

Feb. 5, 1946.

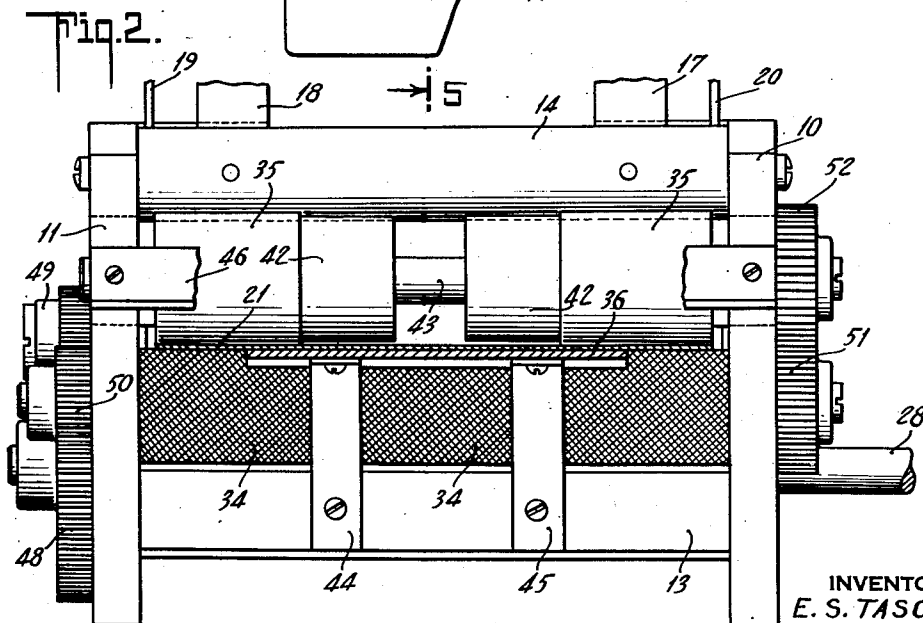
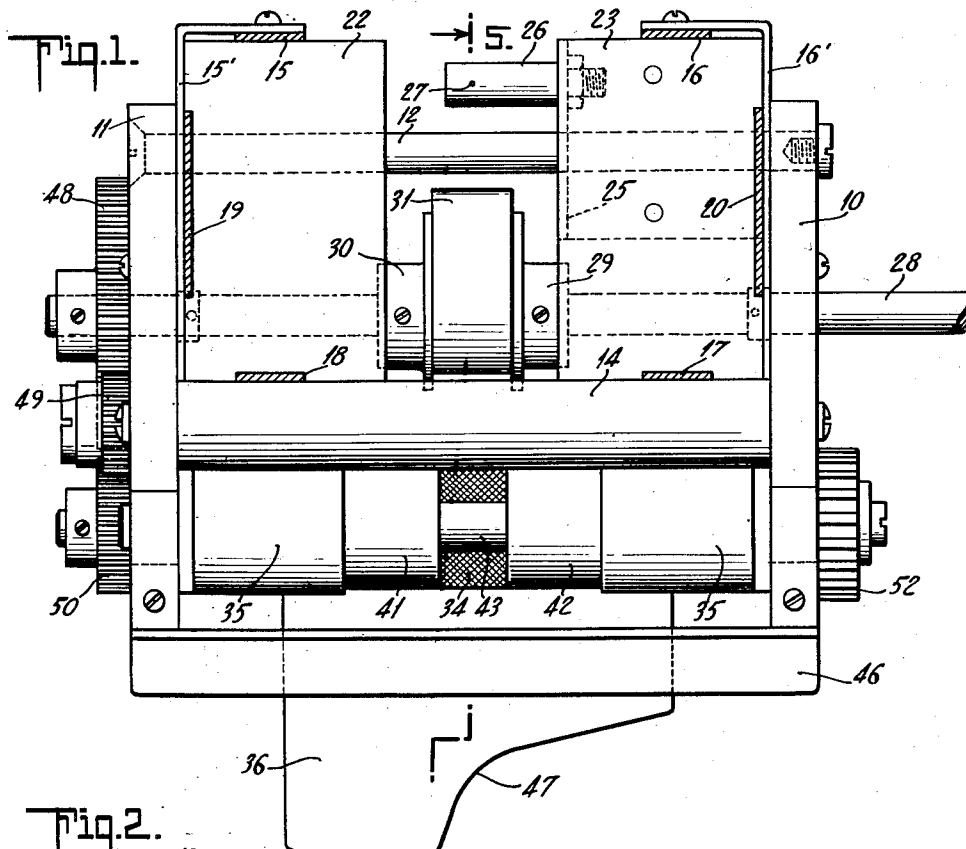
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2,394,410

INSERT FEEDER

Filed March 16, 1944.

4 Sheets-Sheet 1



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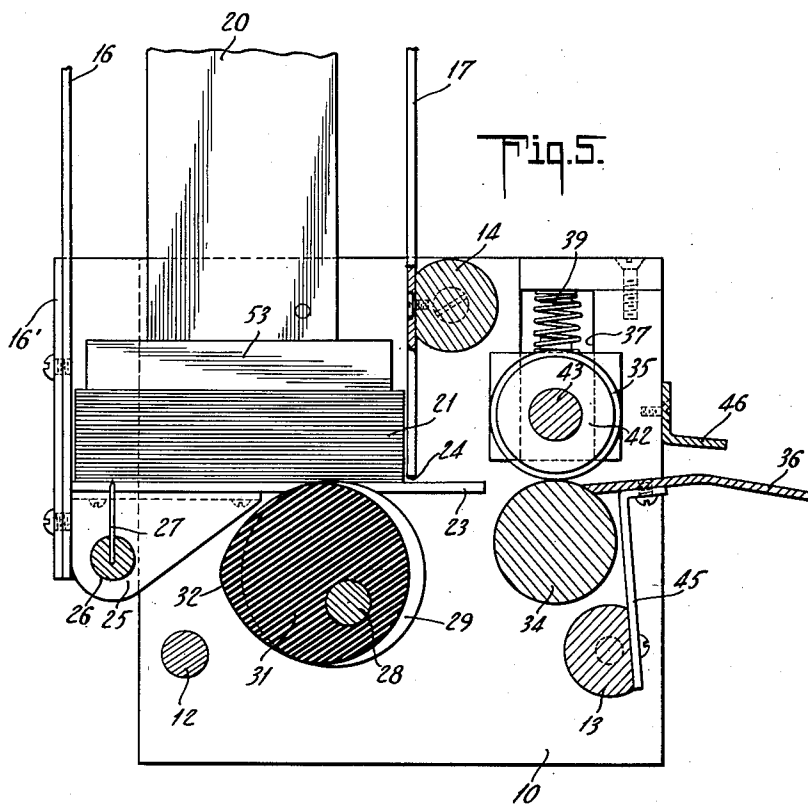
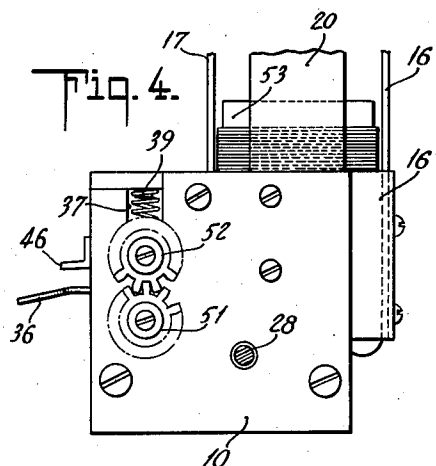
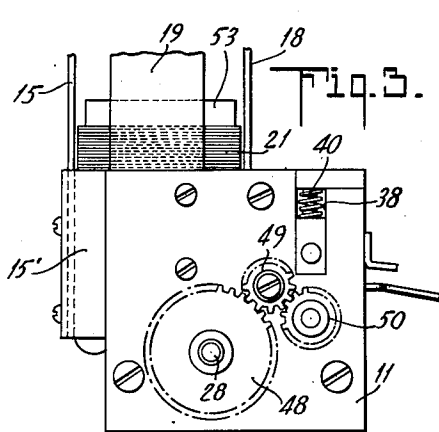
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INSERT FEEDER

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4 Sheets-Sheet 2



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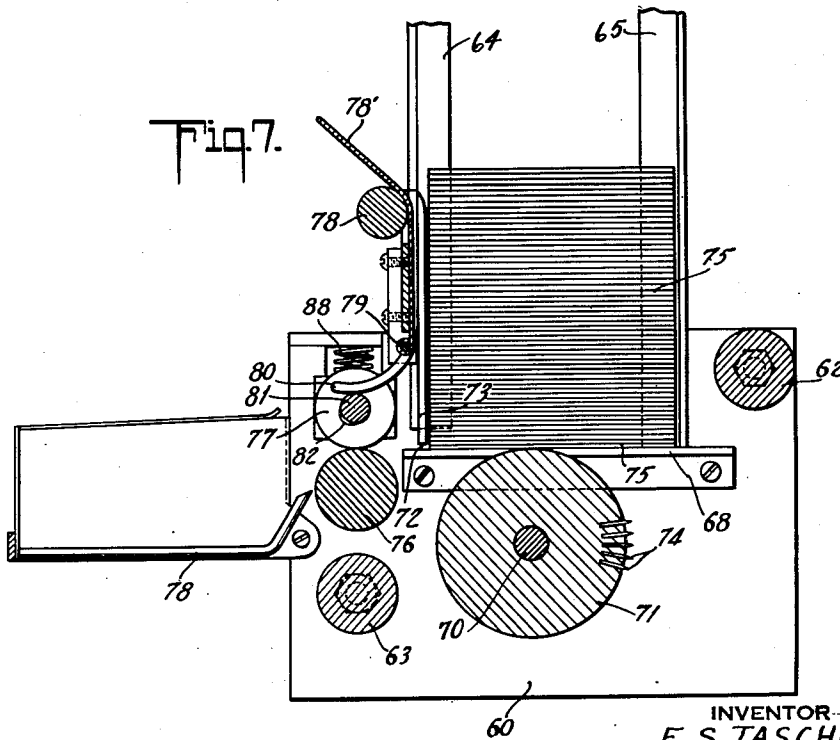
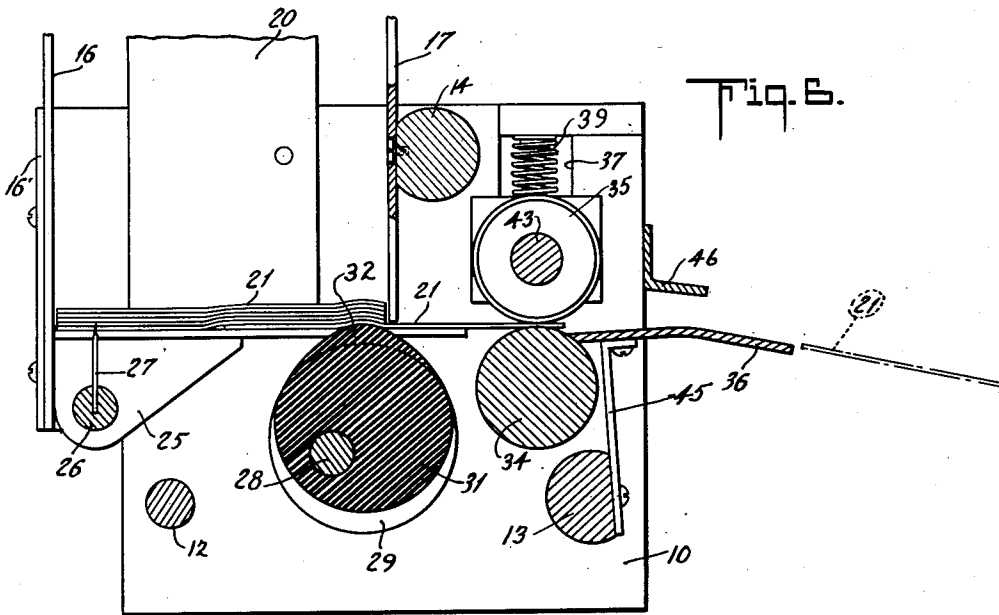
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INSERT FEEDER

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4 Sheets-Sheet 3



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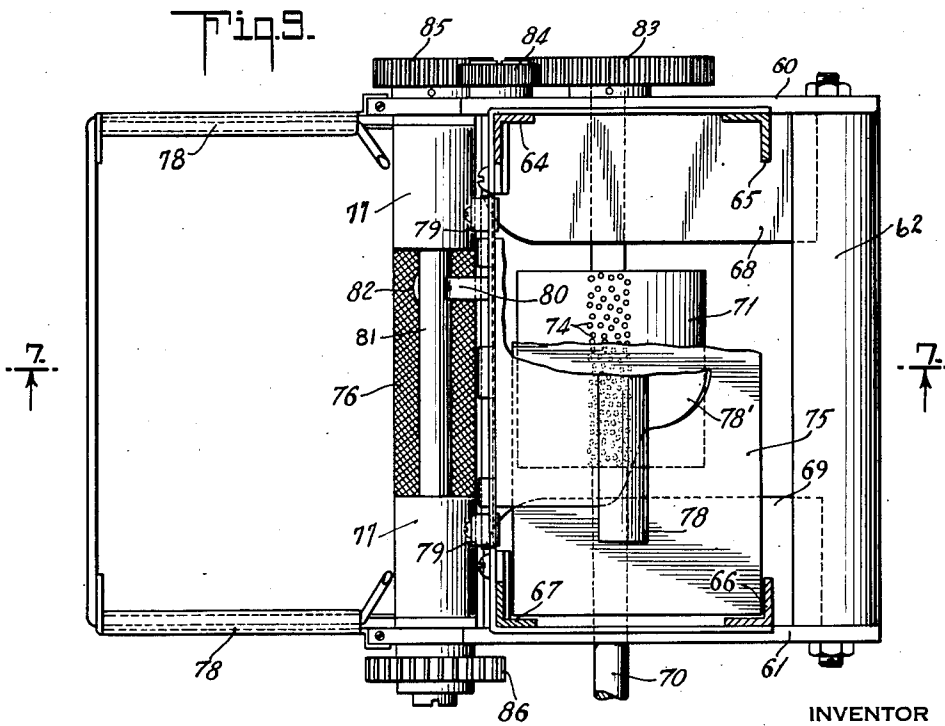
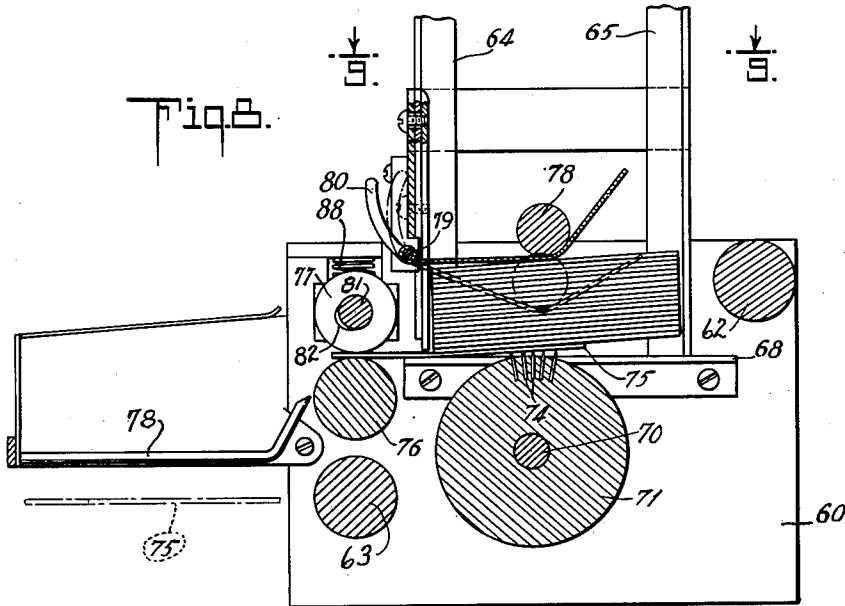
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INSERT FEEDER

Filed March 16, 1944

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,394,410

INSERT FEEDER

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Application March 16, 1944, Serial No. 526,807

4 Claims. (Cl. 271—41)

My invention pertains to insert feeders and has for its principal object to provide a device which will feed inserts into cartons, bags and other types of packages with certainty and at high speed.

Many kinds of merchandise are packed in boxes or cartons in layers or tiers with paper or cardboard inserts or separators between the layers. In other packages, a printed slip is inserted containing information useful to the purchaser as to the proper use of the product, its ingredients, the operator's identification number, an advertisement of other products made by the same manufacturer, or other data.

Heretofore, these inserts, whether of cardboard or paper, have been inserted usually by hand, because apparatus designed for that purpose has not been entirely reliable.

My invention does away with hand labor in placing inserts in the packages and provides an apparatus for that purpose that is reliable in operation and can be timed to operate in conjunction with automatic package filling machines.

In the accompanying drawings, I have illustrated two adaptations of my invention, one for feeding relatively thin paper slips, and the other for feeding heavier inserts, such as cardboard separators.

Fig. 1 is a top plan view of a paper insert feeding device.

Fig. 2 is a front elevation of Fig. 1 with parts broken away.

Fig. 3 is an elevation, looking toward the left side of Fig. 1.

Fig. 4 is an elevation, looking toward the right side of Fig. 1.

Fig. 5 is a section taken substantially on the line 5—5 of Fig. 1.

Fig. 6 is a section similar to Fig. 5, but with an insert being fed from the bottom of the stack to the delivery rolls.

Fig. 7 is a section, taken substantially on the line 7—7 of Fig. 9, showing a device for feeding cardboard inserts or separators.

Fig. 8 is a section similar to Fig. 7, but with the bottom insert being fed from the stack to the feed rolls.

Fig. 9 is a plan view, as indicated by the line 9—9 on Fig. 8.

Referring first to Figs. 1 to 6, my insert feeder has a frame made from side plates 10, 11 connected by spacers 12, 13, 14 to form a rigid structure.

The frame supports a magazine formed from four vertical side bars 15, 16, 17, 18, and two end bars 19, 20 adapted to hold a stack of inserts 21.

The bars 15, 16 are secured to brackets 15', 16' that are secured to the side plates 11 and 10, respectively, and the bars 17, 18 are secured to the spacer 14. The bars 19, 20 are secured to the side plates 11 and 10. The bottom of the magazine or holder is formed from two plates 22, 23 which are spaced apart at the center to leave an opening that is spanned by the bottom insert.

The front bars 17, 18 terminate just above the bottom plates 22, 23 so as to leave a narrow slot or passage 24 through which the bottom insert may be pushed out. The bars 17, 18 are adjustably supported on the spacer 14 so that the width of the slot 24 may be adjusted for different thicknesses of inserts.

A bracket 25 secured adjacent the rear of the magazine supports a bar 26 having a pin or needle 27 that extends upward through the opening between the plates 22, 23 so that its sharp point will penetrate the lowest insert in the stack and engage in the next lowest insert, as best shown in Figs. 5 and 6.

A shaft 28 is supported in bearings in the plates 10, 11 below the insert magazine and has a pair of eccentric discs 29, 30 secured thereon so as to securely clamp an eccentric or cam shaped rubber pusher 31. This pusher is below the opening between the plates 22, 23 and its crest 32 is high enough so that upon each rotation of the shaft 28 it will reach up through the opening and engage the lowest insert in the stack with sufficient frictional engagement to push it out through the slot 24. The pin 27 has a sharp point which extends through the lowest insert close to its rear edge and as the insert is being pushed forward through the opening by the pusher this point cuts through the lowest insert as it is pulled out and holds the next insert above it from following with the lowest one. This assures only one insert being pushed out at a time.

When the insert is pushed through the slot 24 it enters between a pair of feed rollers 34, 35 which pull the insert from the bottom of the stack and deliver it to a chute 36 from which it drops into the package.

The rollers 34 and 35 are journaled in bearings in the plates 10 and 11, the bearings for the roller 35 being slidable in slots 37, 38 in the side plates 10, 11 and held yieldably against the roller 34 by springs 39, 40. The yieldable mounting of the roller 35 permits the two rollers to securely grip inserts of varying thicknesses without manual adjustment.

The roller 34 preferably is cylindrical throughout its length and may be knurled or provided

with a rubber or other friction surface for gripping the inserts. The roller 35 preferably is reduced in diameter at its central portion, as shown at 41, 42, 43, Fig. 1, so that it grips the inserts only adjacent their edges. This prevents creasing or buckling of the inserts.

The delivery chute 36 is supported on a pair of brackets 44, 45 secured to the spacer 13. A short angular plate 46 is secured to the side plates 10 and 11, slightly above the chute 36 so as to afford a passageway through which the inserts are discharged.

In general, the delivery chute 36 will be rectangular in outline but in certain cases, as where the package to receive the insert is narrower than the width of the insert, the chute may be cut away on one side, as shown at 47, Fig. 1, so that the insert will turn as it is discharged and enter the carton or other package edge downward.

The shaft 28 is the drive shaft to which power is applied and at one end it has a gear 48 which meshes with an idler 49 that in turn meshes with a gear 50 on the shaft of the roller 34. On the other end of the shaft of the roller 34 there is a gear 51 which drives a gear 52 secured to the shaft of the roller 35.

In the operation of the device as thus described, the magazine is filled with inserts 21 upon which a weight 53 may be placed to hold them down. The pressure of the inserts and the weight 53 is sufficient to cause the needle 27 to penetrate the bottom insert and engage the insert next above it. Power is then applied to the shaft 28 and upon each rotation of the pusher 31 an insert is engaged and pushed forward through the opening 24 to the feed rolls 34, 35 which pull it out and deliver it to the chute 36 from which it drops into the carton or other package. The feeding of such an insert 21 is illustrated in Fig. 6.

The insert feeder just described is adapted particularly for feeding thin paper inserts. In Figs. 7 to 9 I illustrate my invention embodied in a feeder that is designed particularly to feed heavier inserts, such as cardboard, that may be used to form partitions between rows or tiers of articles in the package.

Referring now to Figs. 7 to 9, the feeder has a frame made from side plates 60, 61 secured rigidly together by spacers 62, 63. A magazine composed of vertical angle bars 64, 65, 66, 67 is secured to the frame and its bottom is formed from two plates 68, 69 which are spaced apart so as to leave a central opening. A shaft 70 is journaled in the side plates below the magazine and has a cylinder 71 secured to it, the diameter of the cylinder being such that its upper surface is level with the tops of the bottom plates 68, 69 and lies between the plates so that the central part of the inserts rests upon this cylinder. This holds the inserts from sagging at the center and keeps their front edges accurately in alignment with the discharge slot 72 which is provided at the front side of the magazine by an adjustable plate 73. The bottom ends of the uprights 64, 67 are cut away, as best shown in Fig. 7, so that they do not interfere with the passage of the inserts through the slot 72.

At one point on its perimeter the cylinder 71 is provided with rows of pins 74 having sharp points which at each rotation of the shaft will engage the bottom insert 75 and push it through the slot 72, Fig. 8. The plate 73 is adjusted so that the width of the slot 72 is sufficient to permit the passage of one insert but not wide enough to permit the passage of two inserts. The insert

as it passes through the slot 72 is engaged by a pair of feed rolls 76, 77 which pull it out from the bottom of the stack and deliver it to a receiver 78 from which it is pushed down by a plunger into a carton below it which is being filled with the product to be packaged.

The plunger for pushing the insert down into the carton is not shown because it is not part of the present invention but a pusher such as is shown in the co-pending application of Tascher and Broderick Ser. No. 490,924 may be used.

Fig. 8 illustrates how the bottom insert is engaged by the pins 74 and pushed from the bottom of the stack.

When the magazine is kept full of inserts, their weight will be sufficient to hold them down firmly against the cylinder 71 so that the teeth 74 will bite into the inserts sufficiently to push the bottom one out. In case the operator is neglectful and fails to keep the hopper full or when the supply of inserts runs low, I provide automatic means for keeping sufficient pressure on the inserts to assure proper feeding. This means comprises a weight 78 secured to a plate 78' that is pivoted at 79 to the uprights 64, 67. Normally this weight stands vertical as shown in Fig. 7 and its center of gravity falls outside of the pivot point 79 so that it does not bear against the inserts. However, the plate 78' to which it is secured has an arm 80 that extends forwardly and normally bears on the shaft 81 of the roller 77. On this shaft there is a small cam 82 which once during each rotation raises the arm 80 and tips the weight 78 backward so that its center of gravity falls on the inside of the point of support. Then, if the supply of inserts has dropped below the weight, it will fall in on top of the inserts as shown in Figs. 8 and 9 and press them down against the cylinder 71 so that the pusher 74 will make proper engagement with the bottom insert.

The shaft 70 is the driving shaft and at one end it has a gear 83 meshing with an idler 84 which in turn meshes with a gear 85 on the shaft of the roller 76. The roller 76 may be knurled or provided with any other surface suitable for gripping the inserts. At its opposite end the roller 76 has a gear, not shown, which meshes with a gear 86 on the shaft of the roller 77 to drive it. The roller 77 is mounted in slidable bearings which are pressed down by springs 88 similar to the yieldable mountings of the top roller 35 in Figs. 1 to 6.

The cardboard inserts 75 must be fed from the stack in exact parallel relationship, i. e. each insert must remain parallel to the position that it occupies in the stack and not be twisted or biased as it is fed to the holder 78 or to the box that ultimately receives it. These inserts are made from cheap news-board, and individual inserts may vary three or four thousandths of an inch in thickness at different points. This makes it difficult to feed them in exact parallel relationship and prevent their yawing while being fed by the rollers 76, 77. In order to overcome this tendency of the inserts to yaw, I cut away the central part of roller 77 so that the two rollers grip the inserts only adjacent their ends and they are not twisted relative to their original position in the stack.

When my invention is used for supplying inserts to shredded wheat cartons as in the co-pending application of myself and Broderick referred to above, it is necessary that they be fed in exact timed relation and the speed of the

shaft 70 must be synchronized with the packaging machine so that it will make one revolution and feed one insert for each layer of biscuit placed in the boxes. The time interval is very short, hence there can be no slippage between the pusher teeth 74 and the insert, as would be the case if there were only frictional engagement between the two. The teeth 74 bite into the lowest insert on each revolution of shaft 70 so that there is no slippage, and the insert is fed to the rollers 76, 77 in exact timed relation. This exact timing is not required in cases where paper inserts are supplied to cartons without definite relation to the carton filling means. In such cases, a frictional feed of the inserts is sufficiently accurate. The ratio of the gears 83, 85 and the surface speed of the rolls 76, 77 are such that one insert is entirely through the rolls by the time the cylinder 71 has completed one revolution and the teeth 74 are about to bite into the next insert. Thus two inserts are not being fed at any one instant and they cannot overlap.

While I have shown rotatable pushers in both modifications of my invention for pushing the bottom insert between the feed rolls, the invention is not limited to rotatable means but includes any equivalent means, as, for example, an oscillating device which will push out the bottom insert. I have also illustrated my invention as a self-contained unit with its own frame, but the frame may, of course, be part of a composite machine, such as a filling and packaging machine with which the invention is best adapted for use.

In Figs. 7 to 9 the pusher pins 74 may be replaced by a rubber pusher in some cases, but I find the pin pusher to be more certain in operation when the inserts 75 are made from cardboard or other relatively heavy material.

In the feeder shown in Figs. 1 to 6 the insert will usually drop from the chute 36 into the container, while in Figs. 7 to 9 the insert, if it is relatively stiff cardboard, will be caught by the receiver 78 and then will be pushed down into the container.

My invention is capable of many modifications and adaptations and I claim all such that come within the terms or scope of my claims.

What I claim is:

1. In an insert feed, the combination of a magazine for holding a stack of inserts, means for removing the inserts one at a time from the bottom of the stack, a weight pivoted on the magazine above the bottom thereof and to one side of the area occupied by the stack of inserts, said weight normally being out of and to one side of the magazine and held in that position by the stack of inserts, and means for tilting said weight so that it will enter the magazine and rest on the top insert when the top of the stack of inserts falls to a height approximating the pivotal support of the weight.

2. In an insert feed, the combination of a frame, a magazine for a stack of inserts thereon having an opening in the bottom affording ac-

cess to the bottom insert and a discharge opening in the front side through which the bottom insert may be discharged, a cylindrical roller mounted to rotate below said magazine and extending into said bottom opening so that the bottom insert rests thereon, a set of pusher pins projecting from said roller at one point in its circumference and extending longitudinally thereof, said pins adapted on each rotation to bite into the bottom insert and positively feed it through said discharge opening, means for adjusting the width of said discharge opening so that only one insert may pass therethrough at a time, and a pair of feed rolls adjacent said discharge opening for receiving said bottom insert as it is pushed through said opening and withdraw it from the stack, one of said rolls being of reduced diameter intermediate its ends, whereby the feed rolls will grip the insert only adjacent its ends, the relative speeds of the feed rolls and cylindrical roller being such that the feed rolls will have completed delivery of one insert by the time the pusher pins engage the next insert.

3. In an insert feed, the combination of a frame, a magazine for a stack of inserts thereon having an opening in the bottom affording access to the bottom insert and a discharge opening in the front side through which the bottom insert may be discharged, a rotatable pusher below the magazine adapted on each rotation to engage the bottom insert through said bottom opening and push it through said discharge opening, a pair of feed rolls adjacent said discharge opening for receiving said bottom insert as it is pushed through said opening and withdraw it from the stack, a weight pivoted on said frame adjacent said magazine, the stack of inserts normally extending above the pivot point of the weight to hold said weight outside of the magazine, the pivot point of the weight normally lying between the weight and stack of inserts, an arm connected to said weight, a rotatable cam adapted on each rotation to engage said arm and tilt the weight toward the magazine so that it will lie on top of the inserts when the top insert falls below the normal position of the weight.

4. In an insert feed, the combination of a frame, a magazine for a stack of inserts thereon having an opening in the bottom affording access to the bottom insert and a discharge opening in the front side through which the bottom insert may be discharged, a pusher mounted to rotate below said magazine and extending into said bottom opening and adapted on each rotation to engage the bottom insert and push it through said discharge opening, a weight pivoted on said frame adjacent said magazine, the pivot point of the weight normally lying between the weight and magazine so that the weight lies outside the magazine, and means for tilting the weight so that it will fall into the magazine on top of the inserts when the stock of inserts falls below the weight.

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