March 12, 1963 H. P. STICKEL 3,081,015

FAN-FOLD CARD GUIDE

Filed Oct. 24, 1960 3 Sheets-Sheet 1

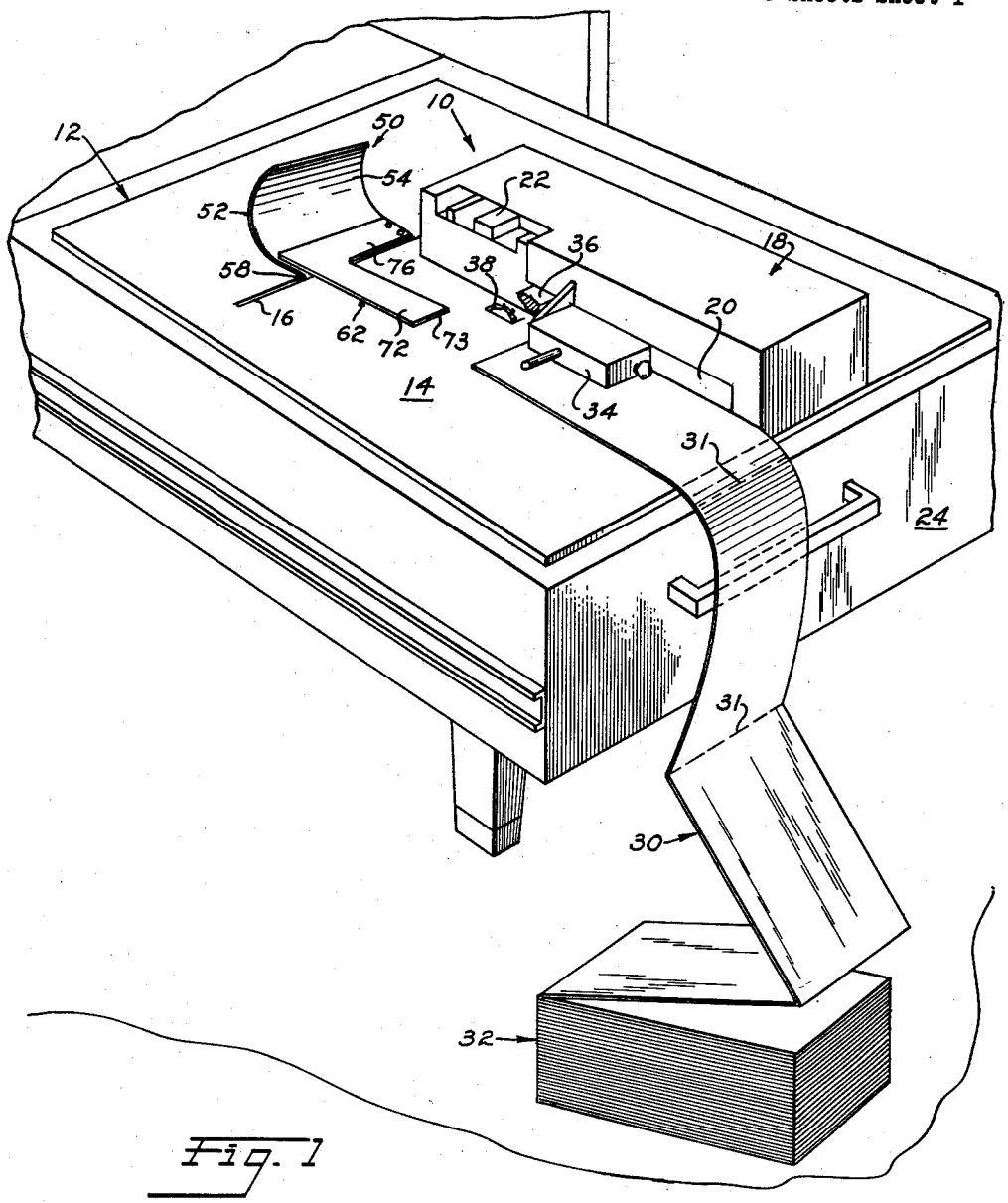


Fig. 1

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3 Sheets-Sheet 2

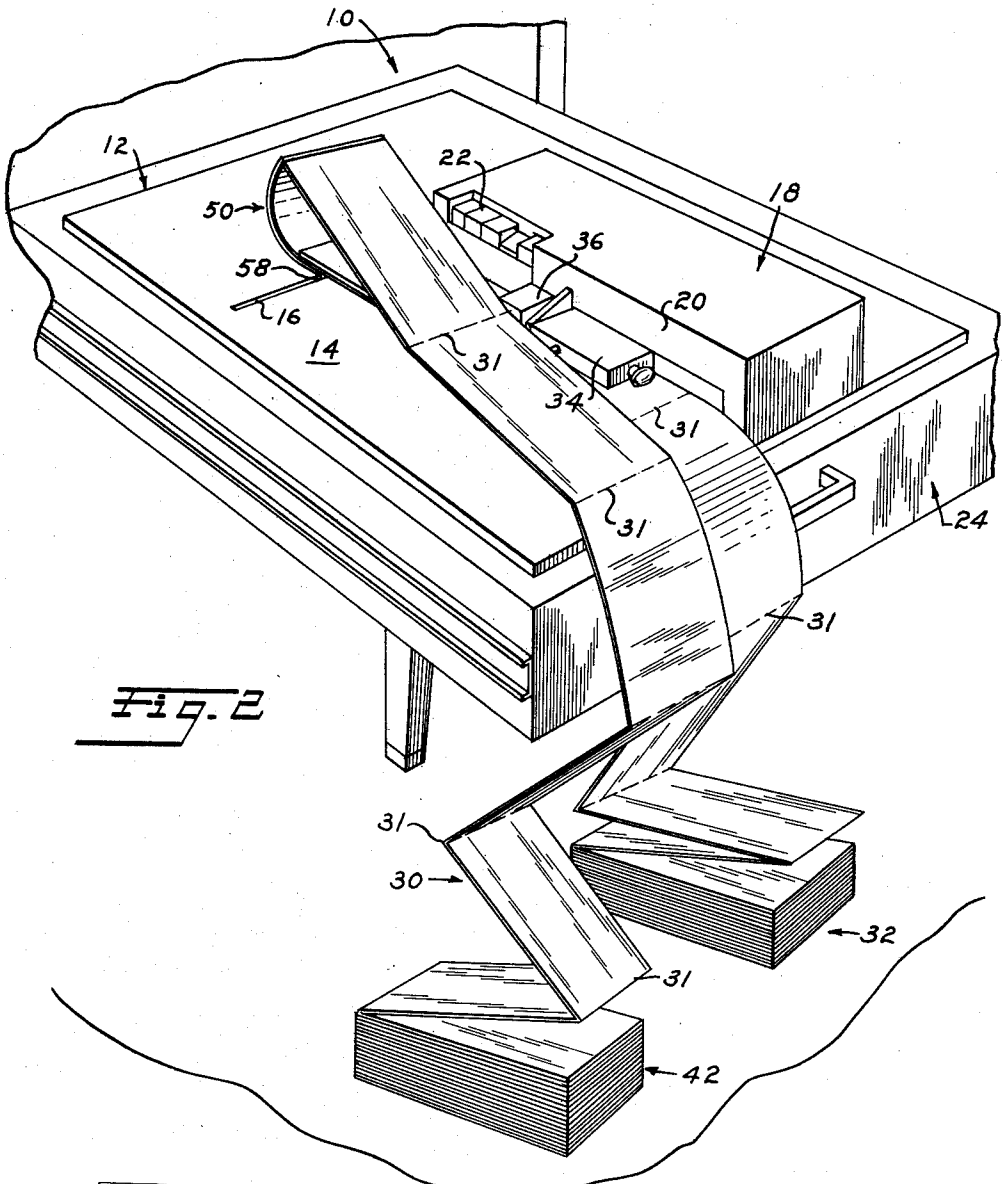


Fig. 2

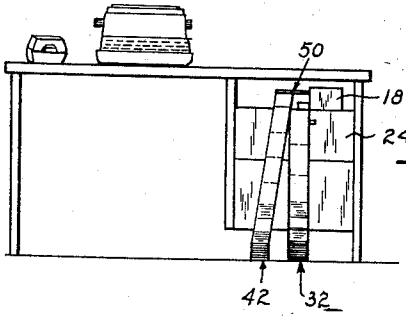


Fig. 5

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Filed Oct. 24, 1960 3 Sheets-Sheet 3

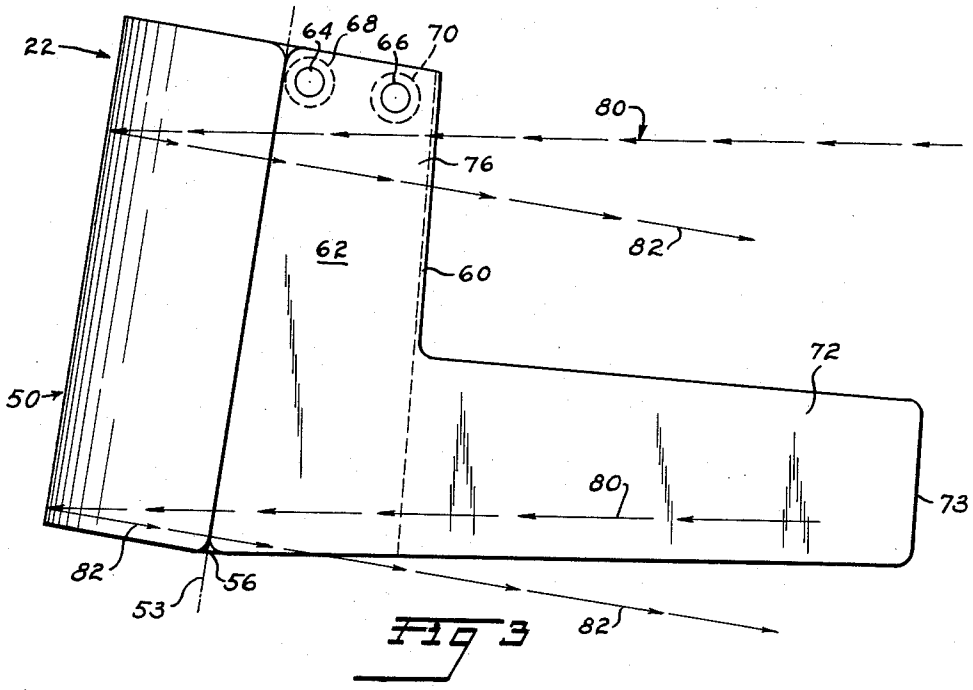


Fig 3

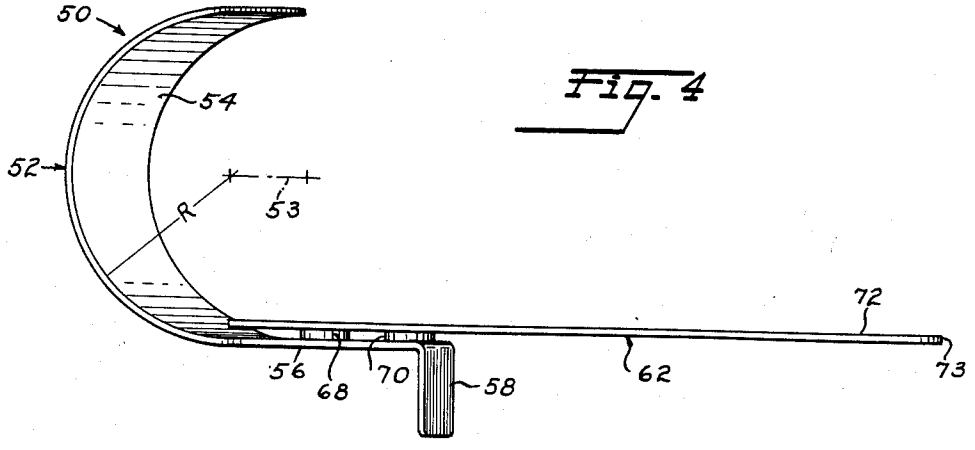


Fig. 4

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FAN-FOLD CARD GUIDE

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15 Claims. (Cl. 226—168)

The present invention relates to card material driving systems, and to guide means for use in such systems, and is particularly concerned with improved apparatus for use in a paper or card perforator employing fan-fold card material to facilitate stacking of the material after it is fed through the machine.

Many card material driving systems known at the present time employ fan-fold record material such as paper. In general, these systems are characterized by driving means such as a sprocket adapted to move the card material from an input stack, through the machine, to an output stack. As the card material is moved, the card material is caused to unfold from the input stack and is caused to fan-fold into the output stack. Known devices of the type described such as that shown in United States Patent No. 2,906,527, for example, employ various methods to cause the fan-fold paper to be stacked at convenient locations by guiding the paper over the back of the machine and holding the paper in a desired stacking position by weighted cords. However, no provision is made for feeding and removing the card material over the same edge surface of the card operating station to make possible placing the operating station in the drawer of the desk and the input and output stacks of card material to be placed side-by-side on the floor under the desk.

Accordingly, a major object of the present invention is to provide a system such as a printer, perforator, reader or the like with a novel guide means for delivering fan-fold card material from an input stack to an output stack.

A further object of this invention is to provide a card material driving system utilizing fan-fold card material wherein card material from an input stack is caused to move through a card moving mechanism, past an operating station and wherein a guide means rigidly positioned with respect to said station to receive the card material as it leaves the card moving mechanism, reverses the direction of card material movement while displacing the card material laterally so that the card material will stack itself in an output stack which is displaced laterally from and along the side of the input stack.

A still further object of this invention is to provide a novel guide member adapted to receive fan-fold card material from a card material mover which has a first portion defining a surface of revolution, a portion extending tangentially therefrom and a guide portion disposed above said tangential portion so that as fan-fold card material is fed into contact with said surface of revolution between said tangential portion and said guide portion, the card material will not prematurely buckle or fold at the perforations between adjacent cards.

Another object of this invention is to provide a novel card material guide member having a portion defining a surface of revolution, a portion tangentially extending therefrom, a plate like member secured to the upper side of said tangential extension and spaced therefrom a sufficient distance to allow card material to pass therebetween, and means for securing said guide member to a supporting structure in operative relation to a fan-fold card moving device.

Further novel features and objects of this invention will become apparent in the following detailed description, and the appended claims taken in conjunction with the accompanying drawings showing a preferred structure embodiment in which:

FIGURE 1 is a perspective view of a fan-fold card material utilizing system disposed in a desk drawer employing the guide means of the present invention showing fan-fold card material entering the system;

FIGURE 2 is a figure similar to FIGURE 1, but showing the fan-fold card material as it egresses from the guide means of the present invention;

FIGURE 3 is a plan view of the novel guide member of this invention;

FIGURE 4 is a side elevation view of the guide member of FIGURE 3; and

FIGURE 5 is a front elevation of a fan-fold card system in operative position in a closed desk drawer.

Referring now to the drawing figures for a detailed description of the invention, FIGURE 1 shows a fan-fold card material moving system 10 employing guide member 50 of the present invention which system is contained within a housing 12 having a top planar surface 14 having a slit 16 therein and a system control box 18 having a side 20 forming a guiding surface and having control buttons 22 mounted on top planar surface 14. Housing 12 is of such a size that it will fit into a desk drawer 24 and so that control box 18 will not project above the desk drawer.

The system utilizing this invention can effectively operate with the desk drawer 24 closed because fan-fold cards 30 may be stacked in an input pile 32 on the floor in front of the desk, fed up over the front edge of the desk drawer 24, over the top planar supporting surface 14 of housing 12 along the guiding surface 20, into system operating station 34 which may be a printer, perforator, reader or the like, into the fan-fold card material moving mechanism 36 which may include a sprocket drive wheel 38, into the novel guide member 50 of the present invention which has a flange 58 that is inserted into slit 16 to hold the guide means rigidly in place with respect to operating station 34 and guide surface 20.

In guide member 50, the direction of movement of the card material 30 is reversed without moving upwardly so far as to interfere with the top of the closed desk drawer and the path of card movement is displaced laterally from its incoming direction so that the card material leaves over the front edge of desk drawer 24 adjacent the place it moved up over the front edge of the desk drawer and stacks itself into an output pile 42 (FIGURE 2) immediately adjacent the input pile 32. From the foregoing it is readily apparent that the present invention provides a guide member which permits a card material moving system to be used in a limited space and to be hidden away in a desk drawer even while in use, as shown in FIGURE 5.

Referring now also to FIGURES 3 and 4, the guide member 50 is preferably made of metal such as aluminum or a plastic, and has a first semi-circular portion 52 which is wider than a fan-fold card and defines a surface of revolution 54. Extending tangentially from the lower edge of the semi-circular portion 52 is a tangentially extending portion 56, see FIGURE 4. Extending downwardly from the free end of tangentially extending portion 56 is a flange 58 which may be formed by bending over the free end of tangentially extending portion 56 along line 60 which line was selected to lie in a plane which converges with the axis of revolution 53 of semi-circular portion 52.

Connected to tangentially extending portion 56 at one edge thereof by rivets 64 and 66 is a plate 62. Positioned between plate 62 and tangentially extending portion 56 are washers 68 and 70 disposed about rivets 64 and 66 which space plate 62 from tangentially extending portion 56 a sufficient distance whereby fan-fold card material can freely pass therebetween yet not far enough apart to permit the fan-fold card material to fold or buckle.

Plate 62 is provided with a laterally extending portion 76 having one end connected to tangential extension by rivets 64 and 66 that is wider than the width of a fan-fold card material so that the rivets do not interfere with movement of the card material, and the length of the portion 72 which extends in the direction of said tangential extension 56 is greater than the distance between lines of perforations 31 in fan-fold card material 30 to prevent undesired folding or buckling.

Guide member 50 is rigidly secured with respect to guiding surface 20 and operating station 30 by inserting flange 58 into slit 16 which slit is disposed perpendicular to guiding surface 20 which surface determines the direction of card movement. Thus, movement of fan-fold card material will be perpendicular to flange 58 and line 60. Therefore, the direction of ingress of card material into contact with surface of revolution 54 will be along line 80 of FIGURE 3.

As the line of ingress 80 is perpendicular to line 60, as line 60 lies in a plane which converges with the axis of revolution 53 of semi-circular portion 52, and as fan-fold card material leaves contact with surface of revolution 54 along the direction of the central plane of the semi-circular portion 52, the card material as it egresses is angularly related to the incoming card material. This angle is equal to the angle which the line 60 makes with axis 53. On FIGURE 3, arrows 80 indicate the ingress line, arrows 82 the egress line, and the angle between lines 80 and 82 determining the lateral displacement of the card material as it passes off the drawer edge into stack 42.

From the foregoing it will be readily apparent that the same angular relationship could be achieved by forming the deflection portion of guide member 50 to define a conical surface instead of a cylindrical surface with surface 52 being substantially one-half of a conical surface, the same ingress line 80 and egress line 82 could be achieved. In either case, the conical or semi-circular surface is a surface of revolution and the choice is largely determined by ease of fabrication.

In addition to the above interrelationship of parts, the relationship of plate 62 to the surface of revolution 54 and the moving mechanism 36 is unique. As before mentioned, the extending portion 72 of plate 62 is longer than the distance between perforations 31 in the fan-fold card material. This extending portion 72 is of such a length to prevent particularly flexible fan-fold card material from buckling as it is pushed around surface of revolution 54. Further, as shown in FIGURE 1, slit 16 is so positioned with respect to the moving mechanism that when flange 58 of the guide member 50 is inserted thereinto to hold the guide member in place relative to sprocket drive wheel 38, the front end 73 of extending portion 72 preferably extends up to the sprocket drive wheel and in no case is spaced from the card moving mechanism 36 a distance more than the distance between perforations in the fan-fold card material so that the particularly flexible fan-fold card material cannot buckle between moving mechanism 36 and extending portion 72 of plate 62.

Although the guide member of the present invention has been characterized as being made from metal and comprised of two parts, it will be apparent to one skilled in the art that the guide means could be molded from a polymer or bent from a single piece of metal thus eliminating the need for fastener rivets 64, 66 and separator washers 68, 70. Further, the tendency of the fan-fold card material to buckle is dependent upon its flexure. Therefore, the plate 62 may be dispensed with, if a sufficiently non-flexible fan-fold card material is used.

In some installations, guide member 50 may be placed closer to the moving mechanism 36 than shown in FIGURE 1 to prevent buckling without the use of guide plate 62. Also, in the illustrated installation, it is not essential that guide plate 62 be connected to card guide 50 to perform its anti-buckling function as it could be connected to the housing 12. Further, the plate 62 need not necessarily be a plate. The only requirement that it must fulfill is to guide the fan-fold card material from the card moving mechanism 36 into the surface of revolution; therefore, any suitable guide means such as, for example, a plurality of spring wires displaced between the surface of revolution 54 and the card moving mechanism 36 may be used.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. Means for driving a continuous strip of fan-fold card material in a first direction across a planar supporting member past a station operating on said material, means for reversing the direction of card movement through an angle of at least 180°, said reversing means having a curved inner surface against which said material is driven for delivering said paper in a direction which when projected on said planar supporting member is angularly related to said first direction to laterally displace the reversed card material from the incoming card material.

2. Means for driving a continuous strip of fan-fold card material in a first direction across a planar supporting member past a station operating on said material, means for reversing the direction of card movement comprising a guide means having a curved inner surface of revolution for guiding said card through an angle of substantially 180°, said reversing means delivering said card material in a direction which when projected on said planar supporting member is angularly related to said first direction to laterally displace the reversed card material from the incoming card material, said card material being pushed within said surface of revolution by said means for driving said card material.

3. In a card moving system of the type wherein an elongated length of fan-fold card material is caused to move from an input stack, through a card moving mechanism, past an operating station in a substantially linear run, over a planar supporting member and to an output stack, the improvement which comprises a guide member having a portion defining a curved inner surface of revolution adapted to receive said paper as it completes its substantially linear run through said card moving mechanism, which surface of revolution is positioned with respect to said linear run so that when said card material comes in contact therewith its direction of movement is inverted and additionally is displaced angularly with respect to said linear run to displace said output stack laterally from said input stack.

4. The combination as defined in claim 3 wherein said card moving mechanism is supported in a desk drawer and said input stack is on a floor under the desk drawer whereby the card material feeds substantially vertically over the front edge of said drawer and the output stack is on the floor adjacent the input stack whereby the card material is received substantially vertically over the front edge of said drawer.

5. The combination of claim 3 wherein said portion which defines said surface of revolution is provided with a tangential extension and a planar portion which is displaced above said tangential portion whereby when card material feeds into contact with said surface of revolution it will first pass between said tangential extension and said planar portion so as to be thereby guided.

6. In a fan-fold card material handling system including a means for pushing fan-fold card material, an op-

erating station, and a substantially planar supporting surface, a guide means comprising: a portion defining a surface of revolution, a portion extending tangentially from said surface of revolution, a planar portion disposed above said tangentially extending portion, said first-mentioned means pushing said card material past said operating station, over said planar supporting surface and between said planar portion and said tangential extending portion into contact with said portion defining a surface of revolution whereby said fan-fold card material will follow said surface of revolution without premature buckling.

7. In a fan-fold card material handling system including means for pushing fan-fold card material, an operating station, and a substantially planar supporting surface having a slot therein, a guide means comprising: a portion defining a surface of revolution, a portion extending tangentially from said surface of revolution, which portion has a flange extending downwardly therefrom, which flange is adapted to be inserted into said slot whereby said surface of revolution is properly rigidly disposed relative to said operating station, a planar portion disposed above said tangentially extending portion, said card material pushing means pushing said card material past said operating station, over said planar supporting surface and between said planar portion and said tangentially extending portion into contact with said portion defining a surface of revolution whereby said fan-fold card material will follow said surface of revolution without premature buckling.

8. The guide means as defined in claim 7 wherein said planar portion is secured by rivets to said tangentially extending portion and is spaced thereabove by spacer means.

9. In a guide member adapted to receive fan-fold card material fed into said guide member from a card material mover across a planar card material supporting surface comprising: a first portion defining a surface of revolution, a tangential portion formed structurally integrally with said first portion, a downwardly extending flange formed structurally integrally with said tangential portion adapted to be inserted into said planar supporting surface whereby said surface of revolution portion is rigidly positioned with respect to said card material mover so that said card material as it comes in contact with said surface of revolution will reverse its direction and be delivered in a direction which when projected on said supporting surface is angularly related to its incoming direction.

10. A guide member adapted to receive fan-fold card material fed into said guide member from a card material mover across a planar card material supporting surface comprising: a first portion defining a surface of revolution, a tangential portion formed structurally integrally with said first portion, a downwardly extending flange formed structurally integrally with said tangential portion adapted to be inserted into said planar supporting surface whereby said surface of revolution portion may be rigidly positioned with respect to said card material mover so that said card material as it comes in contact with said surface of revolution will reverse its direction and be delivered in a direction which when projected on said supporting surface is angularly related to its incoming direction, said guide member further comprising a planar extending guide portion which is disposed above said tangential extension and which extends toward said fan-fold card material mover to prevent said fan-fold card material from buckling before it comes in contact with said surface of revolution.

11. The guide means as defined in claim 10 wherein said planar portion is secured at one side to said tangentially extending portion.

12. The combination of claim 11 wherein said planar portion is secured to said tangential portion by rivets and spacer means are provided between said planar portion and said tangentially extending portion.

13. An article of manufacture comprising a portion defining a surface of revolution having a tangential extension, a flange extending downwardly from said extension, and a substantially flat member secured at one edge to the upper side of said extension and spaced above said upper side a distance sufficient to permit card material to pass therebetween.

14. The article of claim 13 wherein said substantially flat member is cantilever supported at one side by said tangentially extending portion.

15. The article of claim 14 wherein said substantially flat member is fastened to said tangential extension by fastening means and spacing means are provided between said substantially flat member and said tangential extension.

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