5

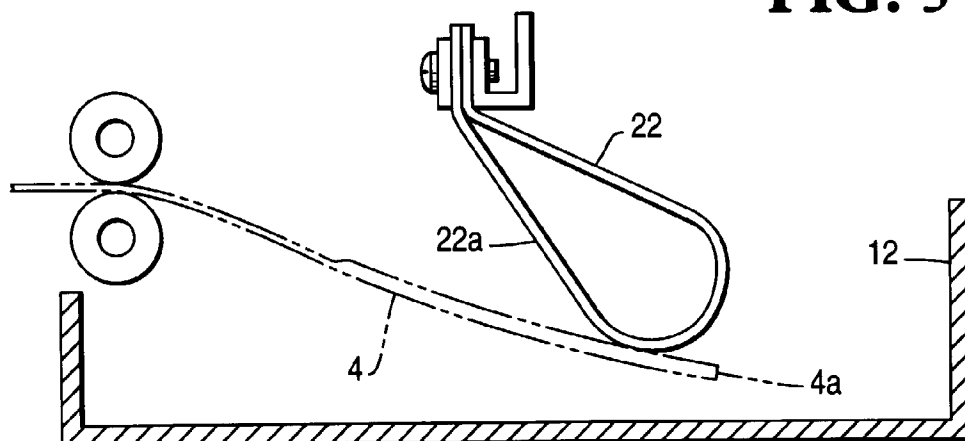


FIG. 6

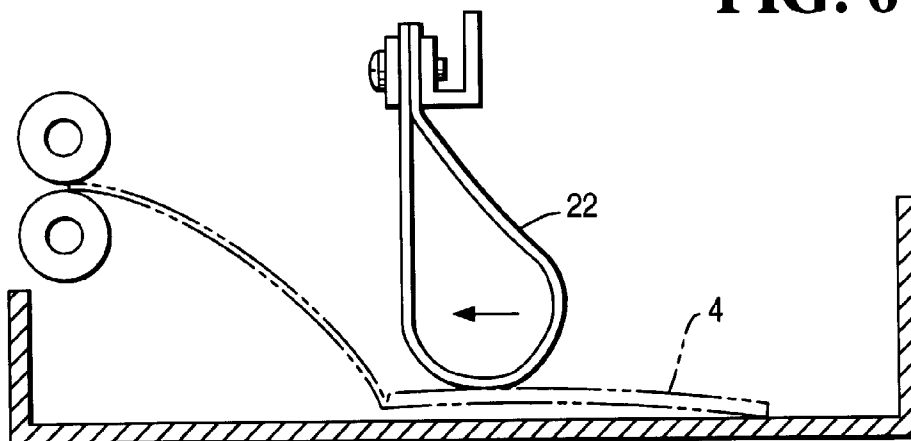


FIG. 7

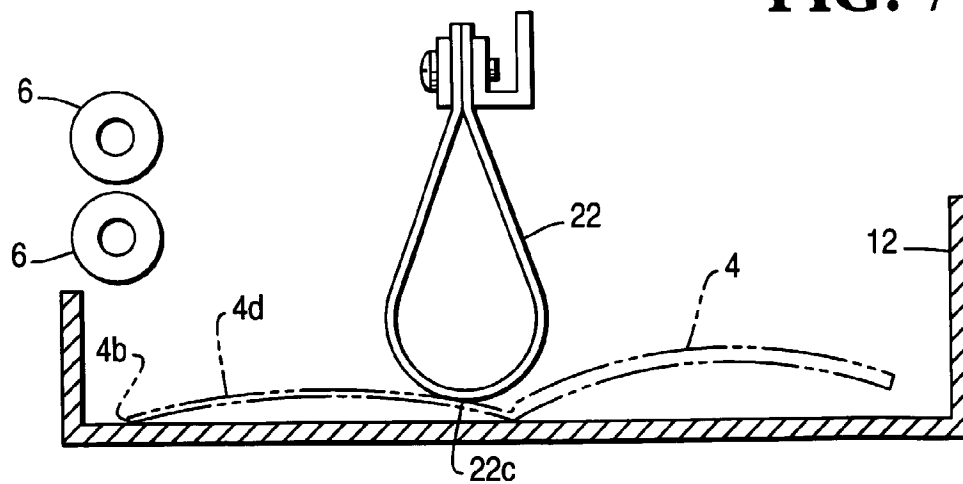


FIG. 8

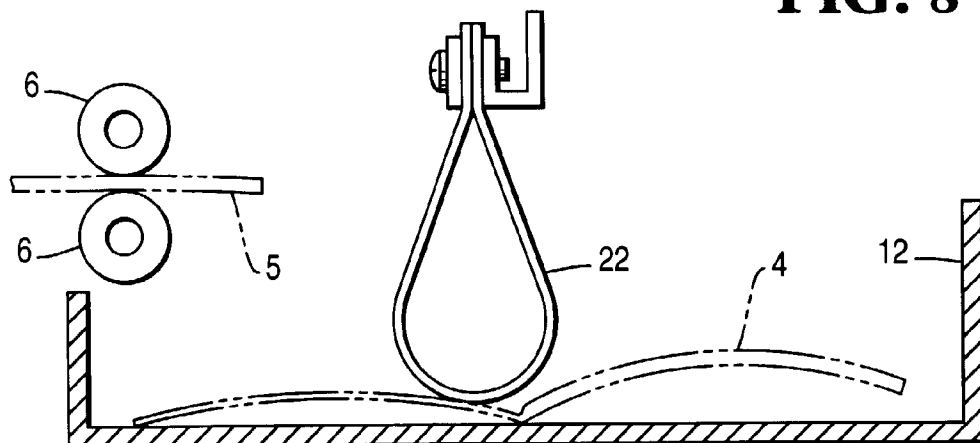


FIG. 9

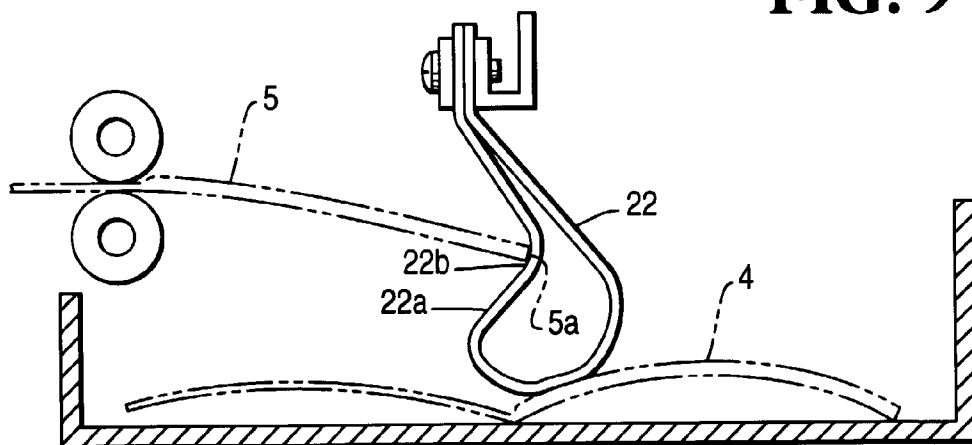


FIG. 10

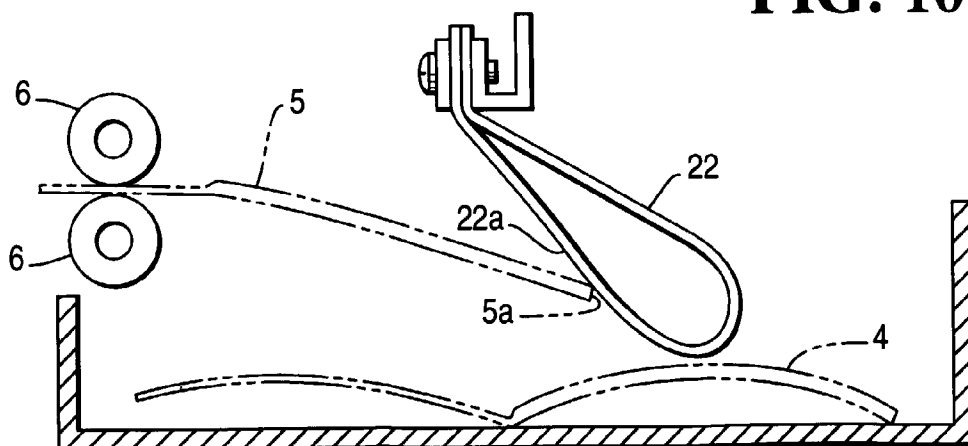


FIG. 11

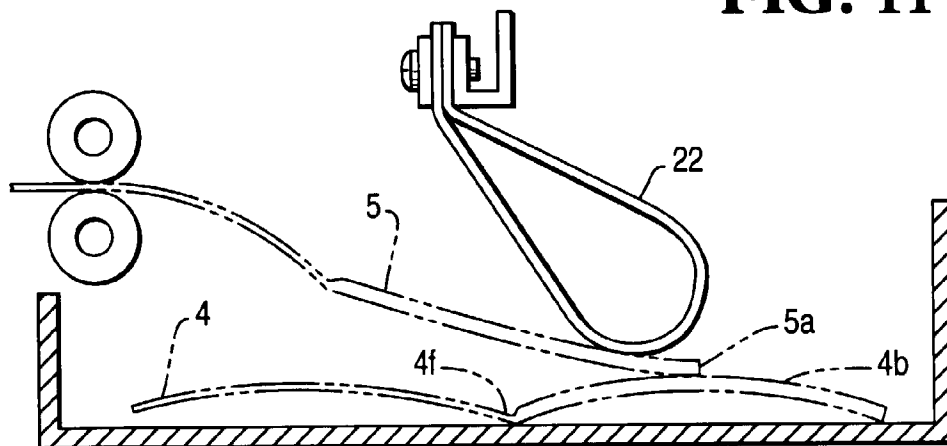


FIG. 12

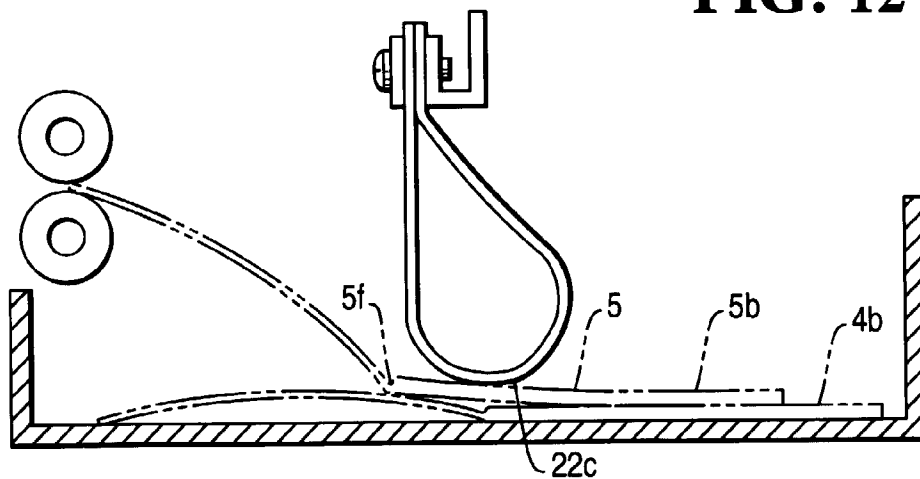


FIG. 13

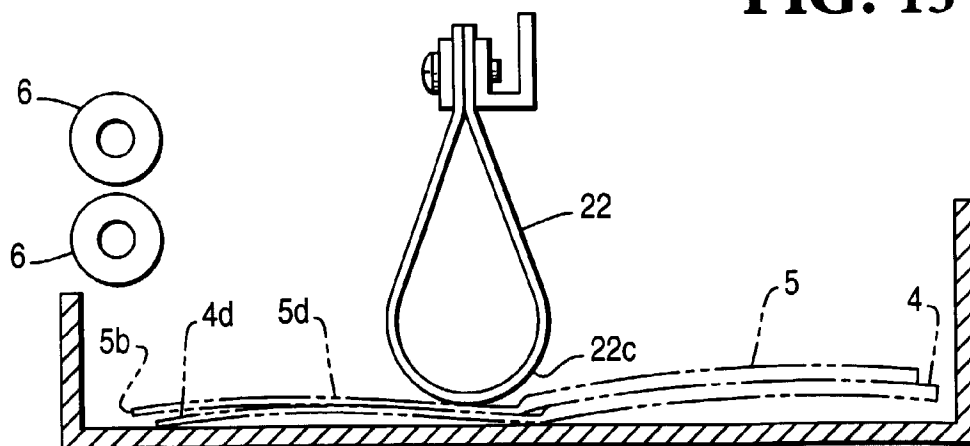


FIG. 14
PRIOR ART

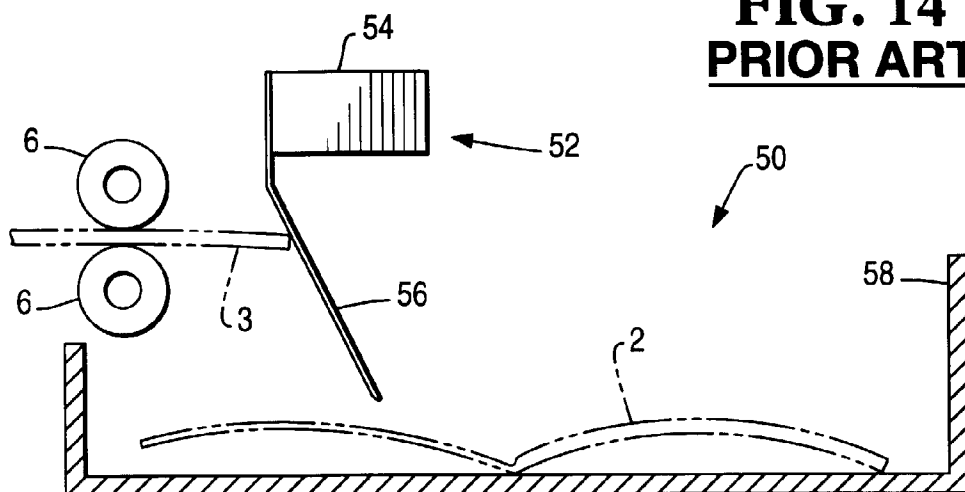


FIG. 15
PRIOR ART

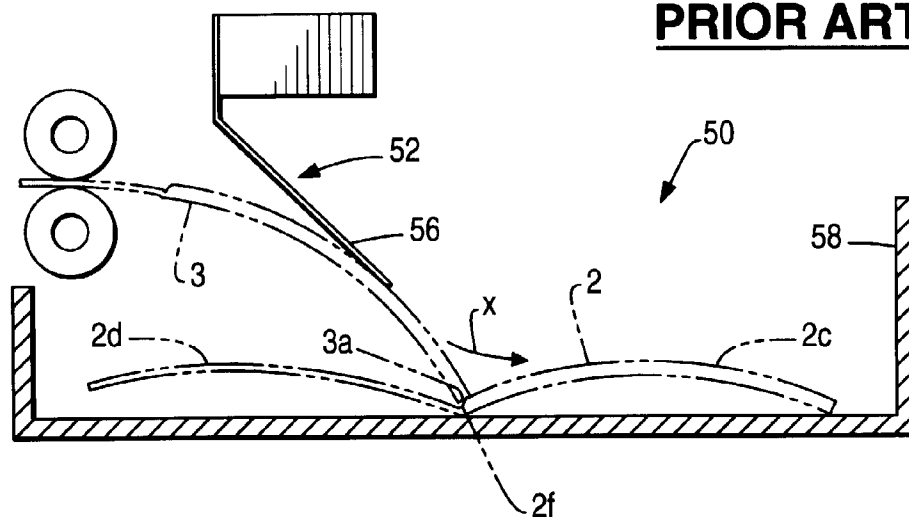


FIG. 16
PRIOR ART

