

Sept. 2, 1958

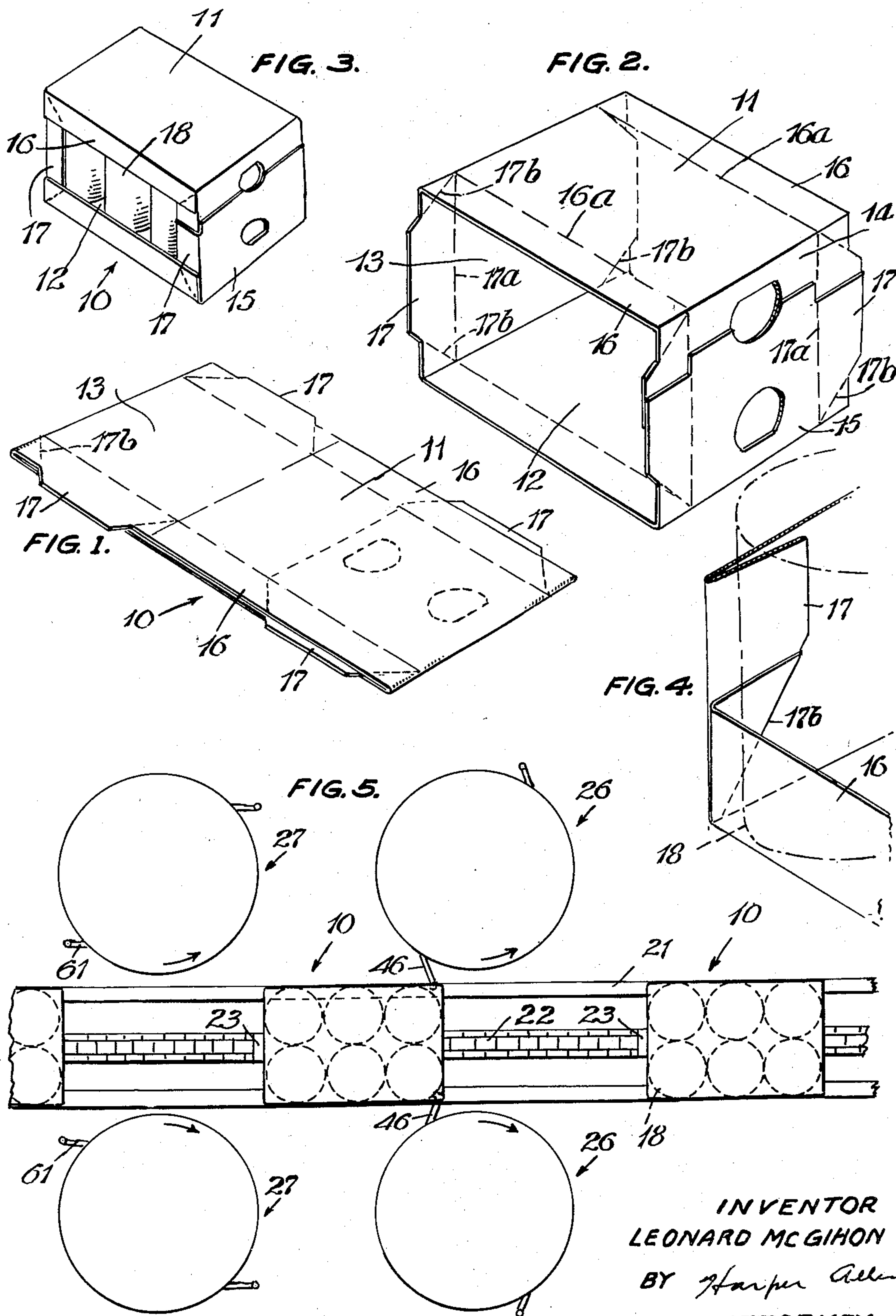
L. McGIHON

2,849,846

CARTON CLOSING MACHINE

Filed Nov. 16, 1953

3 Sheets-Sheet 1



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FIG. 6.

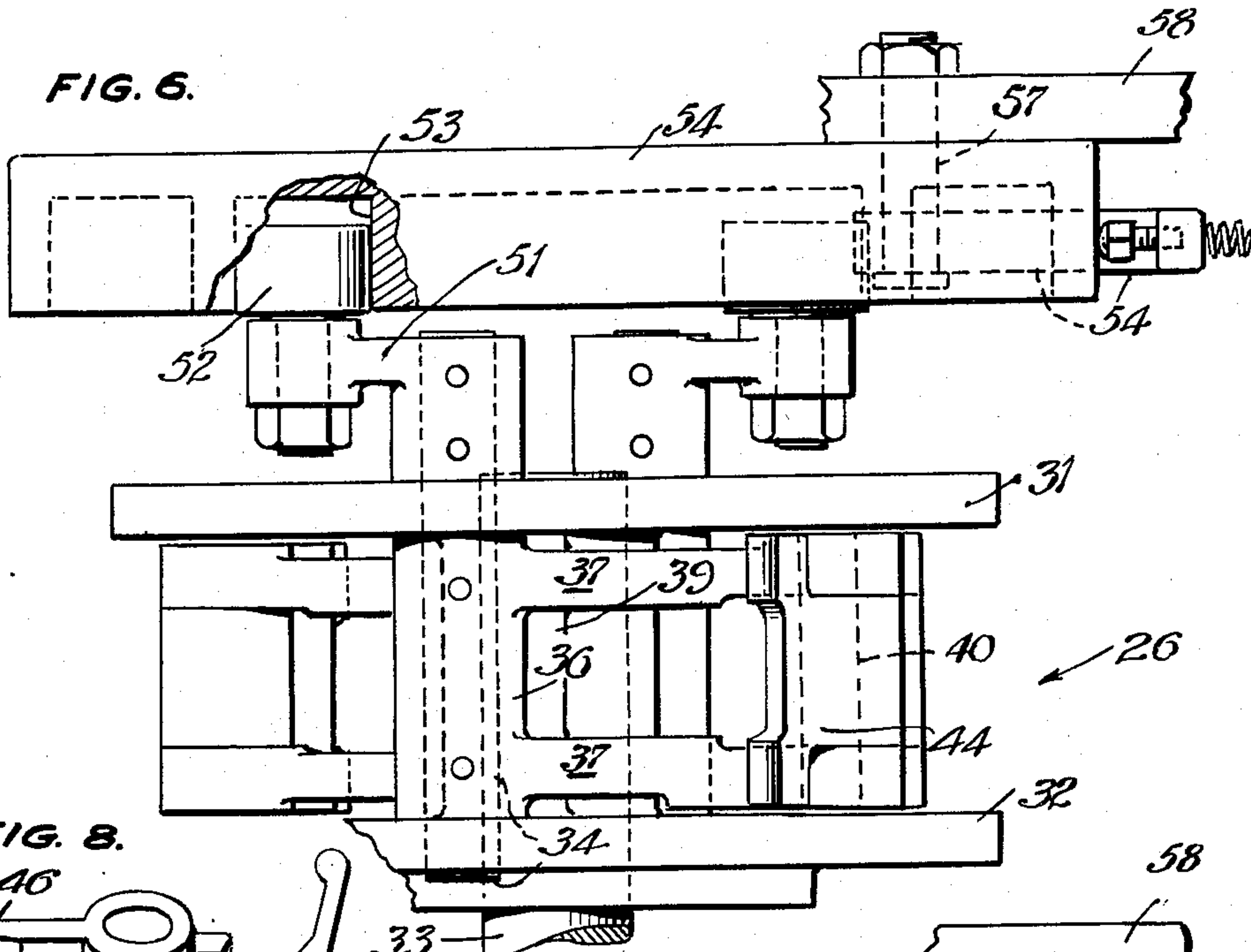


FIG. 8.

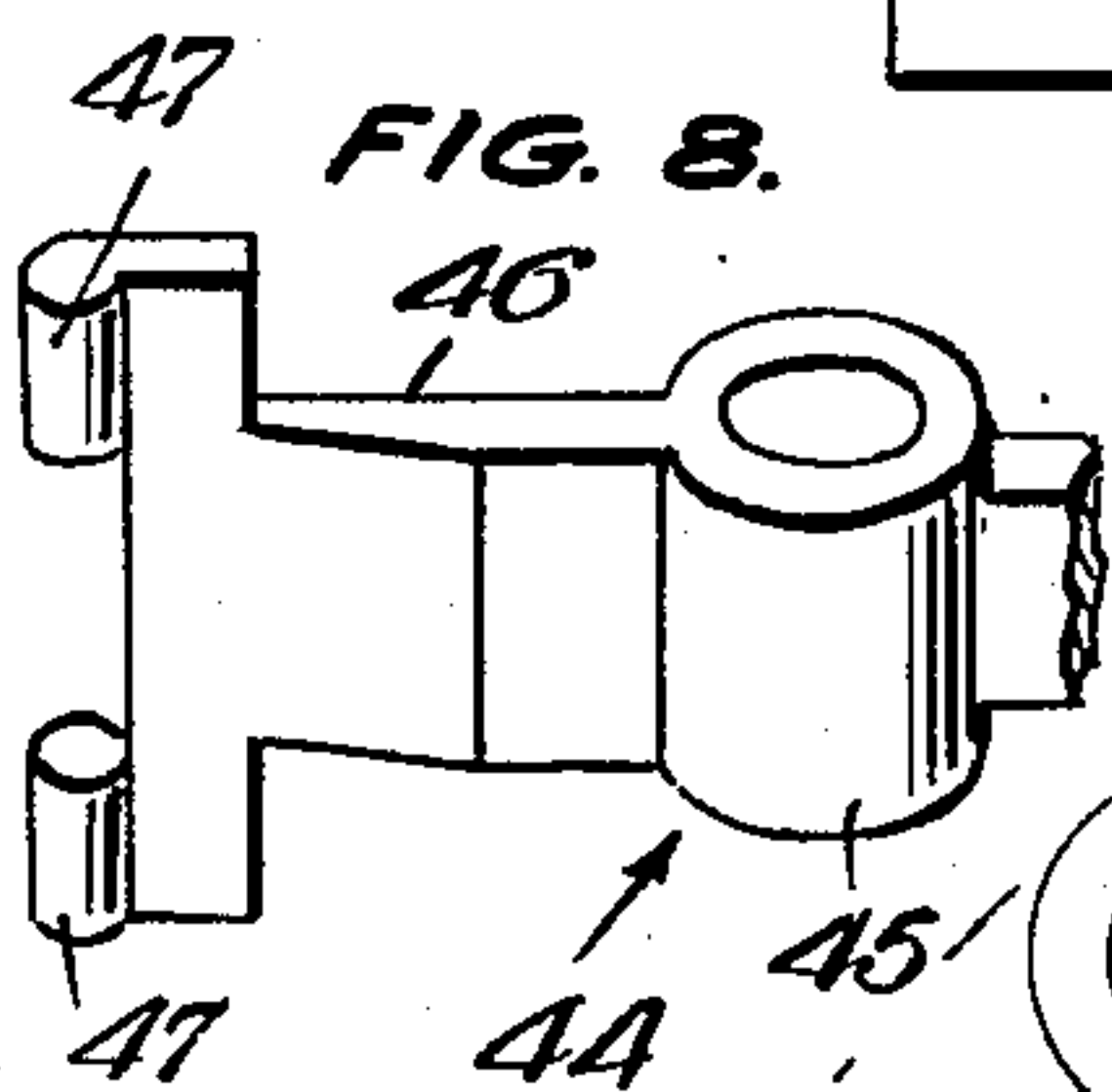
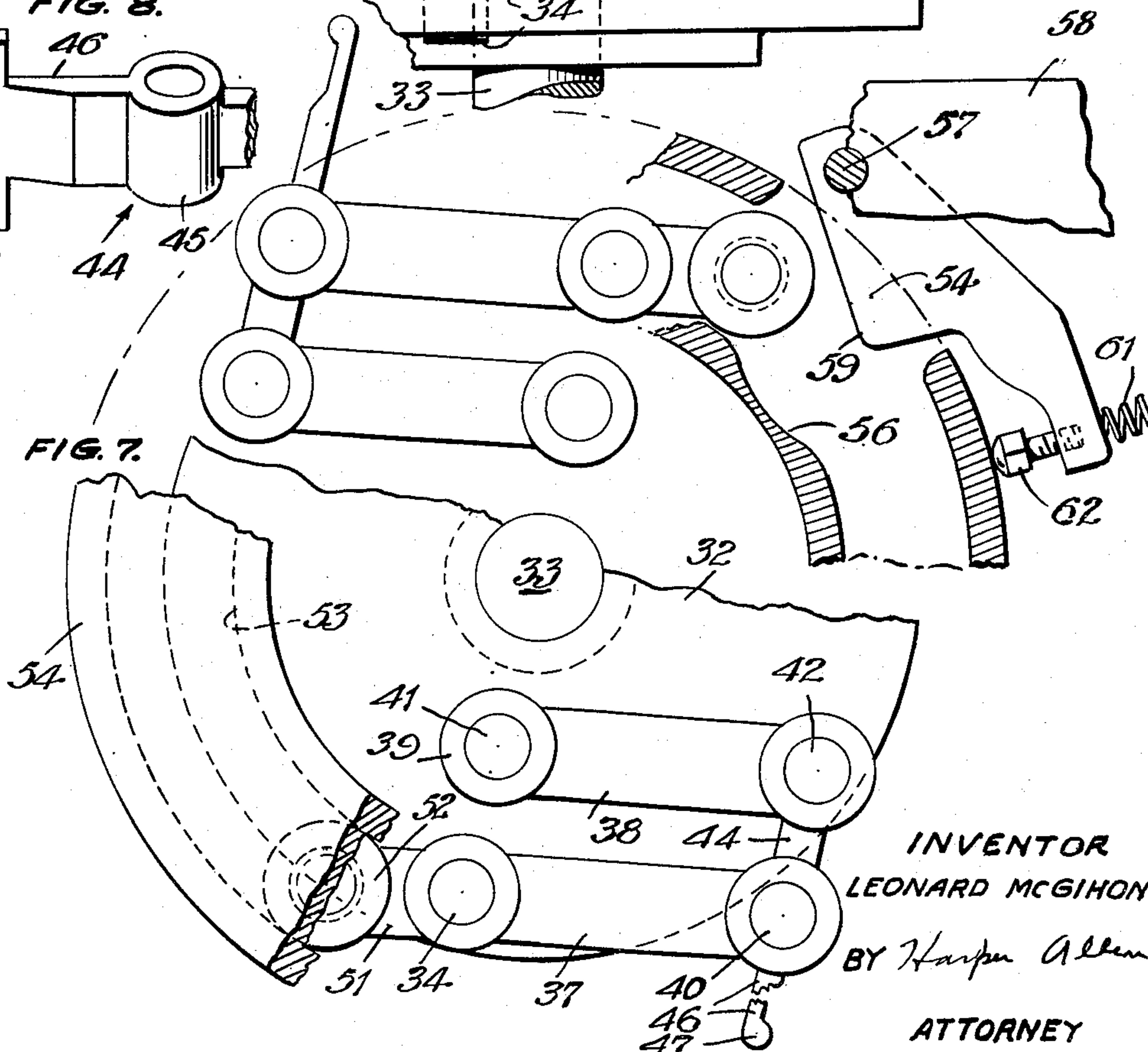


FIG. 7.



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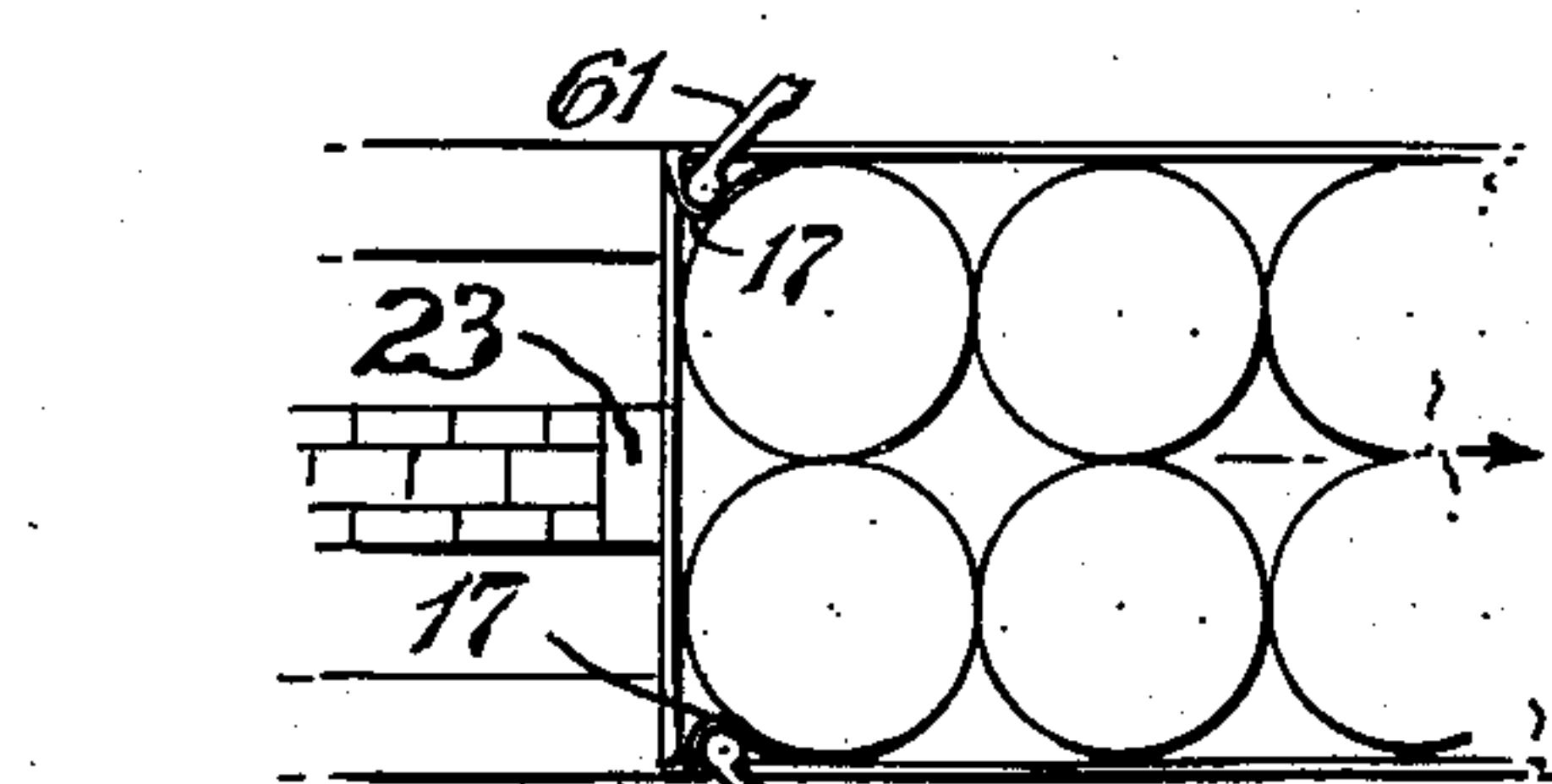


FIG. 12.

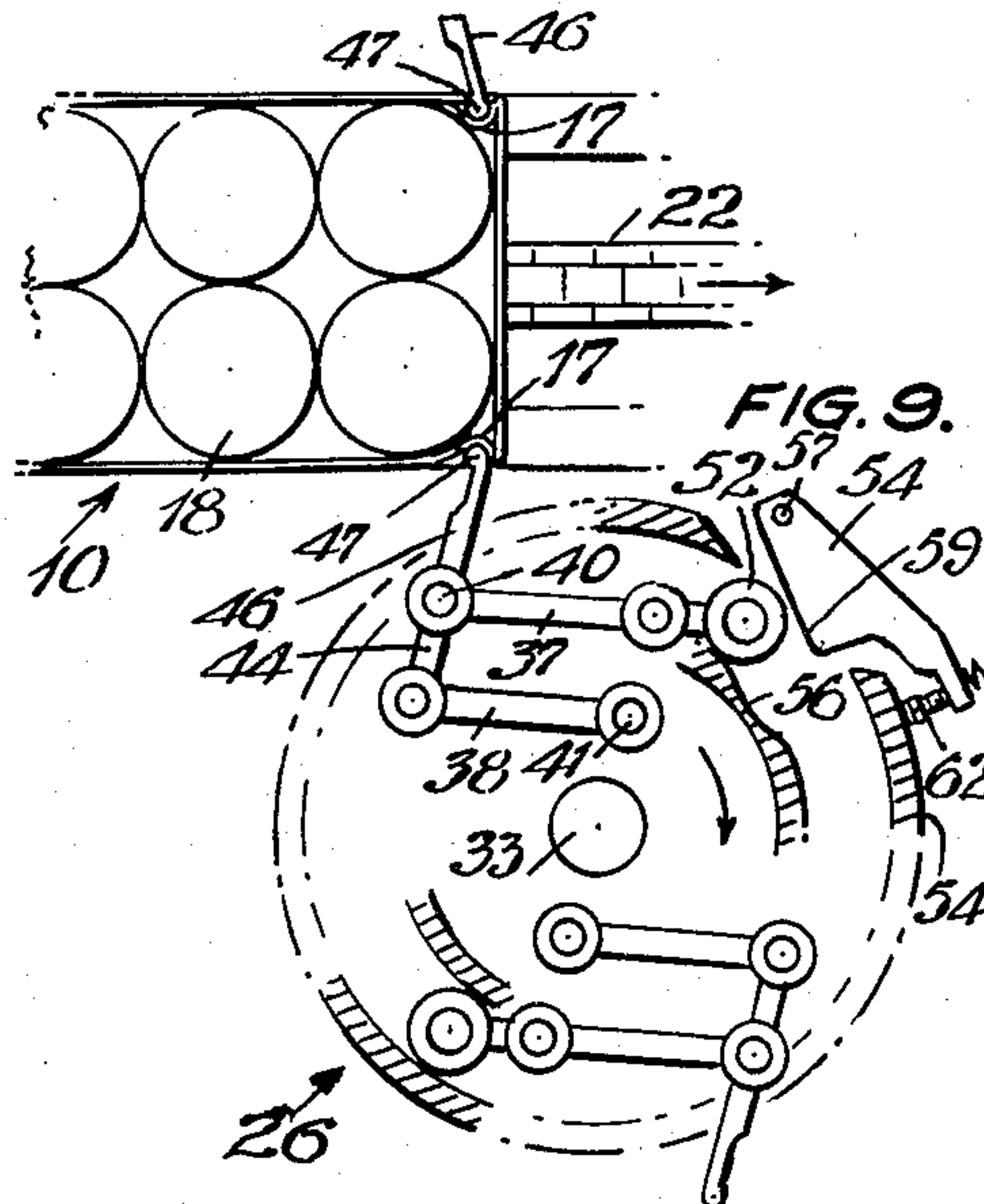
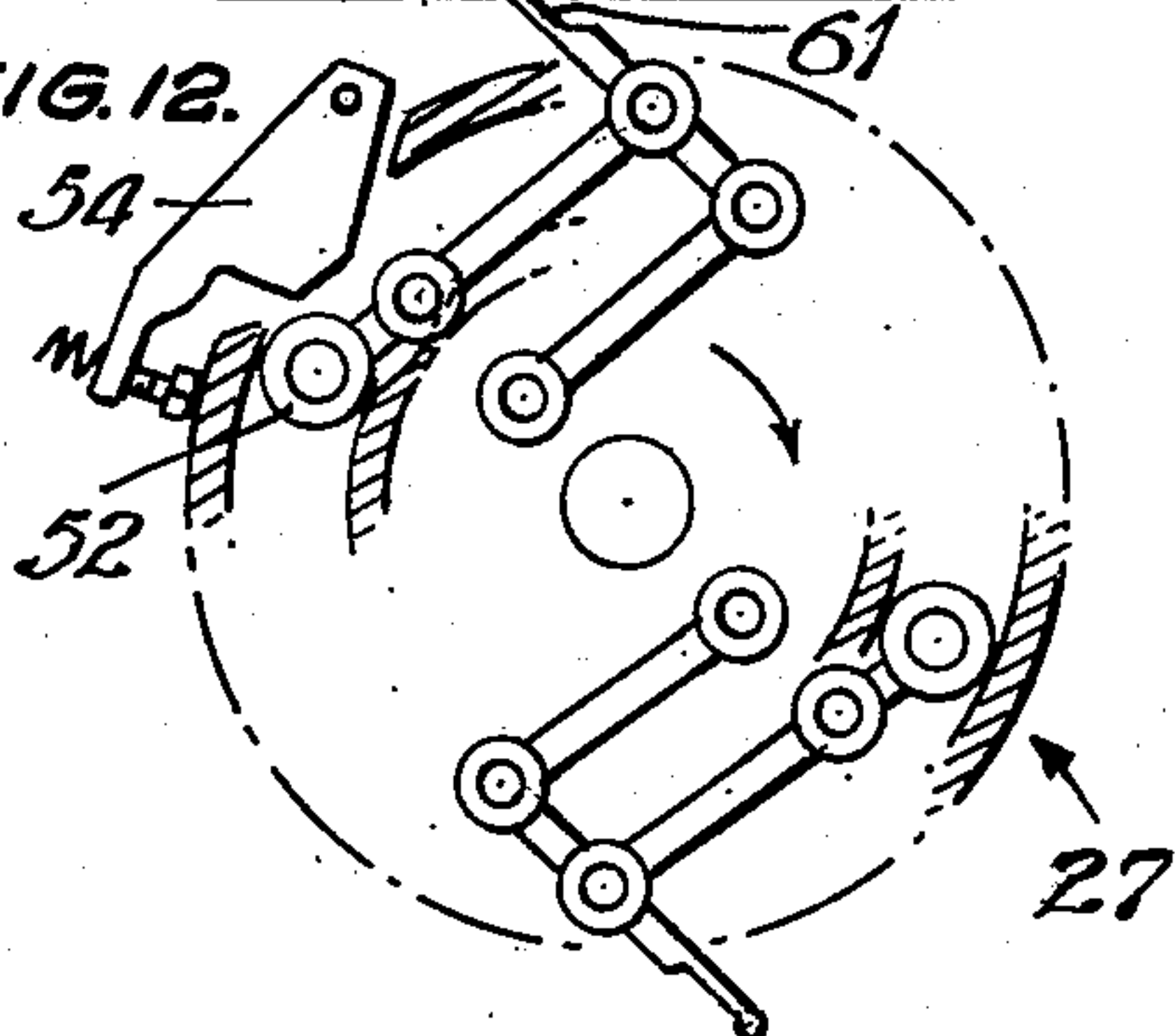


FIG. 9.

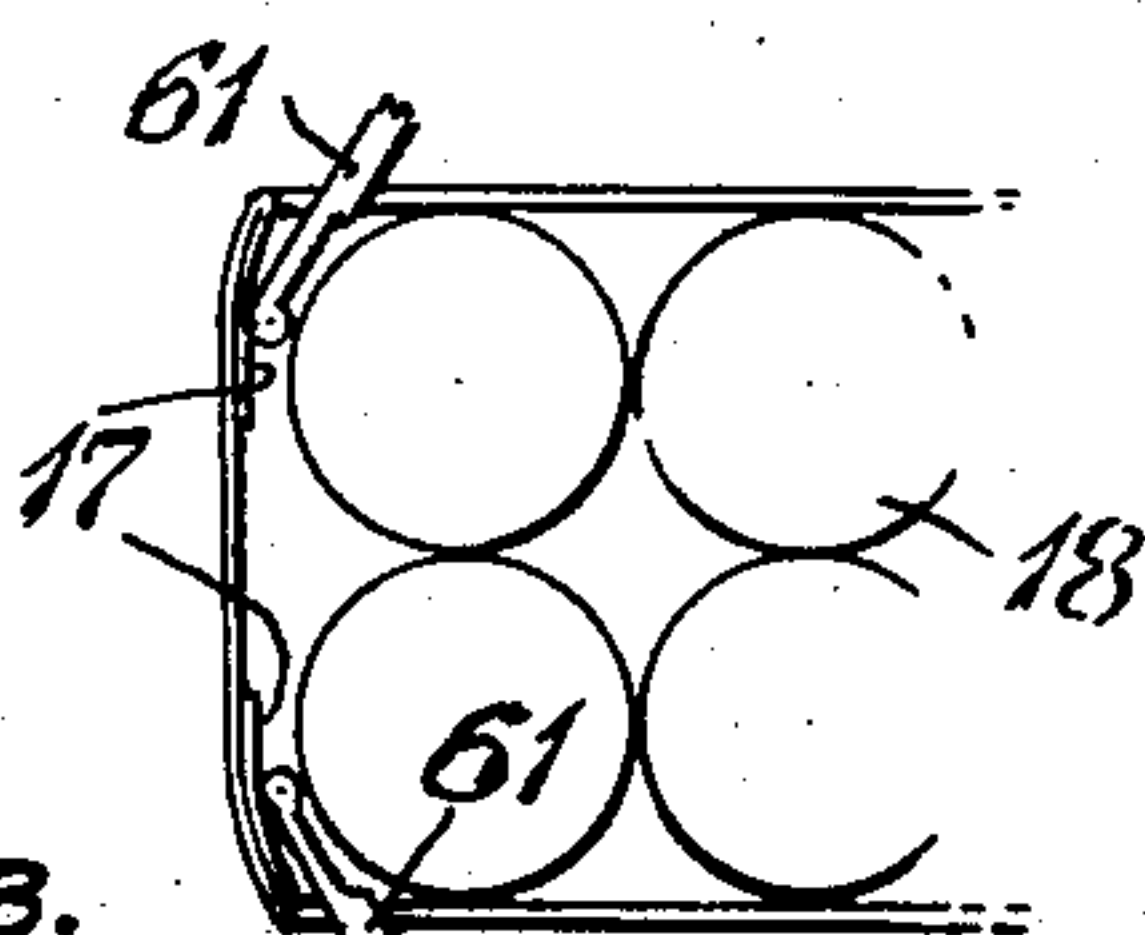
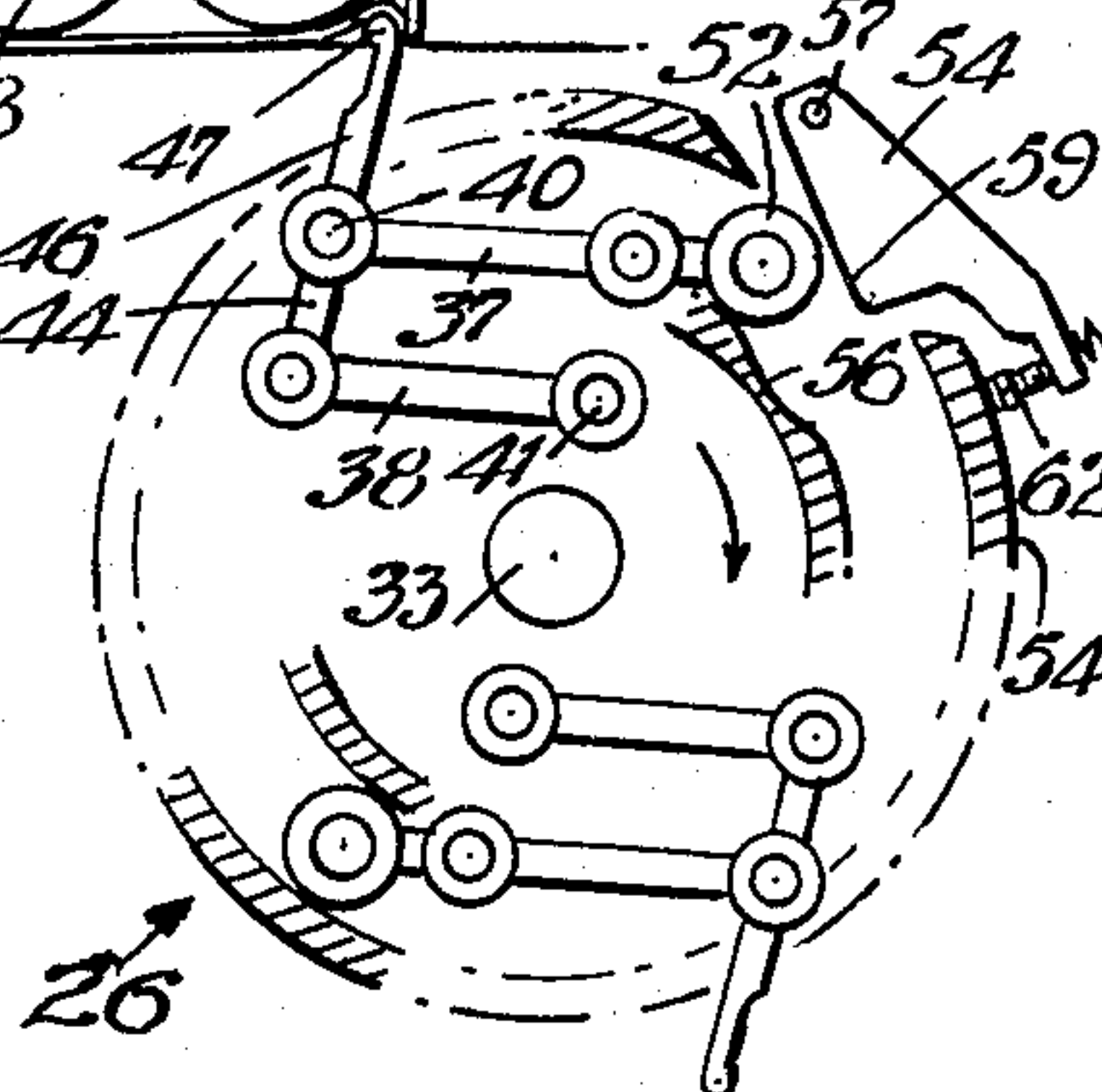


FIG. 13.

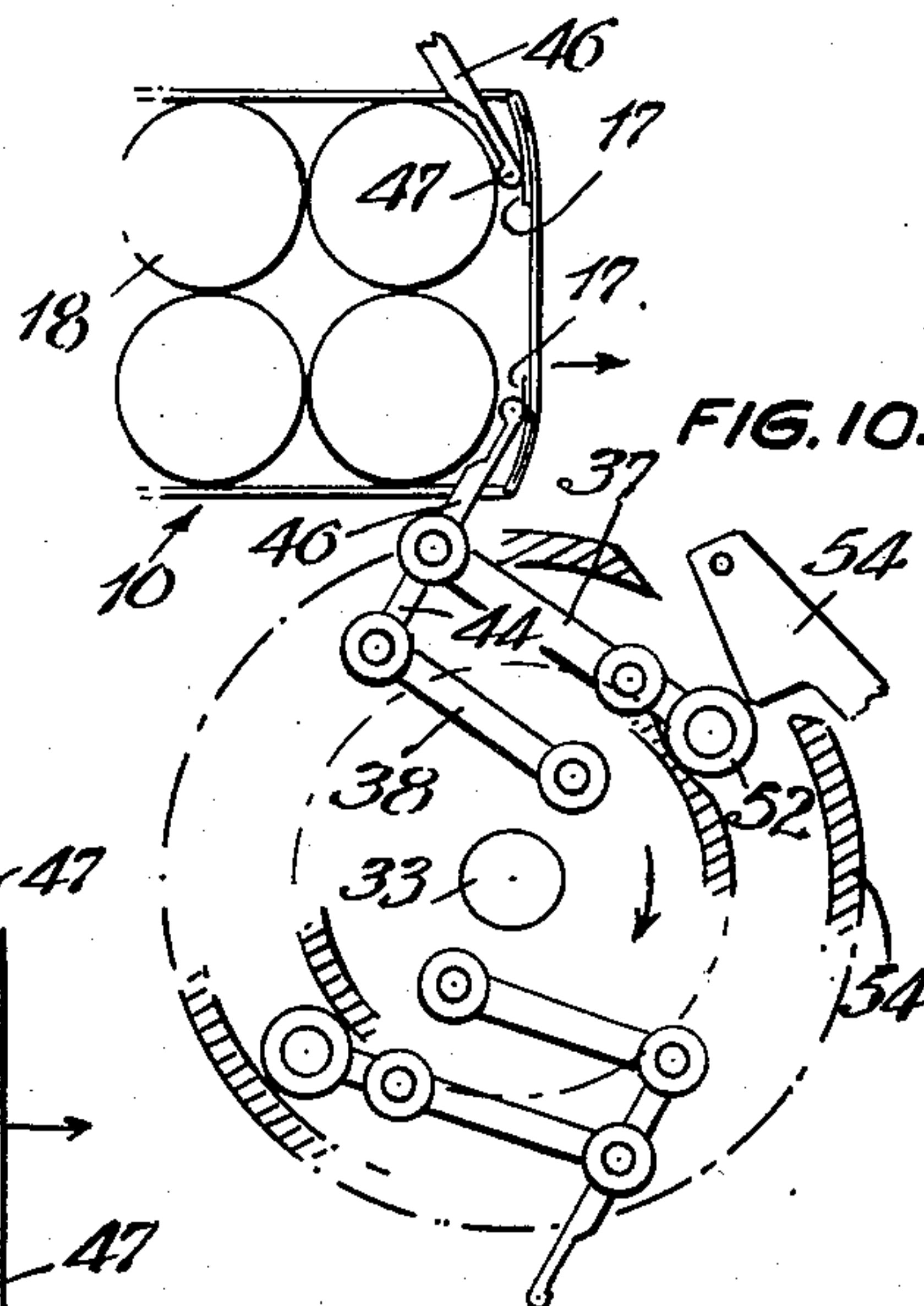
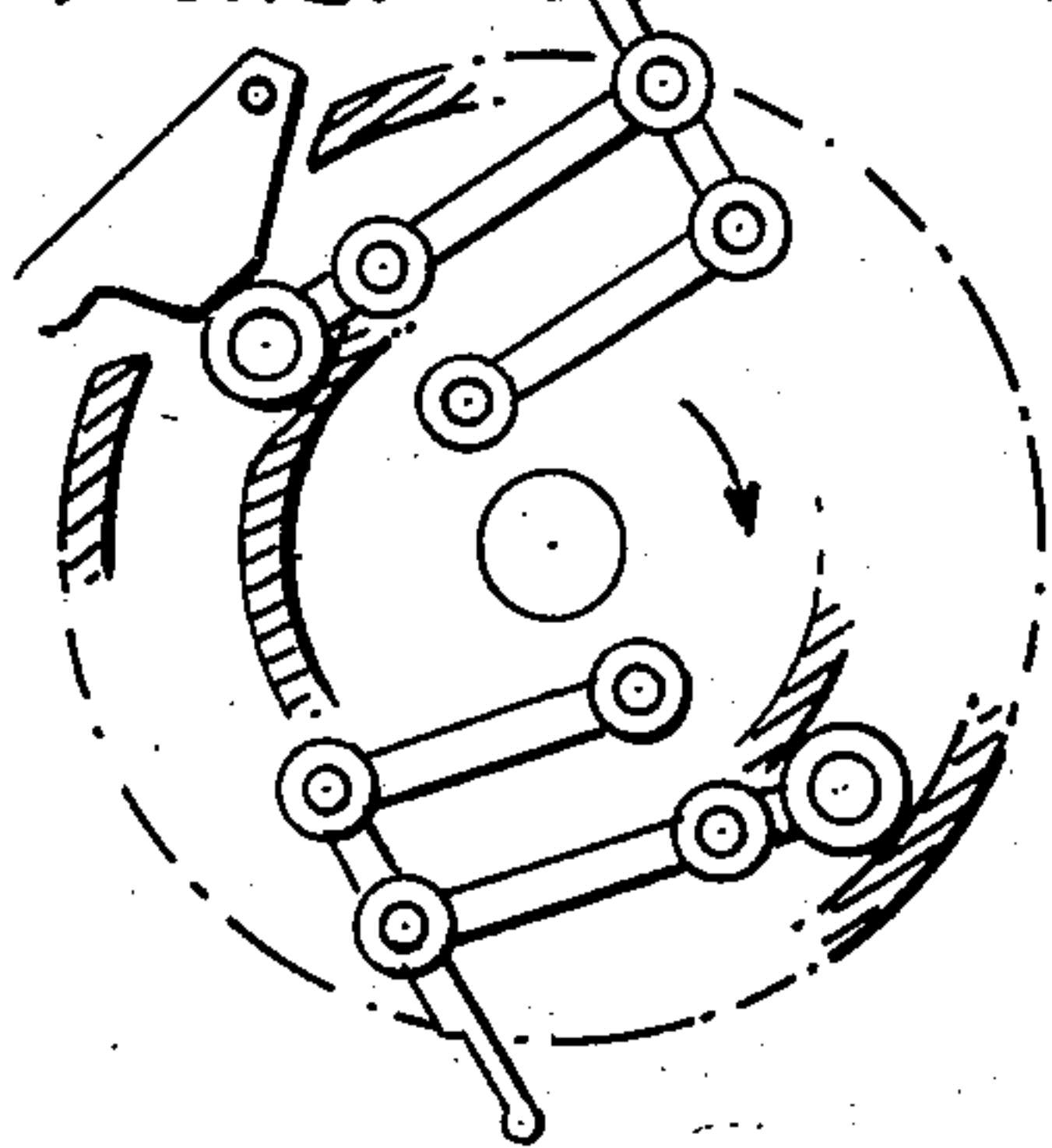


FIG. 10.

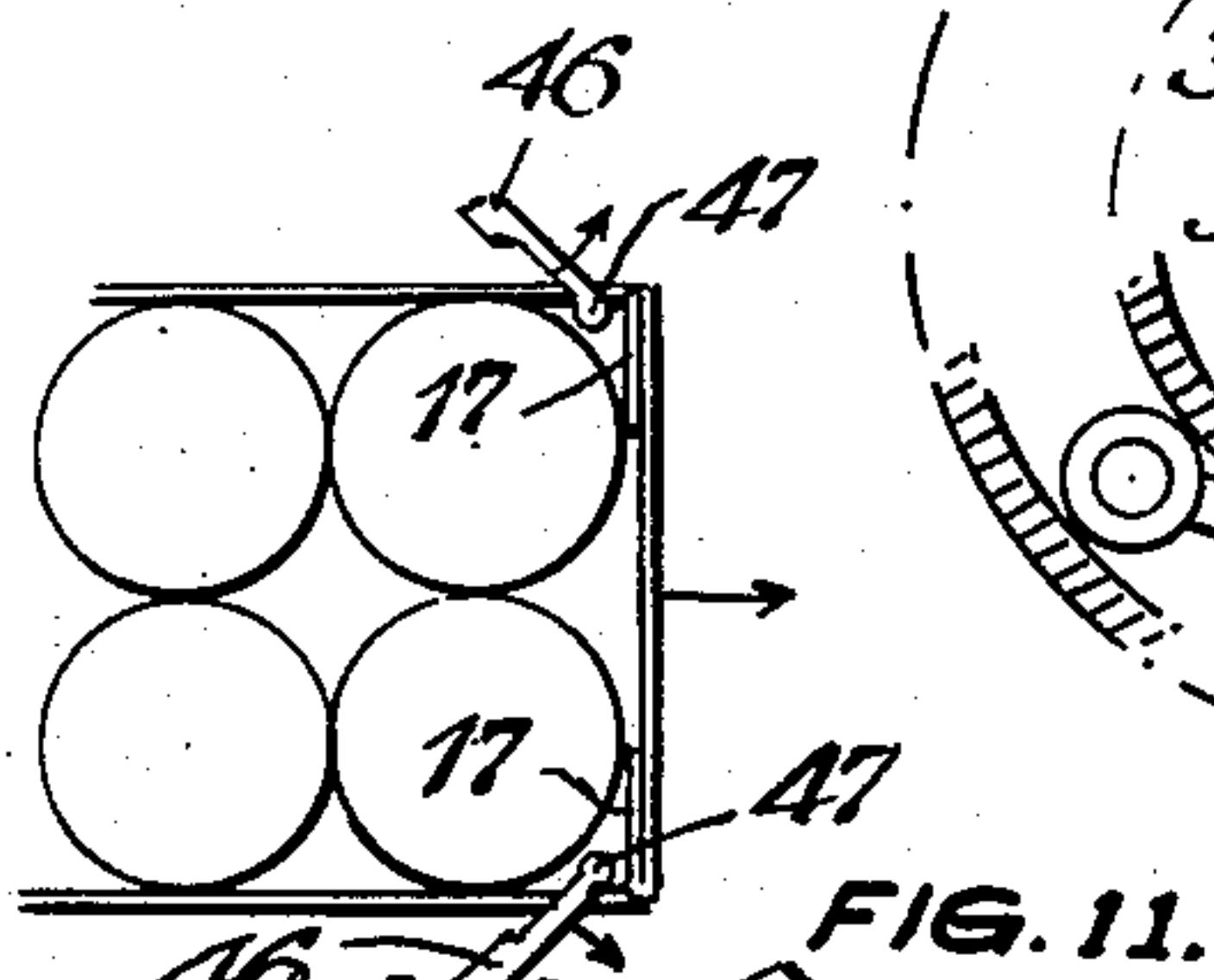
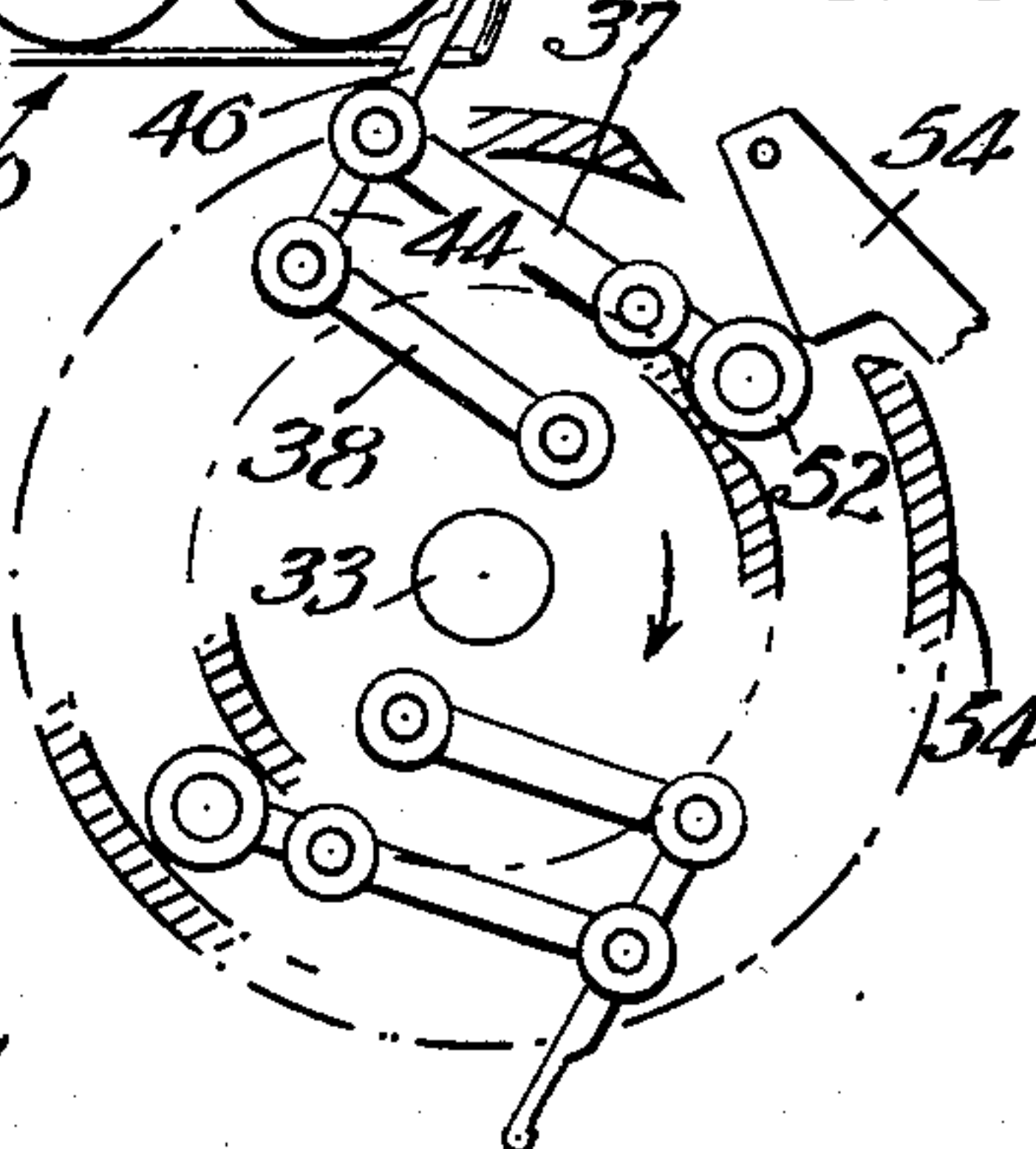
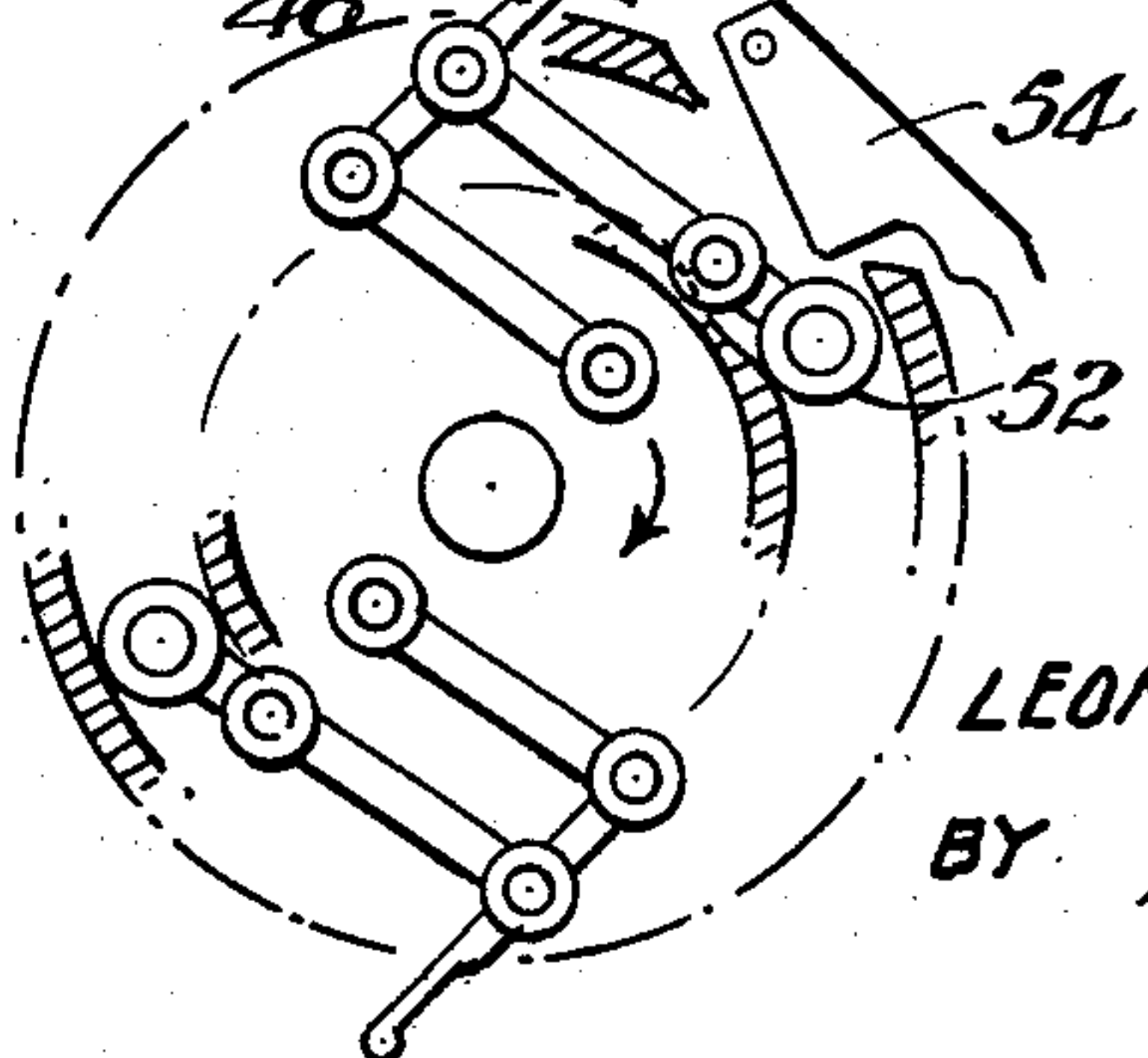


FIG. 11.



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CARTON CLOSING MACHINE

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Application November 16, 1953, Serial No. 392,158

7 Claims. (Cl. 53—374)

The present invention is concerned with carton closing machines and relates more particularly to a carton closing machine for closing a carton by tucking or folding in certain side flap portions thereof.

It is a general object of the invention to provide a machine of the above character in which the cartons are closed successively and automatically as they are passed through the machine, which automatically closes or tucks four separate flaps.

A further object of the invention is to provide a carton tucking machine of the character described in the foregoing objects in which the individual tucking mechanisms can be made as duplicate units, but by varying their relation and positioning to the cartons to be adapted to tuck the opposite pair of end flaps, i. e. at the front and rear of the carton respectively.

Other objects and advantages of the invention will be apparent from the following description of a preferred embodiment thereof, as illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of the carton in collapsed condition which is adapted to be used in the instant machine.

Figure 2 is a perspective view of the carton in erected position, and open at the sides for introduction of containers.

Figure 3 is a perspective view of a partially closed carton ready for feeding to the machine.

Figure 4 is a perspective view of one corner of the carton showing the condition and position of the flap after it is folded and tucked into place.

Figure 5 is a schematic plan view of the carton closing or tucking machine.

Figure 6 is an elevational view of one of the carton-tucking or flap-tucking mechanisms, with certain portions broken away and showing sections to illustrate details of construction.

Figure 7 is a plan view, partially in section, of the mechanism shown in Figure 6.

Figure 8 is a perspective view of one of the flap-tucking blades of the machine.

Figures 9, 10 and 11, respectively, are schematic plan views showing different phases of the operation of the tucking of the front or leading flaps of a carton.

Figures 12 and 13 are similar schematic plan views showing successive operations in the tucking of the rear or trailing flaps of the carton.

Referring to the drawings, Figures 1-4 illustrate one type of carton adapted to be closed by the machine of the instant invention, and this carton 10 includes a top panel or wall 11, a bottom panel or wall 12, end panels or walls 13, and 14-15, the end wall 14-15 being comprised of overlapped and glued wall portions 14 and 15. Around the sides of the respective walls, side flap portions are provided including side flaps 16 at the edges of the top wall 11 and 12 and connected thereto by scored lines 16a, and side flaps 17 at the sides of the end walls 13 and 14-15, respectively, and connected thereto by

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scored bend lines 17a. Also at the top and bottom of each end side flap 17, there is provided a diagonal scored line 17b for a gusset type corner fold in closing a carton.

The carton 10 is shown in Figure 1 in collapsed condition as it is delivered from the carton maker, and subsequently it is erected as shown in Figure 2 and the containers inserted therein after which the end flaps 17 are folded in for 90° and the side flaps 16 at the top and bottom are folded down and up, respectively, as shown in Figure 3 so that the carton in this condition, and with the opposite sides similarly folded is ready for the carton closing operation. This operation consists essentially of bending in or folding the flaps 17 a further amount on their scored bend lines 17a until they lie flat against the respective end walls 13 and 14-15 being held in place by the containers 18 (Figure 4) which in the present instance are shown as being in the form of cans. Cartons of this character are shown and described in my copending application, Serial No. 402,872, filed January 8, 1954, for Carton.

Referring to Figure 5, the carton closing or tucking machine includes a frame comprising four angle rails 21 which are spaced apart for fitting of a closed carton therein, without the flaps 17 being tucked. At the bottom of this tunnel or track containing the cartons, a chain 22 is suitably mounted having progressors 23 extending up therefrom one of which will engage each carton as it is placed in the entrance end of the tunnel frame and progress the carton along in timed relation to the other cartons past four tucking mechanisms 26 and 27. It will be noted that there are two carton tucking units 26 for engaging the side flaps 17 at the leading or front edge of the carton, and two carton tucking mechanisms 27 for engaging the trailing or rear flaps 17 of the carton. The pairs of mechanisms 26 and 27 need not be timed with respect to each other, but only with respect to the progressors 23 feeding the cartons therpast.

Because the various tucking mechanisms 26 and 27 are essentially identical in construction, only one will be described in detail.

Referring to Figures 6 and 7, one of the tucking units 26 is illustrated and includes a pair of opposed disks 31 and 32 which are carried by an upright drive shaft 33 and secured in spaced relation thereon. The disks 31 and 32 carry two similar tucking means spaced 180° apart, and for each tucking means have pivotally journaled therein an upright shaft 34 which carries a boss 36 having a pair of arms 37 secured thereto in vertically spaced relation and carrying a pivot pin 40 between their outer ends. The arms 37 form a part of the parallel linkage including a second pair of parallel arms 38 having a boss 39 journaled on a pin 41 secured between the plates 31 and 32. The arms 38 and 37 are parallel to each other and carry at their outer ends respective pins 42 and 40 on which a blade arm 44 is pivotally mounted by respective bosses 45. The blade arm 44 has a tucking blade 46 extending therefrom, this tucking blade including a pair of vertically spaced, round fingers 47 to perform the actual tucking operation. The upper end of shaft 34, carries a lever 51 having a cam follower roller 52 journaled therein and engaged with a cam track 53 and a movable cam member or track portion 54. The cam track 53 is suitably mounted in stationary position above the related tucking assembly, and the cam track 53 thereof is circular in configuration except for a cam depression 56 opposite which the movable cam member 54 is mounted. The cam member 54 is pivotally secured by a pin 57 in a plate 58 mounted on the cam track 53 and has a cam portion 59 projecting into the cam track and spring urged into position by a spring 61 suitably engaged at its opposite end with

a portion of the plate 58. The cam member 54 carries a screw 62 which engages the cam track 53 so that the extent of penetration of the cam surface 59 can be adjusted. The yieldable mounting of the cam member 54 provides against breakage in the event of a jam in the operation of the tucking blade 46 so that no parts will be broken.

Referring to Figures 9, 10 and 11, three positions of the tucker blade 46 in various stages of the operation are shown including a position in Figure 9 which is the normal position of the tucker blade 46 with the roller 52 riding on the long dwell of the cam track 53. In this normal position of the tucker blade 46, it moves in to engage the aligned flap 17 and makes an initial bend therein. The timing of the carton with respect to the tucker blade is such that this initial bend in the tuck-in flap is performed by the tucker blade along its normal path of travel and it will be noted that the cam follower roller 52 is just ahead of the depression 56 opposite the protuberance 59 of the counter cam member 54. During the continued movement of the carton from the position shown in Figure 9 to that shown in Figure 10, the tucker blade 46 moves inwardly, and accelerates relative to the carton to place the flap 17 behind the adjacent container 18 and flat against the end wall 15—17 of the carton, this wall being slightly flexed during the operation. As the carton is moving, it progresses from the relative position shown in Figure 10 with respect to the center line and the tucker blade 46 being withdrawn, the flap 17 being securely held in place by the adjacent container.

It will be noted that the tucker blade 46 in its relation to the travel of the carton has three phases. During its normal rotating movement it is travelling at substantially the same speed as the carton (Figure 9), during its advance to the position shown in Figure 10, by virtue of the pivoting of the parallel linkage 37—38, etc., it is accelerated with respect to its regular rate of travel, and during its withdrawal, i. e., to the position shown in Figure 10, it decelerates back to its normal rotating speed.

The operation of unit 27 is shown in Figures 12 and 13 and it is noted that the operation is generally similar to that shown with respect to the tucker blade 46, except that the tucker blade 61 of unit 27 is oppositely angled with respect to the carton, being in trailing relation in its direction of rotation so that when it is projected, it is effectively decelerated with respect to its regular rate of travel, and when it is withdrawn it is effectively accelerated so as to leave the tucked-in flap in place and to clear the carton in leaving. The opposite angle of the tucker blades is effected by inverting the tucking assemblies. It will be noted that as the tucking assemblies for the front and rear flaps are timed only with respect to the flaps, the machine is useful with cartons of varying length.

While I have shown a preferred form of the invention, it will be apparent that the invention is capable of variation and modification from the form shown, so that its scope should be limited only by the scope of the claims appended hereto.

I claim:

1. In a carton closing machine, a conveyer for progressing a carton along a path, said carton having at one side thereof respective flaps in leading and trailing position in the direction of travel of the carton for folding inwardly to a closed position in parallel relation to an adjacent wall of the carton, tucking means for said flaps disposed along said path including a carton entering element engageable with at least one of said flaps to move said one flap to its closed position, said tucking means also including means for carrying said element to enter the carton in moving said one flap to said closed position and means for operating said carton conveyer and said tucking means in synchronism.

2. In a carton closing machine, a conveyer for progressing a carton along a path, said carton having at one

side thereof respective flaps in leading and trailing position in the direction of travel of the carton for folding inwardly to a closed position in parallel relation to an adjacent wall of the carton, tucking means for said flaps disposed along said path including respective carton entering tucking blades oppositely inclined with respect to said path and engageable with said flaps to move said flaps to closed position, said tucking means also including means for causing said blade to enter the carton in moving said flaps to said closed position and means for operating said carton conveyer and said tucking means in synchronism.

3. In a carton closing machine, a conveyer for progressing a carton with cans therein along a path, said carton having at one side thereof respective flaps in leading and trailing position in the direction of travel of the carton and including a flap folding inwardly to a closed position in parallel relation to an adjacent wall of the carton, carton entering tucking means for said flap disposed along said path including an element engageable with said flap to produce a ninety degree fold thereof to closed condition, said tucking means also including means for causing said element to enter the carton between an adjacent container and a carton wall in moving said flap to closed position between said container and said wall, and means for operating said carton conveyer and said tucking means in synchronism.

4. In a carton closing machine, a conveyer for progressing a carton with containers therein along a path, said carton having a flap folding inwardly to a closed position in parallel relation to an adjacent wall of the carton and disposed between said wall and an adjacent container, tucking means for said flap disposed along said path including a tucking blade disposed in angled relation to said path engageable with said flap to produce a ninety degree fold thereof to closed condition, said tucking means also including means for causing said blade to enter between a container and said adjacent wall in moving said one flap to said closed position, and means for operating said carton conveyer and said tucking means in synchronism.

5. In a carton closing machine, a conveyer for progressing a carton along a path, said carton having a flap folding inwardly to a closed position in parallel relation to an adjacent wall of the carton, tucking means for said flap disposed along said path including a rotary support, a parallel linkage mounted on said support, a tucking blade carried by said linkage and engageable with said flap to produce a ninety degree fold thereof to closed condition, means for controlling movement of said blade during rotation of said support to change its speed relative to the speed of the carton and to effect a carton entering movement during the tucking operation, and means for operating said carton conveyer and said tucking means in synchronism.

6. In a carton closing machine, said carton having respective front and rear flaps at one side thereof for folding through an angle to a closed position in parallel relation to an adjacent wall of the carton, said machine comprising a carton conveyer for moving a carton along a path, a front flap closing mechanism including a tucking assembly having a tucking blade disposed at an angle to the path of the conveyer and means for projecting said tucking blade outwardly to engage the front flap to enter the carton in moving it to closed position, a rear flap tucking assembly including a tucking assembly having a tucking blade angled to the path of the conveyer and means for projecting said second-named blade to enter the carton in moving said rear flap to closed condition, and means for driving said conveyer and said tucking mechanisms in synchronism with each other.

7. In a carton closing machine, means for supporting a carton with the containers therein, said carton having at one side thereof respective flaps at opposite edges thereof of extending in a direction parallel to the length or height

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of the containers, said flaps being adapted to be folded inwardly past a container to a closed position in parallel relation to and adjacent wall of the carton and between and in contact with said wall and an adjacent container, tucking means mounted on said machine including a carton entering element extending parallel to the length of said flaps and engageable with at least one of said flaps to move said flap between said wall and said adjacent container to its closed position, said tucking means also including means for causing said element to enter the carton to move said flap into said position between a con-

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tainer and the adjacent wall, and means for operating said tucking means.

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