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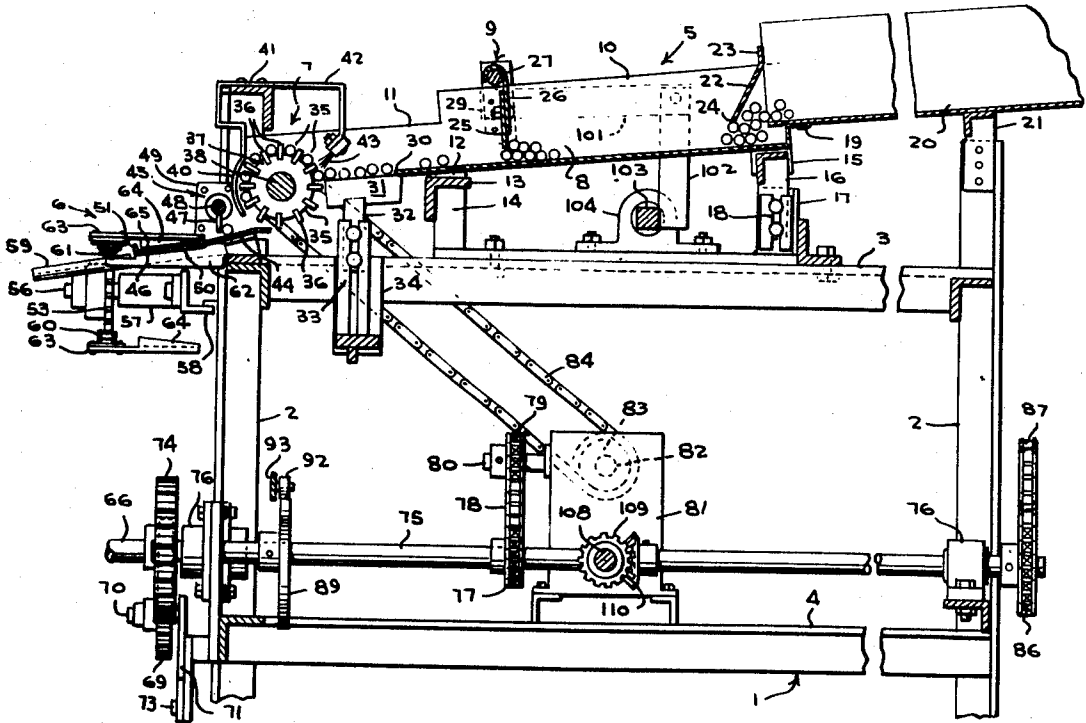
[54] **STICK ASSORTMENT GATHERING MACHINE**  
 12 Claims, 8 Drawing Figs.

[52] **U.S. Cl.**..... 198/26,  
 53/240, 221/93, 221/200, 221/225, 221/236

[51] **Int. Cl.**..... B65g 47/56;  
 B65h 3/44

[50] **Field of Search.**..... 221/93,  
 298; 214/6(M); 53/240; 198/26, 22(Cursory);  
 193/32, 40

**ABSTRACT:** A stick assortment-gathering machine wherein stick objects of different kinds are picked singly from a number of individual kind supply channels and fed, one of each kind, to a vaned accumulator traveling at right angles to the direction of single stick feed sequentially across the outlets from the several channels, whereby one stick from each channel is released to roll between each pair of vanes on the vaned accumulator as the vanes move across the channel outlets.



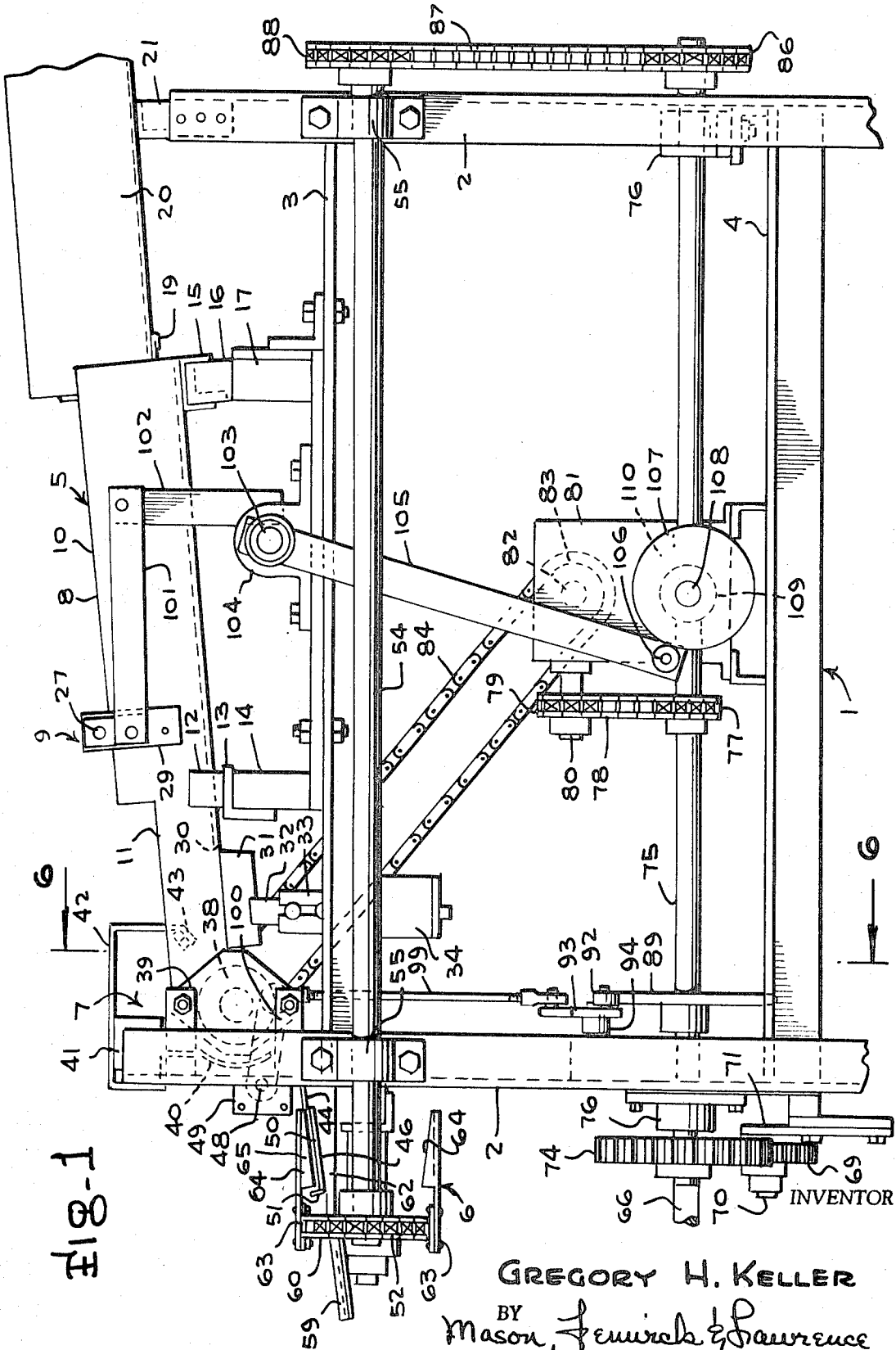
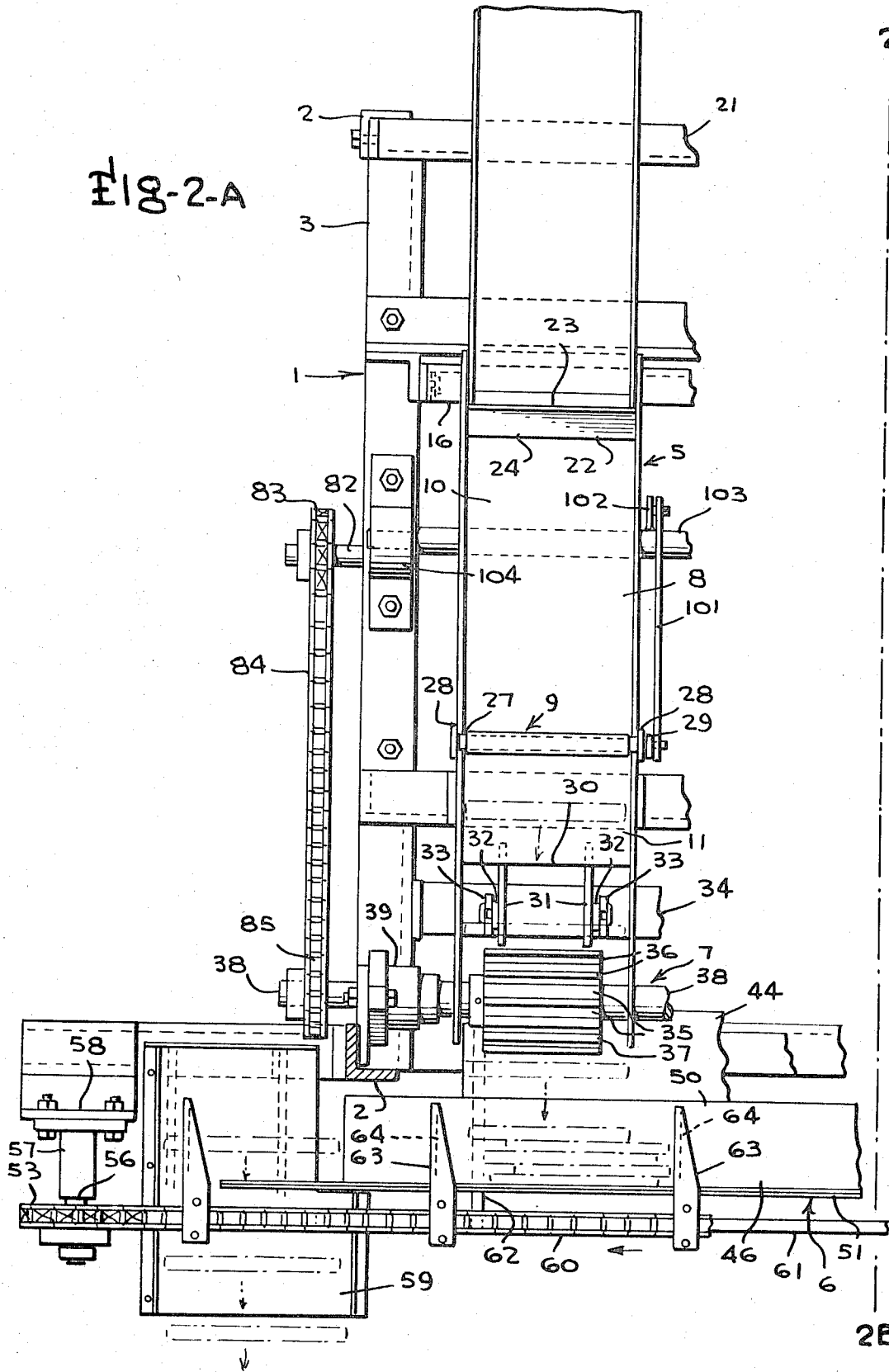


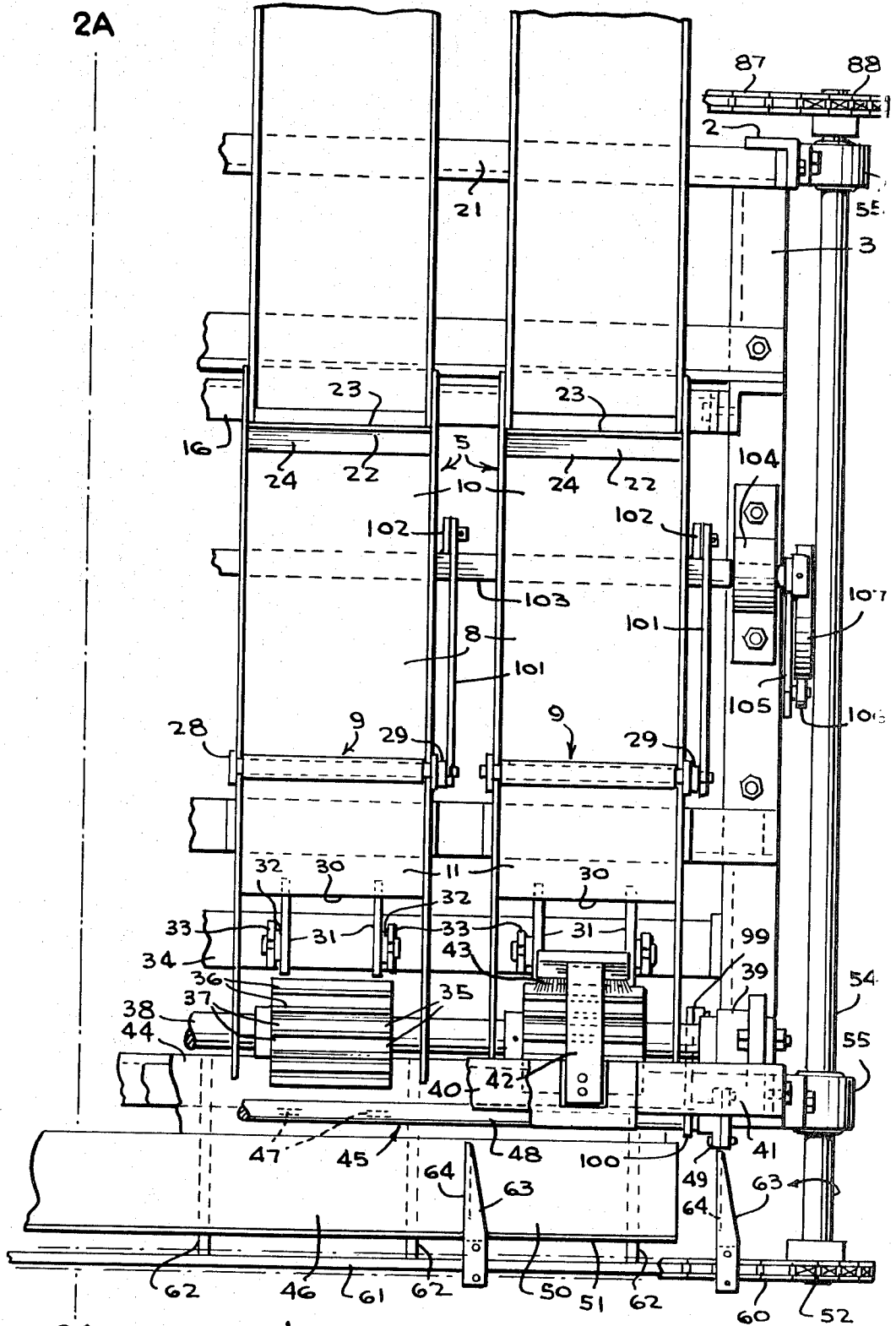
FIG-1

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FIG-2-A





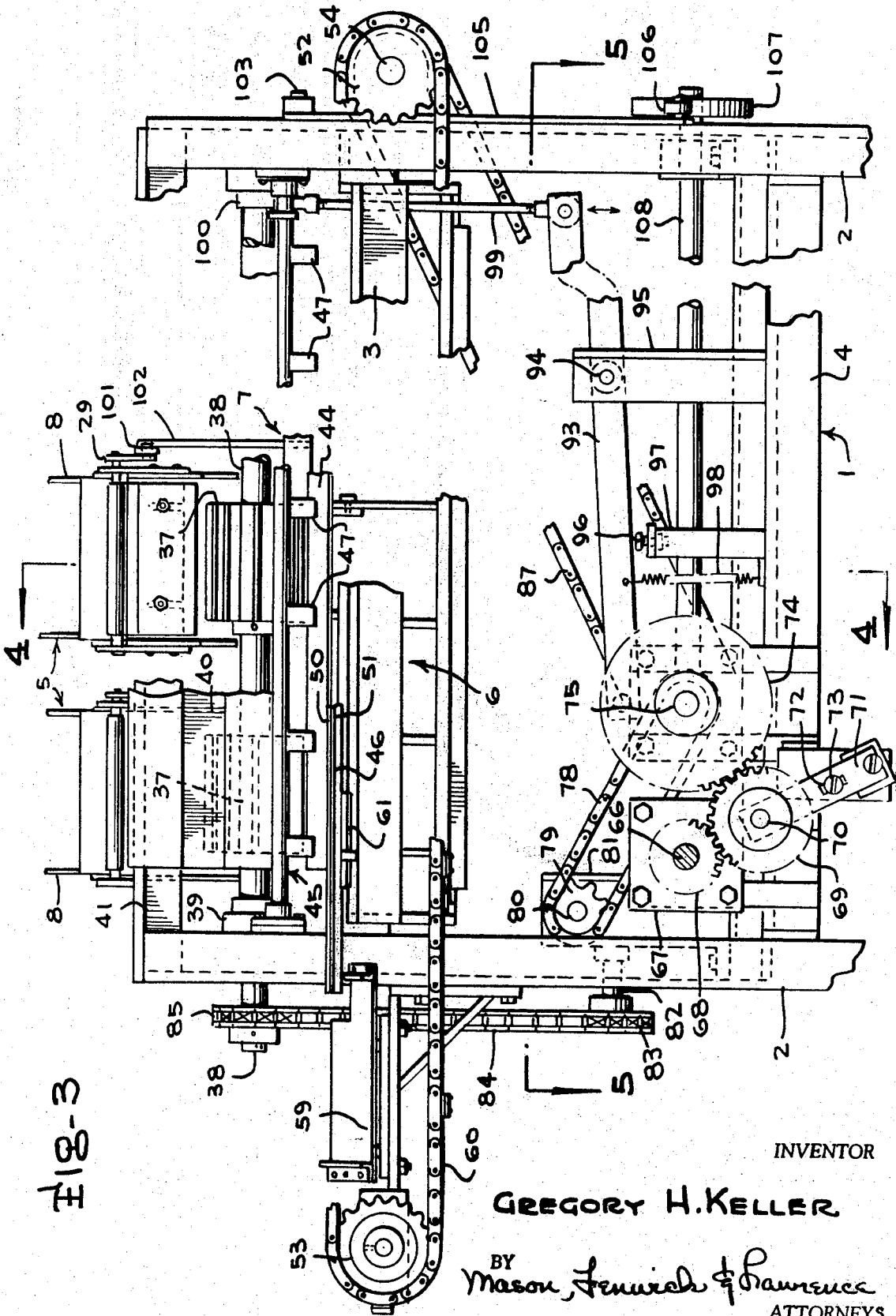


Fig-3

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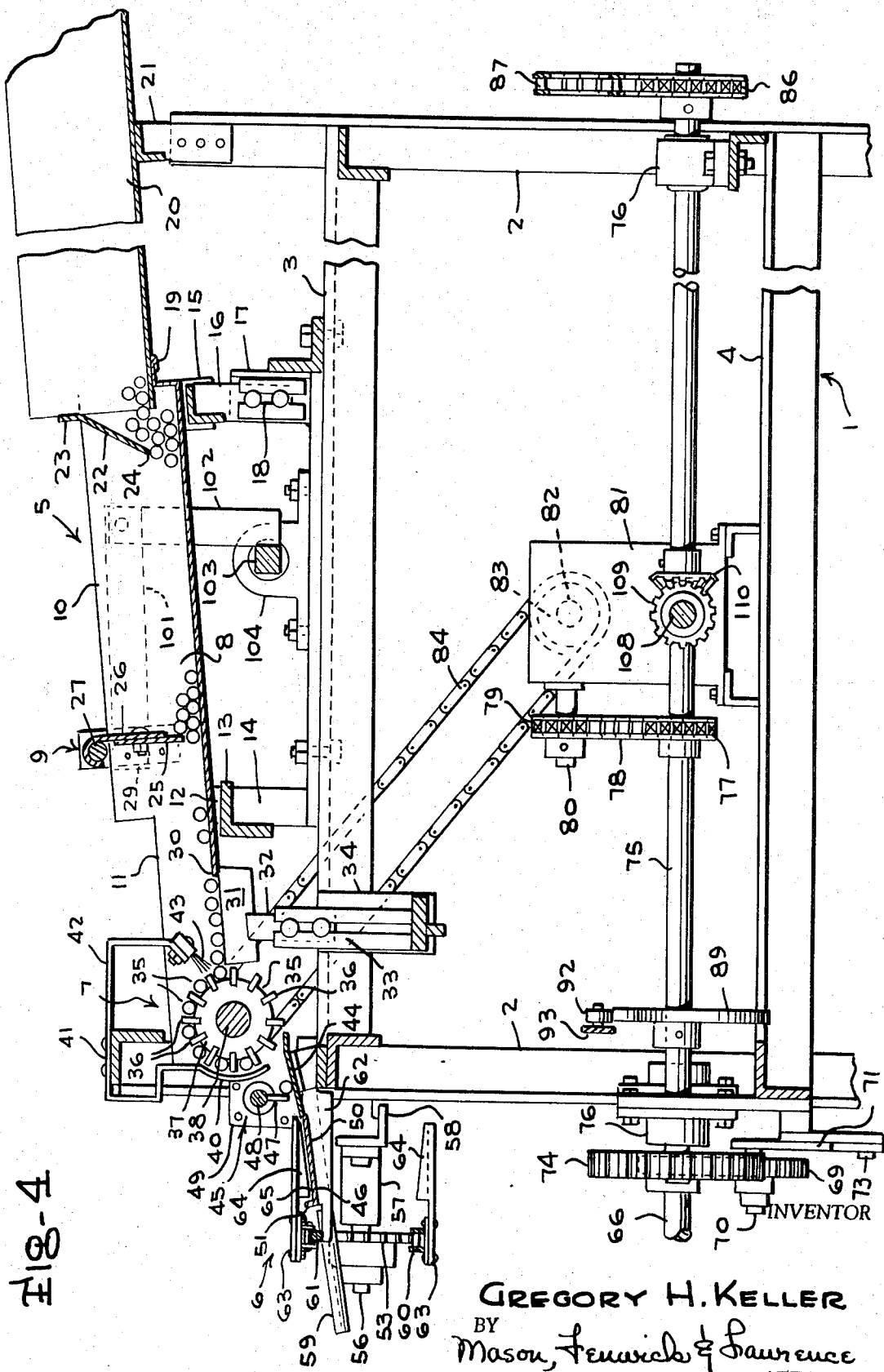


FIG-4

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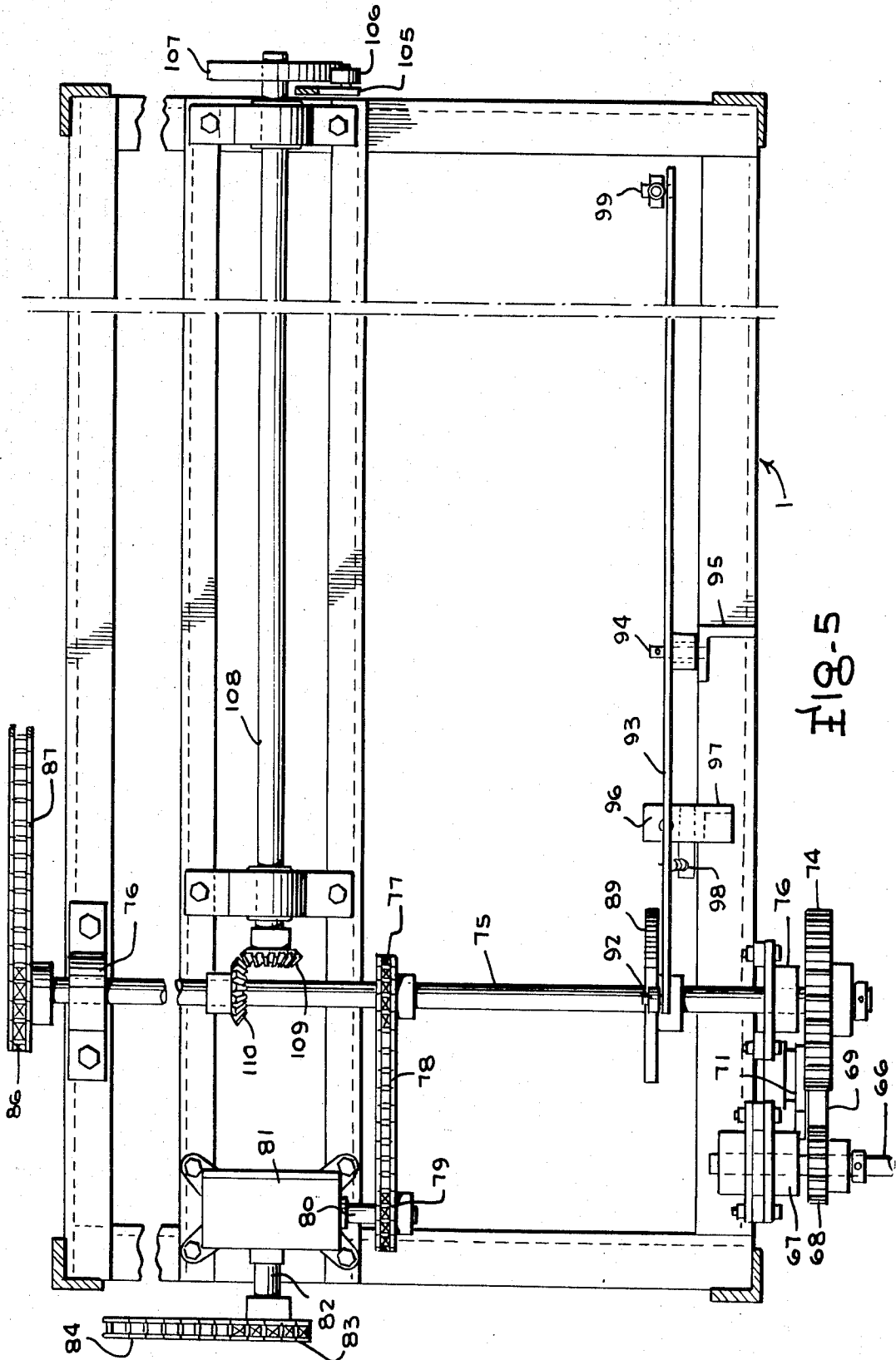


FIG. 7

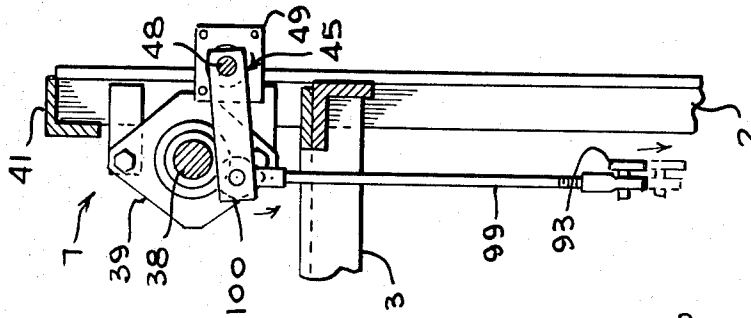
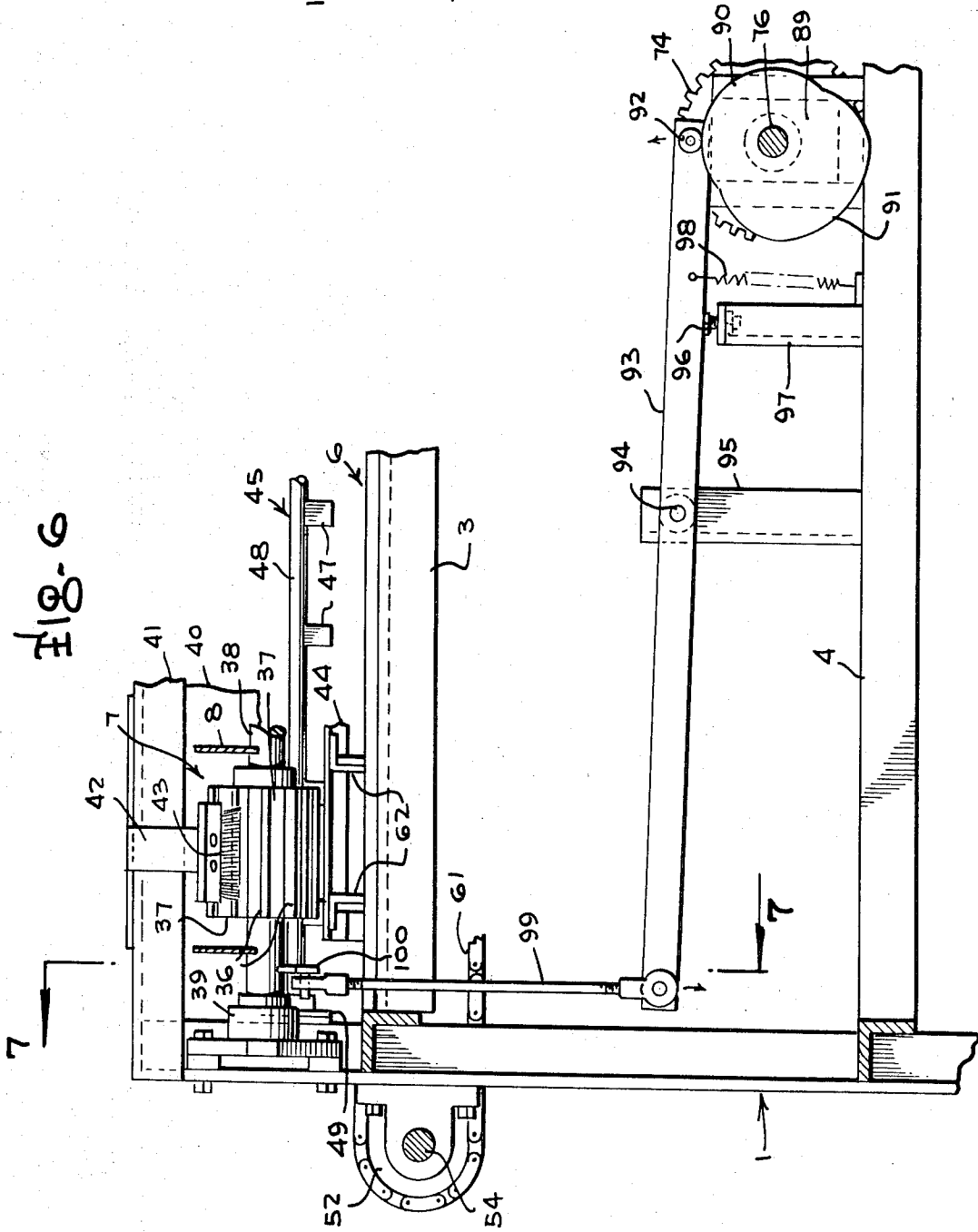


FIG. 6





## STICK ASSORTMENT GATHERING MACHINE

## BACKGROUND OF THE INVENTION

This invention relates to machines for gathering, or accumulating, objects of generally cylindrical, or stick, shape of different types, or kinds, in predetermined assortment, and more particularly to machines for accumulating uniform assortments of stick candy.

It has been customary to make hard stick candy different flavors, colors, or kinds, all of the same size and shape, and to sell the candy sticks in packaged assortments or predetermined numbers of pieces. Usually, one, or more, sticks of each kind have been included in the assortment, although small packages of lesser quantity are sometimes prepared.

The general practice has been to gather by hand the assortment desired and pack it in a jar or box or simply wrap it as a package. Manual handling is not desirable for the obvious reasons of sanitation and softening of the sticks, and experience has shown that manual collection of assortments results in highly inaccurate counts. Customer dissatisfaction is bound to result if a favorite flavor, or kind, is omitted from the assortment.

## SUMMARY OF THE INVENTION

It is the general object of the present invention to provide a machine which will accumulate candy sticks in accurate predetermined assortment.

A more specific object of the invention is to provide a machine of this character which will have magazines for different kinds of stick candies, and will feed sticks singly from each magazine to an accumulator traveling across the outlet ends of the magazines and then feed one stick from each magazine between each pair of vanes of the accumulator as the vane pairs move across the magazine outlets.

Another object of the invention is to provide an assortment collecting machine which is capable of operating to gather assortments of different numbers.

A further object of the invention is the provision of such a machine which can be driven from a package-wrapping machine, and which has means for changing its operating speed when different numbers of pieces are included in an assortment, so as to maintain the same assortment feed to the wrapping machine.

Other objects of the invention will become apparent from the following description of one practical embodiment thereof, when taken in conjunction with the drawings, which accompany, and form part of, this specification.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of a stick assortment-gathering machine embodying the principles of the present invention;

FIGS. 2A and 2B, together, show the machine in top plan view, the center portions of the machine being broken away; FIG. 3 is a front elevation of the machine with central portions broken away;

FIG. 4 is a vertical, longitudinal section through the machine taken on the line 4-4 of FIG. 3;

FIG. 5 is a horizontal section taken on the line 5-5 of FIG. 3;

FIG. 6 is a partial vertical, transverse section taken substantially on the line 6-6 of FIG. 1; and,

FIG. 7 is a fragmentary vertical section taken on the line 7-7 of FIG. 6.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Although it will be obvious from the following description of one practical embodiment of the invention that the principles of the machine disclosed can be employed for gathering assortments of stick-like articles of many types, such, for example, as crayons, colored pencils, etc., the machine shown and described is particularly adapted to the gathering of assortments of sticks of hard candy.

The machine can be mounted upon any suitable open frame. The frame 1 shown in the drawings consists of vertical corner legs 2, interconnected by a substantially rectangular top frame 3 and a lower frame 4. Other details of specific supporting elements of the frame will be described as the disclosure proceeds.

The frame 1 carries the operating mechanisms of the machine. These consist, essentially, of a plurality of combination stick candy magazines and feed channels 5, an assortment accumulator 6, and feed means 7, interposed between the feed channels to the accumulator, to feed candy sticks singly from the channels to the accumulator.

There will be as many stick magazines and feed channels arranged in side-by-side relation as the maximum number of different flavored sticks desired for the assortments. Each magazine feed channel is in the form of an open ended, U-shaped, trough-like member 8. The member is divided medially of its length, by means of a transversely positioned agitating and leveling member 9, into a magazine 10 and feed channel 11. The forward portions of the U-shaped members 8 are supported in seats 12, mounted in spaced relation along a transversely extending angle member 13 supported at its ends by uprights 14 mounted on the top frame 3 of the machine. At the rear of each magazine, there is an inverted, U-shaped clip 15 which fits over a transversely extending mounting bar 16. Bar 16 is supported at its ends by pedestals 17 mounted on the top frame 3. Vibrators 18 may be secured to the pedestals 17 to assist in assuring smooth and continuous flow of the stick candy, as will be described.

At the rear, each one of the magazines is provided with a rearwardly projecting step 19 to support the front end of a magazine loader 20 having its rear end supported on a cross-bar 21 affixed to upward projections of the rear corner posts 2. A baffle 22 extends across the magazine 10 adjacent its rear end. The upper end 23 of the baffle provides a stop to limit the forward movement of the magazine loader when in position on the magazine. The baffle extends forwardly and downwardly, and has its lower end 24 spaced from the bottom of the magazine to allow limited flow of candy sticks into the magazine and, thereby restrict the number of sticks which will be in the magazine at any one time.

The agitating and leveling member 9 consists of a leveler 25 mounted for vertical adjustment in a mounting plate 26. The plate carries a shaft 27 rotatably mounted in bearings 28, carried on the upper edges of the U-shaped member forming the feed channel 11. The shaft 27 will carry an actuating arm 29, fixed to the shaft outside the bearing for swinging movement at the side of the channel member. The actuating arm is given a rocking motion, by means to be described, to cause the leveler 25 to sweep rearwardly. This accomplishes several purposes. It pushes back candy sticks in excess of a single layer, it agitates the sticks for free feeding and prevents the feeding of more than one stick depth of the candy.

The forward portion of the magazine 10 has no bottom floor. The floor terminates along an edge 30, but the sidewalls continue forward. In place of the floor, spaced track members 31 are used, the track members extending longitudinally of the magazine from the floor edge 30 to the feed means 7. Each track member is supported upon a post 32 mounted for vertical adjustment in a holder 33 carried by a cross brace 34 connected to the top frame 3. The track members are arranged inwardly of the sidewalls, and spaced from the sidewalls of the magazine and from one another, with their tops just slightly below the bottom of the magazine floor. The distance from the floor to the tops of the tracks is just enough to insure the sticks having a rolling motion as they proceed toward the feed means. The tracks provide supporting means for whole sticks near their ends as they roll toward the feed means, but broken sticks and pieces will fall through the openings between the tracks and only whole sticks will advance to the feed means.

As the candy sticks roll from the ends of the track members 31, they move into pockets 35 formed between radially extending vanes 36 of a rotatable feeder 37. The feeder is a

cylindrical member, somewhat shorter than the width of the magazine, and has the radial vanes 36 projecting from its surface at such angles to form the pockets 35 of sufficient arcuate extent to freely receive one candy stick. There will be a feeder at the exit end of each magazine, and all the feeders will be fixed to a shaft 38 extending across the forward end of the machine with its ends journaled in bearings 39 mounted on the top frame 3. The shaft will be rotated in a counterclockwise direction, as viewed in FIGS. 1 and 4, to carry candy sticks forwardly over the tops of the rotatable feeders. Arcuate guards 40 extend about the forward portions of the rotatable feeders to prevent the sticks from falling from the pockets as they are carried to, and below, a horizontal position. The guards are mounted on a transversely extending angle member 41 mounted on upward extensions of the forward cornerposts 2.

Angle member 41 also serves as a mounting means for brackets 42 which carry brushes 43. The brushes serve to sweep over the ends of the vanes 36 and the candy sticks entering the pockets 35, as to prevent the accidental lifting of a second stick which might be stuck to one entering a pocket and to brush away any candy crumbs adhered to the surface of a stick in the pocket.

As each pocket 35 moves below the bottom end of guard 40, the candy stick which it carries drops from the pocket onto a downwardly sloping plate 44. The sticks roll down plate 44 until they contact a gate 45 which serves as a metering device to control release of candy sticks in proper timed sequence to an accumulator tray 46. The gates are formed by fingers 47 which depend vertically from a rock shaft 48 journaled in bearings 49 mounted on the top frame 3 of the machine frame. Shaft 48 is rocked periodically, by means to be described, to release one candy stick from each channel to roll down into the accumulator tray. The gate returns to its stick-arresting position in time to stop the stick released by the next pocket 35.

The accumulator tray 46 has a bottom 50 which slopes downwardly in a forward direction so that candy sticks will roll across the bottom into abutment with a forward wall 51. The tray extends completely across the machine to receive candy sticks from all of the magazines.

Two sprockets 52 and 53 are mounted on the front of the machine, forwardly of the accumulator tray 46. Sprocket 52 is mounted on a shaft 54 at one side of the machine, the shaft being supported in bearings 55 mounted on the vertical frame leg 2. Sprocket 53, which is an idler, is mounted on a stub shaft 56 supported in a bearing 57 attached to an extension 57 of the frame which projects outwardly from the opposite forward leg 2. Sprocket 53 is spaced outwardly beyond the end of the magazine bank and the end of the accumulator tray 46 in order to provide space for a delivery chute 59, which slopes downwardly in a direction at right angles to the length of the accumulator tray, to receive gathered lots of assorted candy sticks and deliver them to the wrapping machine. Chute 59 has its upper end supported on the frame extension 58.

A chain 60 is trained over the sprockets 52 and 53. The upper flight of the chain rides on a horizontal guide rail 61, supported by a plurality of brackets 62 extending forwardly from the top frame 3 and also serving to support the plate 44 and the accumulator tray 46. Selected links of the chain 60 carry rearwardly extending arms 63 which overlie, and move over, the accumulator tray and carry downwardly extending vanes 64. Vanes 64 are shaped to conform to the accumulator tray so that the bottom edges 65 are parallel to the bottom 50 of the tray and move closely adjacent to it. The vanes serve as pushing elements to move candy sticks along the tray length to the delivery chute 59. The arms 63 are so located along the chain as to position vanes 64 a distance apart equal to the distance between the centers of the channels. Thus, each two adjacent vanes define a pocket into which the candy sticks will roll. The trailing vane of each adjacent pair will form a pushing member to abut the ends of the sticks to slide them along the tray.

In order to operate the various mechanisms of the machine, a power shaft 66 brings power from a suitable source, for example, they wrapping machine which wraps the candy assortments. This shaft is journaled in a bearing 67 mounted on the lower frame 4 of the machine. Shaft 66 carries a gear 68 in mesh with an intermediate gear 69 on a stub shaft 70, carried by an arm 71 mounted for adjustment on the frame 4. The arm is provided with a slit 72, and a bolt 73 fixes the arm to the frame. This allows the shaft 70 to be set in different positions of adjustment to accommodate gears 74 of various sizes that may be mounted on shaft 75 in order to change the ratio of the machine drive with respect to the power source. Gear 69 is in mesh with the gear 74 fixed to one end of shaft 75 which is the main drive shaft of the machine. This shaft is also mounted in bearings 76 fixed to the lower frame 4.

Drive shaft 75 carries the sprocket 77 that, through a chain 78, drives a sprocket 79 mounted on shaft 80, which is the input shaft of a gear reducer 81 mounted on the frame 4. The gear reducer has an output shaft 82 carrying a sprocket 83 driving chain 84 travelling around a sprocket 85 mounted on one end of the rotatable feeder shaft 38. Thus, whenever the drive mechanism is in operation, power will be supplied from the main drive shaft 35 to the reducer 81, and from the reducer to shaft 38 to provide continuous rotary motion to the feeders 37.

The end of drive shaft 75 carries another sprocket 86 which, by means of chain 87, drives a sprocket 87 fixed to the end of the shaft 54, the drive shaft for the accumulating chain 60. Therefore, chain 60 will be in continuous motion whenever power is applied to the machine.

A cam 89 to actuate gates 45 and control movement of the candy sticks into the accumulator tray, is also carried by the drive shaft 75. The cam has a low area 90 and a rise 91. The cam serves to actuate a cam follower roller 92, carried at one end of a lever 93 which is pivoted at 94, intermediate its ends on a post 95 which rises from the bottom frame 4. An adjustable stop screw 96, mounted at the top of the bracket 97, serves to limit the tilting movement of the the lever in one direction to fixedly position the gates in their downward, stick-retarding position. A spring 98 connected to the frame 4 and to lever 93, between its pivot 94 and the cam following roller 92, serves to urge the cam follower roller into contact with the surface of cam 89. The opposite end of the lever 93 is pivotally connected to a link 99, which has its opposite end pivotally connected to an actuating arm 100 fixed to the end of the gate shaft 48. The gates will be in their downward, stick-stopping position when the roller is on the lower area 90 of cam 89, and will be caused to rock forwardly to release one candy stick from in front of each magazine as the rise 91 causes the roller 92 to lift and the lever 93 to tilt. The rise 91 of the cam is of sufficient extent to raise the gate and let one candy stick pass by, yet the gate will close soon enough to prevent passage of a second stick.

The only other moving part of the machine is the leveler 25. Its actuating arm 29 is pivotally connected to one end of a link 101 which has its opposite end pivotally connected to a lever 102. This lever forms part of, or is rigidly fixed to, a shaft 103 which extends across the machine and has its ends supported in bearings 104 mounted on the top frame 3 of the machine. It will be understood that there will be a link 101 and lever 102 connected to the actuating arm 29 of each magazine. One end of shaft 103 carries an arm 105 which has a cam following roller 106 at its free end. The roller is in contact with the surface of the cam 107 mounted on a shaft 108 fixed in bearings on the lower frame 4. The cam is actually in the form of an eccentric so that during rotation the arm 105 will be in continuous oscillating motion. The opposite end of shaft 108 carries a bevel gear 109 which meshes with a bevel gear 110 fixed to the main drive shaft 75. Thus, as long as the power is supplied to the machine, the leveling and agitating members of the several magazines will be in constant oscillating motion.

When the machine is to be used, supplies of stick candy can be placed directly in the magazines 10, or filled magazine loaders 20 maybe put into position at the rear ends of the

magazines. In either case, a supply of sticks will be available in each of the magazines, with each magazine supply being of a different kind, or flavor, of candy stick. If the magazine loaders 20 are used, the candy sticks will move from the loader forwardly through the space between the forward and of the bottom of the loader and the baffle 22 at the rear portion of the magazine. This will prevent too rapid supply of sticks to the magazine and avoid too great a pileup of the sticks in the area of the agitating and leveling members 9. The oscillating movement of the agitating and leveling member 9 will sweep back sticks in excess of one layer thickness, to permit but a single layer to enter the feed channel 11 and, by means of the agitating movement, keep the sticks in the magazine in free moving condition.

The sticks move down the bottom of the feed channel 11 by gravity and then onto the tracks 31, where broken sticks and pieces, will fall from the feed channel for collection in any suitable manner. As the sticks reach the lower end of the tracks, they are picked up singly in the pockets 35 of the rotatable feeder 37. As the feeding vane 36 of each pocket rises above the stick level on the tracks, the first stick will roll into the pocket formed between that vane and the next succeeding one, to be carried upwardly past the brush 43, then forwardly and downwardly around the arcuate path of the rotatable feeder pockets. As each pocket opens at the bottom edge of the arcuate guard 40, the stick within the pocket drops onto the sloping plate 44 and rolls into contact with the fingers 47. Periodically, in timed relation with the movement of the chain 60, and in that phase of chain movement when the vanes 64 carried by the chains are positioned centrally between the magazines, the gates rock forwardly to release one candy stick from each channel to roll down onto the accumulating tray 46 between pairs of adjacent vanes 64.

As the vanes mounted on the chain move along the accumulator, the vane approaching the first channel receives its first stick while the vane approaching the second channel receives its second stick, and so on, the vane approaching the last channel receiving its last stick, all simultaneously. Thus, each vane, when it has traversed the accumulator 46, has its full load of sticks, having received a stick from each channel.

Further movement of the chain 60 causes the vanes to carry the gathered assortment of sticks to the delivery chute 59, where the collected sticks roll downwardly as a group to the wrapping machine. Each group will be spaced apart due to the successive movement of the pockets to the delivery chute.

At times, it may be desirable to gather smaller assortments, for example, five candy sticks, or four candy sticks. When this is to be done, only four or five magazines will be filled as required. If less than the total number of magazines are used, the time required to gather the full assortment will be proportionately reduced unless the speed of the machine is varied. As the speed of the wrapping machine is fixed, it becomes necessary to change the speed of the gathering machine to meet the requirements of the wrapping machine.

As stated above, arm 71 carrying the stub shaft 70 which supports gear 69 is adjustable so as to change the distance of the shaft center from the driver shaft 75. Because of this, gear 74 may be removed and another gear having a different number of teeth maybe substituted for it. After the substitution, the arm 71 may be adjusted to bring the new gear into its proper mesh with the gear 68 and the gear 74. The change of gear will change the drive ratio, and, consequently, the speed of the gathering machine. Thus, it is possible to change the machine's speed to provide for gathering assortments of different quantities.

The machine is fully automatic in operation, and requires no attention from the operator beyond maintaining adequate supplies of candy sticks in the several magazines. As long as the stick supply is maintained, the machine will operate to gather the desired assortment of whole sticks and deliver the collected assortments to the delivery chute leading to the wrapping machine.

While in the above, one practical embodiment of the invention has been disclosed, it will be understood that the details of the construction shown and described are merely by way of illustration, and the invention may take other forms within the scope of the appended claims.

I claim:

1. A machine for gathering predetermined assortments of articles of stick form comprising, a frame, a bank of magazines for stick articles, the magazines arranged side-by-side on the frame, each magazine being of U-shape and having an open outlet end, a rotatable feeder having a plurality of pockets around it periphery positioned transversely of and adjacent to the open outlet end of each magazine, an accumulator tray extending the length of the magazine bank and positioned on the frame to receive stick articles fed by the feeders, means to rotate the feeders to pick up stick articles from the magazines and deposit them in the accumulator tray, and spaced means movable along the tray in spaced relation equal to the spacing between magazines of the bank to push the stick articles delivered to the accumulator tray along the tray to the discharge end.

2. A machine for gathering predetermined assortments of articles of stick form as claimed in claim 1 wherein, there are magazine loaders attachable to the magazines to hold supplies of stick articles for the magazines, the loaders having outlets in communication with the magazines to allow stick articles to roll from the loaders into the magazines, and baffles carried by the magazines adjacent the loader outlets to limit the depth of stick articles fed to the magazines.

3. A machine for gathering predetermined assortments of articles of stick form as claimed in claim 1 wherein, there are levelers mounted in the magazines for oscillating in the direction of stick article movement along the magazines, the levelers having bottom edges spaced from the bottoms of the U-shaped magazines a distance sufficient to allow but a single row of articles to pass beyond the levelers.

4. A machine for gathering predetermined assortments of articles of stick form as claimed in claim 3 wherein, the magazine bottoms are open between the levelers and the feeders, and there are spaced tracks bridging the openings to allow broken stick articles to fall through.

5. A machine for gathering predetermined assortments of articles of stick form as claimed in claim 1 wherein, there are means forming an incline between the rotatable feeders and the accumulator tray down which the stick articles released from the rotatable feeders may roll, gates over the incline to stop the stick articles before reaching the accumulator tray, and means operative in timed relation with the means movable along the accumulator tray to raise the gates periodically to release single stick articles to the accumulator tray between the spaced means movable along the accumulator tray.

6. A machine for gathering predetermined assortments of articles of stick form as claimed in claim 1 wherein, the spaced means movable along the accumulator tray includes vanes extending at right angles across the tray, an endless chain having one flight at least the length of the accumulator tray parallel to the tray, the vanes being mounted on the chain for movement therewith whereby the vanes will sweep along the accumulator tray when moving along the said one flight.

7. A machine for gathering predetermined assortments of articles of stick form as claimed in claim 6 wherein, there are means to drive the chain, and means to change power means coupled to the means to rotate the feeders and the means to drive the chain, and means to change the speed ratio of the power means to maintain predetermined discharge speed of gathered stick article assortments when different pluralities of magazines are used.

8. A machine for gathering predetermined assortments of articles of stick form comprising, a frame, a plurality of magazines for stick articles arranged in side-by-side relation on the frame, each magazine having an outlet, means forming an accumulator path on the frame extending transversely of the magazines across the magazine outlets, the accumulator

path having a discharge end, means at each magazine outlet to feed a single stick article, each feed means including a rotatable feeder having a plurality of pockets about its periphery to receive single stick articles, the feeders being mounted on a shaft and arranged with the shaft longitudinal axis normal to the magazine outlets and the feeder peripheries adjacent the magazine outlets, and means to drive the shaft to rotate the feeders to pick up articles from the magazines and feed them simultaneously to the accumulator path, the feed means also including means forming an incline from the feeders to the accumulator path, gates over the incline to stop stick articles rolling toward the accumulator path, and means to raise the gates periodically to release single stick articles to the accumulator path, and means movable along the accumulator path sequentially across the magazine outlets in timed relation with the gate raising means to receive one stick article in sequence from each magazine feed means to gather an assortment of stick articles and transport them to the accumulator path discharge end.

9. A machine for gathering predetermined assortments of articles of stick form comprising, a frame, a plurality of magazines for stick articles arranged in side-by-side relation on the frame, each magazine having an outlet, means forming an accumulator path on the frame extending transversely of the magazines across the magazine outlets, the accumulator path having a discharge end, means at each magazine outlet to feed a single stick article, the feed means being coupled to deliver single stick articles simultaneously from all magazines onto the accumulator path, and means movable along the accumulator path sequentially across the magazine outlets to receive one stick article in sequence from each magazine feed means to gather an assortment of stick articles and transport them to the accumulator path discharge end, the means form-

ing an accumulator path being an elongated tray extending across the feed means, the tray being tilted transversely to provide an incline path for sticks released by the feed means, the means movable along the accumulator path including an endless chain having one flight extending the length of the elongated tray, vanes carried by the chain at spaced points and movable in the tray along the said one flight, and means to move the chain to move the vanes along the tray on said one flight to the discharge end.

10. A machine for gathering predetermined assortments of articles of stick form as claimed in claim 9 wherein, each feed means includes a rotatable feeder having a plurality of pockets about its periphery to receive single stick articles, the feeders being mounted on a shaft and arranged with the shaft longitudinal axis normal to the magazine outlets and the feeder peripheries adjacent the magazine outlets, and means to drive the shaft to rotate the feeders to pick up articles from the magazines and feed them to the accumulator path.

11. A machine for gathering predetermined assortments of articles of stick form as claimed in claim 10 wherein, the feed means also includes means forming an incline from the feeders to the accumulator path, gates over the incline to stop stick articles rolling toward the accumulator path, and means operating in timed relation with the means movable along the accumulator path to raise the gates periodically to release single stick articles to the accumulator path in front of the means moving along the accumulator path.

12. A machine for gathering predetermined assortments of articles of stick form as claimed in claim 11 wherein, each magazine has means to permit broken stick articles to fall from the magazine to assure assortments of whole stick articles.

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