J. E. ABRAMS.

BLANK FEEDING MECHANISM.

APPLICATION FILED DEC. 24, 1908.

955,112.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 1.

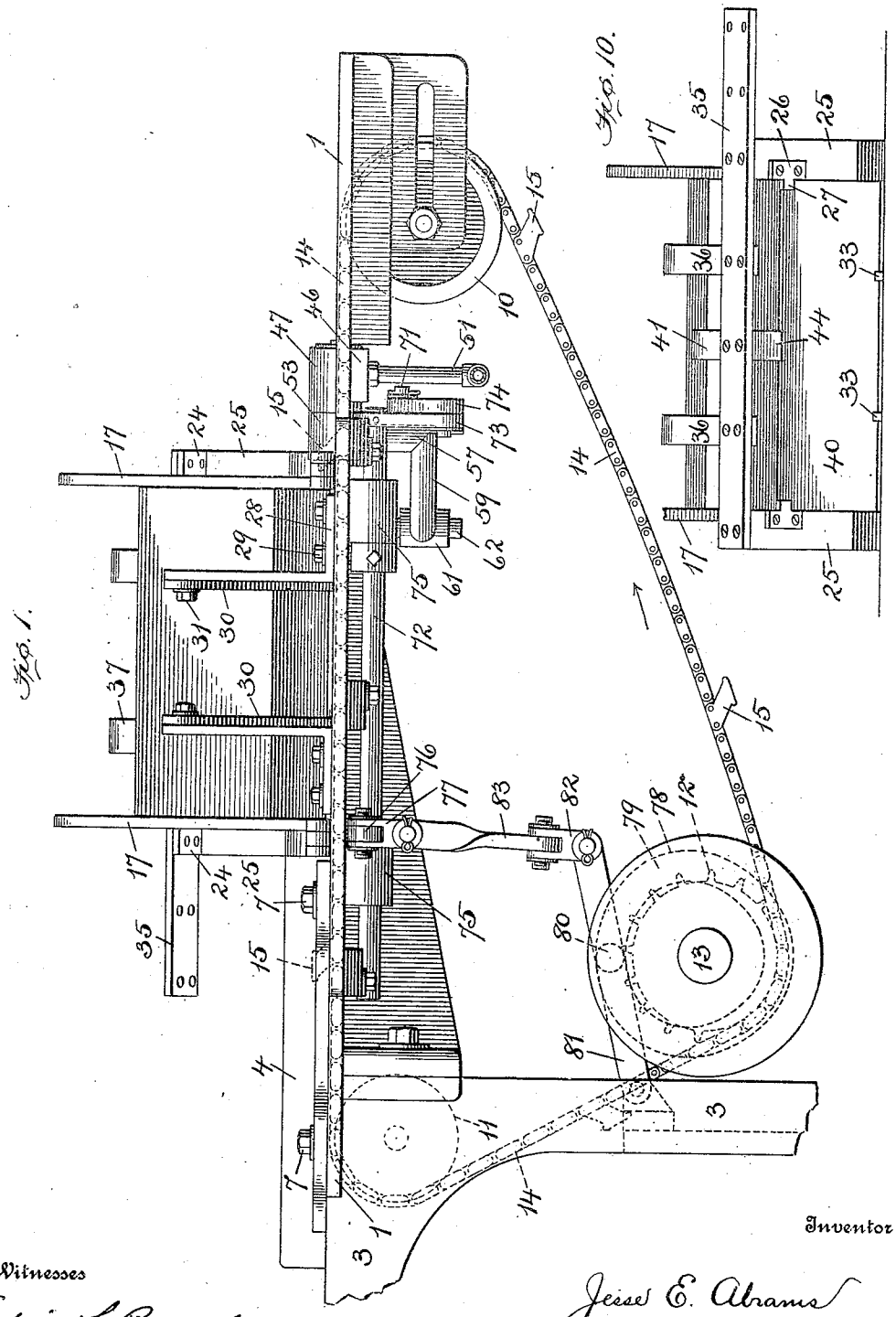

Fig. 1.

Fig. 10.

Witnesses

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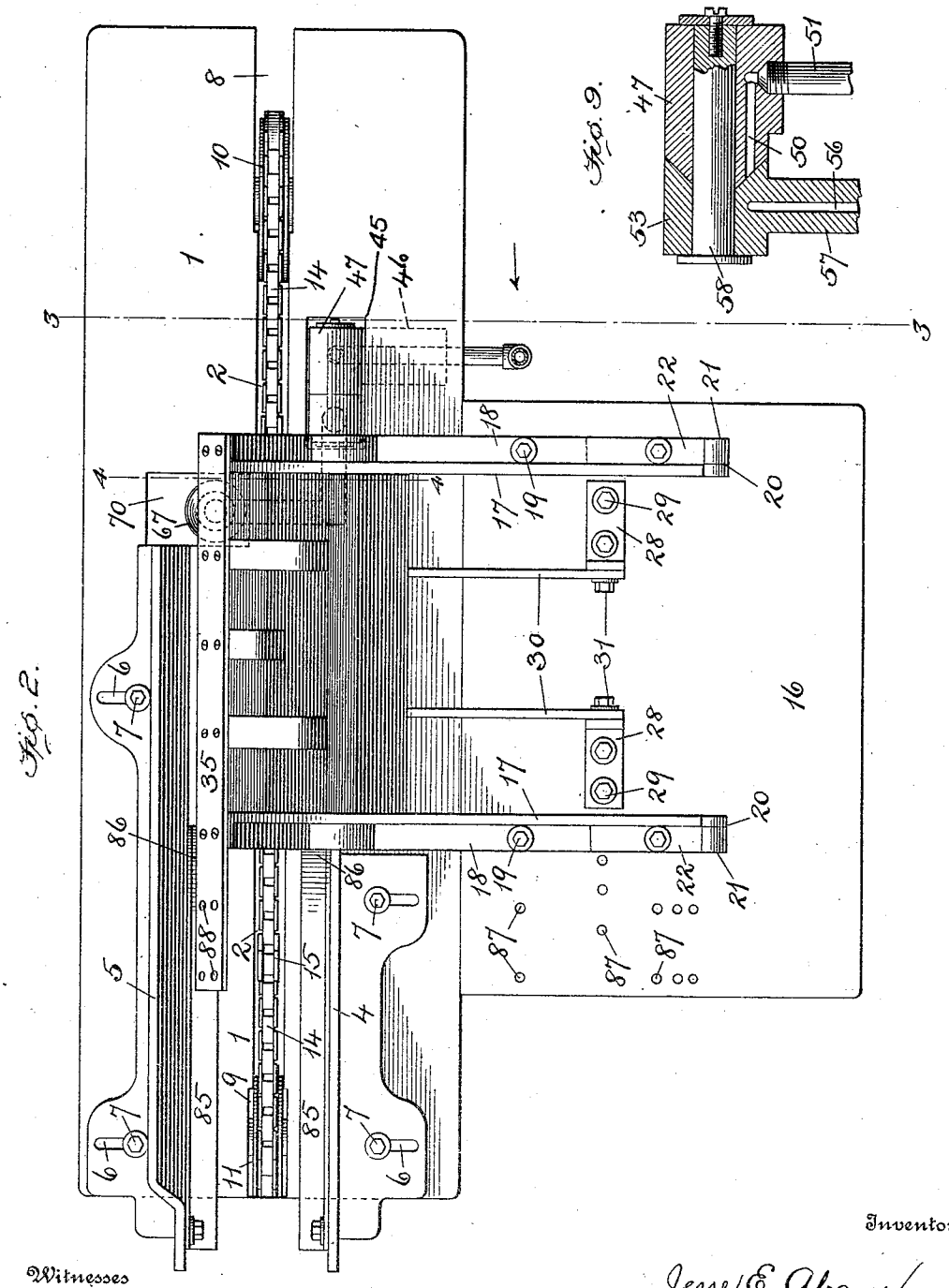

Fig. 2.

Fig. 9.

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3 SHEETS—SHEET 3.

Fig. 3.

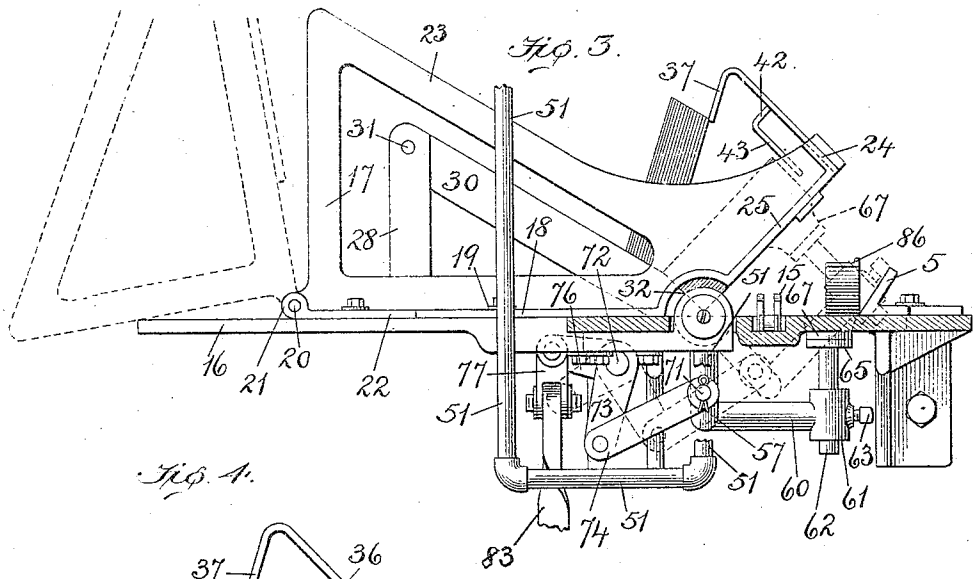


Fig. 1.

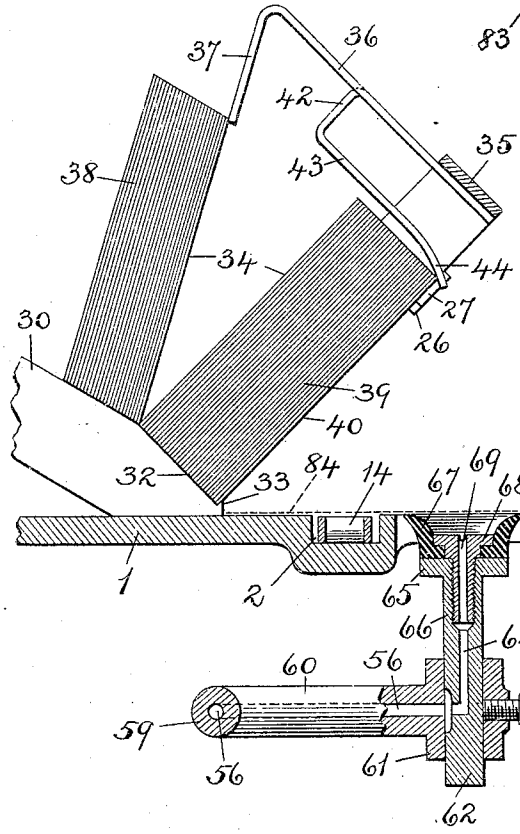


Fig. 5.

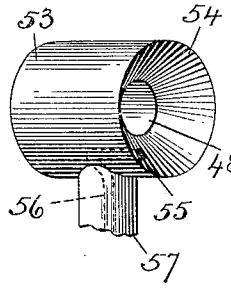


Fig. 6.

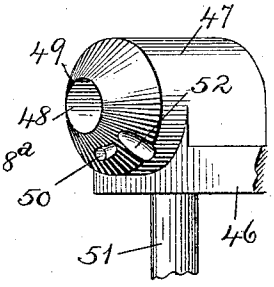


Fig. 7.

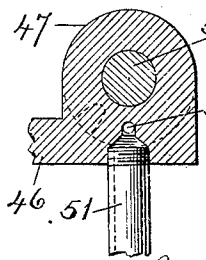
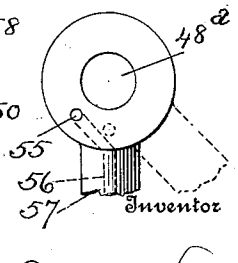


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

JESSE E. ABRAMS, OF BALTIMORE, MARYLAND, ASSIGNOR TO CONTINENTAL CAN COMPANY, OF BALTIMORE, MARYLAND, A CORPORATION OF NEW JERSEY.

BLANK-FEEDING MECHANISM.

955,112. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed December 24, 1908. Serial No. 469,072.

To all whom it may concern:

Be it known that I, JESSE E. ABRAMS, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Blank-Feeding Mechanism, of which the following is a specification.

This invention relates to an improved mechanism for withdrawing sheets of metal from a pile and feeding them successively and one at a time for individual treatment, such for example as during the manufacture of sheet-metal articles.

This invention is particularly designed for handling or feeding sheet-metal blanks from a pile and delivering them to a conveyer by which they are carried into a machine for forming can-bodies, but it is obvious that the mechanism may be employed for feeding flat blanks of other material and for other purposes.

One object of the present invention is to provide an improved mechanism that will be positive in its operation and which will maintain control of the blank until it is in position to be operated upon in the next step.

Another object is to provide an improved construction of mechanism for advancing and controlling the blanks before they are delivered to the blank-removing device.

A further object is to improve the construction of mechanism for operating the suction cup that removes the blanks one at a time and another object is to generally simplify and improve the construction of machines of this character to effect with more certainty the delivery of the blanks, one at a time to the conveying mechanism.

With these and other objects in view the invention is illustrated in the accompanying drawings in which—

Figure 1 is a side elevation of the machine constructed in accordance with my invention. Fig. 2 is a plan view thereof. Fig. 3 a vertical cross-section through a portion of the machine,—the section being taken on the line 3—3 of Fig. 2. Fig. 4 is a cross-sectional detail on an enlarged scale through the feed mechanism and table as would appear if taken on the line 4—4 of Fig. 2 and also shows the cup, and the stem that carries the same in section to illustrate the passages therein. Figs. 5 and 6 are perspective details respectively of the conical valve parts which coact to establish and break the suction through the blank-withdrawing device. Figs. 7 and 8 are detail views of the same. Fig. 9 is a sectional detail through the said valve parts when the same are coupled together, and Fig. 10 is a front elevation of the blank guides and the blanks held in place therein ready to be withdrawn.

Referring to the drawings the numeral, 1, designates a horizontal bed or table having a central longitudinal channel or groove, 2, and which may be supported in any suitable manner. In the present instance the bed is attached at one end to a can-body or other forming machine, 3, to which the blanks are to be fed one at a time in quick succession.

On top of the table and at opposite sides of the central channel or groove are flanged guide plates, 4, and, 5, both of which are provided with cross-slots, 6, so that they may be adjustably secured on top of the bed by means of bolts, 7. These guide plates extend in a parallel direction and the space between them may be varied so as to enable the machine to be utilized for feeding blanks from the smallest to the largest size or to accommodate the blanks whether they are fed in a crosswise or an endwise direction.

At the ends the table is preferably provided with central slots, 8, and 9, which extend longitudinally thereof and in order that idler wheels, 10, and 11, respectively may be mounted so that their peripheries may have position in said slots. A sprocket wheel, 12, shown in broken lines in Fig. 1, is mounted on a driving shaft, 13, which is sustained in any suitable manner, such as by bearings on the can-body machine, 3, or otherwise, and an endless sprocket chain, 14, travels continuously around the wheels, 10, and, 11, and is driven by the sprocket wheel. This sprocket chain is preferably provided at intervals with pairs of fingers or lugs, 15, which latter travel with the chain and after passing around the wheel, 10, project upwardly as they are propelled along the upper surface of the table or bed toward the wheel, 11. While passing along the table the sprocket chain travels in the central channel or groove, 2, but the fingers, 15, project upwardly from the groove so as to propel or push a blank that has been deposited on the table.

At one side the table is provided with an extension, 16, the upper surface of which is

flush with the top surface of the table, and by reference to Figs. 2 and 3, it will be seen that two vertical spaced-apart frames, 17, are supported on top of said table and the extension thereof, so as to form parallel guides for the opposite edges of the blanks that are to be fed, as will presently more fully appear.

It has been found in practice that at times it is desirable to quickly shift these guide frames in order that free access may be gained to the table surface and in order to effect this with rapidity I have provided the frames with bottom flanges, 18, by means of which they may be secured by bolts, 19, down on the table extension surface and I have pivotally connected the ends of the frames at, 20, to an eye, 21, that is formed on the end of a bar, 22, which is rigidly bolted also to the extension. By removing the two bolts, 19, the guide frames may be tilted back as shown in broken lines in Fig. 3, thus leaving the table proper free and accessible.

The shape of the guide-frames, 17, is such as to provide an inclined rail, 23, that extends downwardly from the rear toward the table and at the lower end said frames are provided with laterally-extending top and side flanges, 24, and, 25, respectively, as shown in Figs. 1 and 3. By reference to Figs. 2 and 3 it will be seen that the lower end of the guide-frames has an upwardly-inclined position with respect to the table so that it will overhang the latter and also the central channel or groove therein. The flat faces of the upwardly-inclined flanges, 25, are each provided with a blank retaining plate, 26. These plates have each a lug, 27, that extends inwardly so as to form a stop for the lowermost blank to rest against as will presently be fully described.

Between the guide frames, 17, and secured on the extension, 16, of the table are suitable angle irons, 28,—the horizontal leg or base of which are secured by means of bolts, 29, while the vertical portions thereof extend upwardly. Inclined blank-supporting bars, 30, have their upper ends pivotally connected by means of bolts, 31, to the upper ends of the angle irons and said bars extend downwardly and forward from said irons and have their forward ends resting upon the table and at one side of the channel or groove therein, as clearly shown in Fig. 4. Adjacent the lower end, the supporting bars have a beveled upper surface, 32, and at the lowermost point of said beveled surface said bars are provided with a slight upwardly-projecting hook, 33, see Fig. 4. By pivotally connecting the supporting bars, 30, at their upper ends the same may be readily swung back in the same manner as has been described with reference to the guide-frames and thus leave the table entirely clear for any purpose desired. The blanks, 34, in the present instance, are sheets of tinned plate of such size as may be utilized for making can-bodies, and while in the present instance these flat blanks are placed with their longer edges resting upon the bars, 30, it is obvious that they may be placed with their shorter edges resting on said bars and thereby hold the sheets or blanks so that they may be deposited crosswise of the chain and table or lengthwise as desired.

It is desirable that when the blanks are placed between the guide-rails, 23, and upon the inclined supporting bars, 30, that some means be provided to divide the weight and pressure of those blanks to prevent them from packing close against the foremost or lowermost blank, and thereby interfere with the withdrawal of said lowermost blank. The devices employed to prevent the packing of the sheets or blanks will therefore now be described, reference being made particularly to Figs. 1, 2, 4, and 10 of the drawings. A flat cross-bar, 35, extends between and rests upon the top flanges 24, of the guide-frames, 17, and said cross-bar carries two spaced-apart plates, 36, which project rearwardly and back over the upper edges of the sheets or blanks that are to be fed. At the rear these plates are provided with downwardly-projecting ends, 37, which terminate at or adjacent to the uppermost edges of a group, 38, of blanks so as to slightly contact with said edges and serve as a brake to hold said group of blanks behind it in check. The lower edges of the group of blanks thus held back by the ends, 37, of the plates, 36, rest upon the upper inclined edges of the supporting bars, 30, and immediately behind the beveled portion, 32, of said bars and the blanks thus held, have a slightly tilted or inclined position with respect to the surface on which their lower edges rest,—that is, this group of blanks does not lie or have position at a right angle with respect to the bottom support. In front of this group, 38, of blanks there is another group, 39, which has passed the ends of the plates, 36, and which rests upon the beveled surface, 32, of the supporting bars, 30. The lowermost blank, 40, of this latter group however has its lower edge retained by the hooks, 33, of the bars, 30, while the upper edge or corners of said lowermost blank are held by the lugs, 27, on the retaining plates. It will thus be seen that this lowermost blank is held slightly at four points, see particularly Fig. 10, and that said blank is thereby retained from accidental release. It will also be seen by reference to Fig. 4, that the lower group, 39, of blanks has an inclination with their upper edges overhanging the bed while the upper group, 38, has a lesser inclination and that the lower edge of the rear blank of the lower group contacts with the lower edge

of the front blank of the upper group and thereby prevents the blanks of said upper group from sliding downward. As the blanks are withdrawn successively from the under side of the lower group the blanks at the upper side thereof feed or move down the inclined or beveled surface, 32. This successive downward movement of the blanks of the lower group causes a successive feeding of the blanks from the upper group, thus supplying the lower group with blanks from the upper group. As the blanks are withdrawn from the bottom of the lower group, it is expedient to provide a device that will be positive in its action in preventing more than one blank from being withdrawn at a time, and while the separation of the blanks into groups and the feeding of the blanks successively from one group to another, will materially aid in preventing the blanks sticking together, it is desirable that some means be provided at the point where the blanks are to be fed one at a time that will insure this operation. The device employed for this purpose will therefore now be described, reference being made particularly to Figs. 4 and 10 of the drawings.

To the cross-bar, 35, and between the plates, 36, thereon I secure a spring stripper or separator bar, 41. This bar extends rearwardly from the bottom side of the cross-bar, then turns downwardly at, 42, and finally projects forwardly at, 43, over the lower group of blanks so that said forwardly-projecting portion will have a spring action. The extreme end, 44, curves downwardly and projects slightly over the upper edge of the lowermost blank, 40, so that said latter blank when withdrawn will scrape past the end, 44, of the stripper bar and if by any chance, during this action the second lowermost blank should adhere or cling to the lowermost one the scraping action of the end, 44, will separate said blanks and release only the lower one.

It has been described that the lower group of blanks, 39, have an inclined position directly over the table and the conveyer chain thereon and it is obvious that it only remains to withdraw the blanks and carry them from the inclined to a horizontal position to feed them to the traveling chain. The mechanism for effecting this operation will now be described.

By reference to Figs. 2 and 3 it will be seen that the table or bed, 1, is provided with a short longitudinal slot, 45, and that a horizontal bracket, 46, is secured to the bottom side of the table and is provided at one end with a circular head, 47, which projects upwardly through said table slot. This head is provided with a central bore or perforation, 48, and a conical end, 49, and an air passage, 50, extends longitudinally therethrough and has one end opening at the conical end while the opposite end thereof is in communication with a pipe, 51, that leads to a suitable air exhaust apparatus, which it is deemed unnecessary to illustrate. The conical end of this head is also provided with a radially-disposed cavity, 52, which extends from the outer edge inwardly and which has position to one side of the air passage, 50. A circular head, 53, is also provided at one side of the head, 47, and said head is provided with a bore or perforation, 48^a, and a conical end, 54, which is the counterpart of the conical end, 49, of the head, 47, so as to co-act with the latter and form a tight joint when the two ends are brought together, as shown in Fig. 9. This head, 53, is also provided with an air passage, 55, that extends longitudinally from the conical end and said passage opens into or communicates with a down-pressure, 56, in an arm, 57, that is carried by and depends from said head, as clearly seen in Figs. 5 and 8. When the two heads, 47, and, 53, are fitted together the bores or perforations, 48, and, 48^a, are brought into register and a pin or stem, 58, serves to draw them together sufficiently to effect an air-tight joint and at the same time permit a rotating motion of one head with respect to the other so as to establish an intermittent communication between the air passages, 50, and, 55, when the heads are in one position and an alternate registration between the passage, 55, of one head and the cavity, 52, of the other head, for a purpose presently to be described.

The lower end of the depending arm, 57, has a lateral branch, 59, which extends horizontally and parallel with the conveyer chain, and said branch in turn carries a right angle extension, 60, that projects from one side cross-wise of the conveyer chain to the opposite side thereof where it is provided with a socketed head, 61. The air-passage, 56, extends down through the arm, 57, then through the branches, 59, and, 60, and opens at the socketed head, 61, as clearly shown in Fig. 4. When in the normal inoperative condition the arm, 57, is vertical and the branches, 59 and, 60, have a horizontal position. A stem, 62, is carried by the socketed head, 61, and is held therein by a set-screw, 63, and said stem extends vertically from said head and is provided with an air-passage, 64, that communicates with the passage, 56, in the branch, 60. The upper end of the stem is provided with a circular flange, 65, and a vertical central socket, 66, while an elastic suction cup, 67, is seated on said flange and is held thereon by means of a screw, 68, that is provided with a central air-passage, 69. This latter air passage has its upper end opening into the elastic cup while its lower end registers and is in communication with the vertical air passage, 64, of the stem.

From the foregoing explanation it will be seen that communicating air passages extend from the passage, 55, in the head, 53, to the suction cup, 67, and that when the relative positions of the heads, 47, and, 53, are such as to bring the passages, 50, and, 55, together, that at such time the exhaust apparatus with which pipe, 51, is connected will cause a suction at the cup. By reference to Figs. 2 and 4 it will be seen that when in its normal position, the cup, 67, lies flush with the upper surface of the table, 1, and that a slot, 70, is provided in said table through which said cup may swing upward, as shown in broken lines in Fig. 3 as will now be described. It should be understood that the elastic cup, 67, is pivotally sustained from the head, 53, and that the turning of the head and the swinging of the cup are effected simultaneously in that those elements have a rigid relative position. While the swinging of the cup may be effected in various ways I have found it satisfactory to provide a stem, 71, at the side of the arm, 57, and to connect said stem with a rock-shaft, 72, through a rock-arm, 73, and a link, 74, as shown in Figs. 1 and 3. This rock-shaft, 72, extends horizontally beneath the table or bed and is mounted in suitable bearings, 75. An arm, 76, is carried on said shaft and at its outer end is pivotally connected to the upper end of a bifurcated link coupling, 77.

A cam, 78, is mounted on the driving shaft, 13, see Fig. 1, and is provided with a groove indicated at, 79, by broken lines. A roller, 80, is mounted at the side of a pivoted lever, 81, so as to project and travel in the cam groove. This lever in the present instance, has one end pivoted to the frame of a can-body or other forming machine, 3, and projects laterally therefrom and during each revolution of the can the outer end of the lever is positively pulled down and then raised again. A bifurcated coupling, 82, is pivotally connected to the outer end of the lever, 81, and a link bar, 83, connects said coupling with the link coupling, 77. It will therefore be seen that as the lever, 81, is moved down and up by the cam that the arm, 76, will be given a like movement; that such movement will impart a rocking motion to the horizontal rock-shaft, 72, and that the rocking of the shaft will cause the elastic cup, 67, to be swung up through the slot, 70, in the table until it contacts with the sheet or blank, 40, in the lower group of blanks. At the time the cup contacts with the blank, as described, the head, 53, has been rotated so as to bring the air passage, 55, into register with the passage, 50, of head, 47, and as soon as this communication has been established a suction will be caused in the cup so as to effect a strong pull on the bottom side of the blank, 40. The cup is then swung back while the suction is maintained and draws the blank from behind the lugs, 27, and hooks, 33, and lays it flat on the upper surface of the table, as indicated by a horizontal broken line, 84, in Fig. 4. The blank is therefore carried by the elastic suction cup from an inclined to a horizontal position and laid over the traveling chain, 14, and in front of the upward-projecting fingers, 15, thereof. During the return swing of the cup the head, 53, is rotated toward its normal position and in making this movement the air passages, 50, and, 55, are first separated but the blank is retained by the cup until the head, 53, has substantially reached its normal position, at which time the air passage, 55, will be brought into registry with the radial cavity, 52, and admit atmosphere through said cavity into the passage, 55. The admission of air into this passage will immediately effect a release of the blank from the suction cup and the fingers, 15, on the chain, 14, then engage the blank and carry it in a flat condition along the table toward the forming machine.

In order that the forward end of the blank may be held down during its travel over the table I have provided edge-engaging bars, 85, which have upwardly-curved free ends, 86, beneath which the edges of the blank pass.

By reference to Fig. 2, of the drawing it will be noted that the extension, 16, of the table is provided with a series of perforations, 87, and that the horizontal cross-bar is likewise provided with perforations, 88. These two sets of perforations are provided for the purpose of permitting the guide-frames and supporting bars to be adjusted for the reception of blanks of various sizes.

It is important that it be clearly understood that the invention contemplates the feeding of blanks either in a lengthwise or a crosswise position.

It is obvious that the feeding mechanism herein described will be timed in its operation to suit the mechanism that receives the blanks and forms them into the desired shape.

Having thus described my invention what I claim and desire to secure by Letters Patent is,—

1. The combination with a bed, of a conveyer, a blank-support overhanging the conveyer, a stationary head adjacent the bed and at one side of the conveyer and having a passage therein, a movable head coacting with the stationary head at said side of the conveyer and also having a passage to communicate with the passage of the stationary head, tubular supports carried by the movable head and communicating with the passage of the latter and extending to the other

side of the conveyer, a cup sustained by said support at said other side of the conveyer, means for swinging the tubular supports and cup upward to move the cup over the conveyer and toward the blank, and an exhaust connection with the heads and said passages.

2. The combination with a bed, of a conveyer movable longitudinally along the bed; a blank support overhanging the conveyer and having its lowermost end at one side of the said conveyer whereby to sustain the blanks in an inclined position over the conveyer; a tubular support pivoted at one side of the conveyer and extending below and up at the opposite side of the conveyer; a suction cup carried by the support at the latter side of the conveyer, and means for swinging the tubular support from its pivot at one side of the conveyer to move the cup over the latter and against the overhanging blank.

3. The combination with a bed, of an inclined blank support at one side of the bed and having a cross-bar that overhangs the bed; a plurality of yielding members carried by said cross-bar for engaging the upper edges of the blanks; a conveyer on the bed below the overhanging cross bar; a tubular support pivoted in a horizontal plane adjacent the lower edges of the blanks,—said support extending crosswise of the conveyer with its free end extending up at the opposite side thereof; a suction cup carried by the free end of the tubular support; means for exhausting air from the cup through the tubular support, and means for moving the support to carry the cup upwardly to engage the blanks.

4. The combination with a bed, of a conveyer movable longitudinally over the bed; a stationary head adjacent the bed and at one longitudinal side of the conveyer and having an air-exhaust passage therein; a movable head carried by the stationary head and also having an air passage that communicates with the passage in the stationary head; a tubular support carried by the movable head and extending below the conveyer and having its free end projecting upwardly at the opposite side of the conveyer; a suction cup carried by the free end of the tubular support; means for swinging the tubular support upwardly and in a direction crosswise of the conveyer, and a blank support overhanging the conveyer.

5. The combination with a bed, of a conveyer movable over the bed; a blank support having spaced-apart inclined bars with upturned hooks at their lower ends to engage the lower edges of the blanks; a bar extending horizontally over the bed and carrying a plurality of yielding members to engage the upper edges of the blanks; a tubular support below the conveyer; a suction cup carried by the said support and means for moving the support to swing the cup upwardly in a direction crosswise of the conveyer to engage the blanks.

6. The combination with a bed, of a conveyer, an inclined blank support pivoted at its higher end and having its lower end at one side of the conveyer, pivoted guide frames at opposite sides of the inclined blank-supports, a suction cup at the opposite side of the conveyer from the inclined supports, and means for swinging the suction cup across the plane of the bed toward the blank support.

7. The combination with a bed, of a conveyer, blank support at one side of the conveyer, two heads sustained by the bed and coacting with each other and said heads having coacting passages, a tubular support carried by one head, a suction cup sustained by said tubular support, a rock shaft beneath the bed and means operating between the rock-shaft and the tubular support for swinging the suction cup.

In testimony whereof I affix my signature in presence of two witnesses.

JESSE E. ABRAMS.

Witnesses:
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CHARLES B. MANN, JR.