

**Dec. 19, 1939.**

S. E. WERNER ET AL

**2,183,600**

# ASSEMBLY

Filed Jan. 15, 1938

2 Sheets-Sheet 1

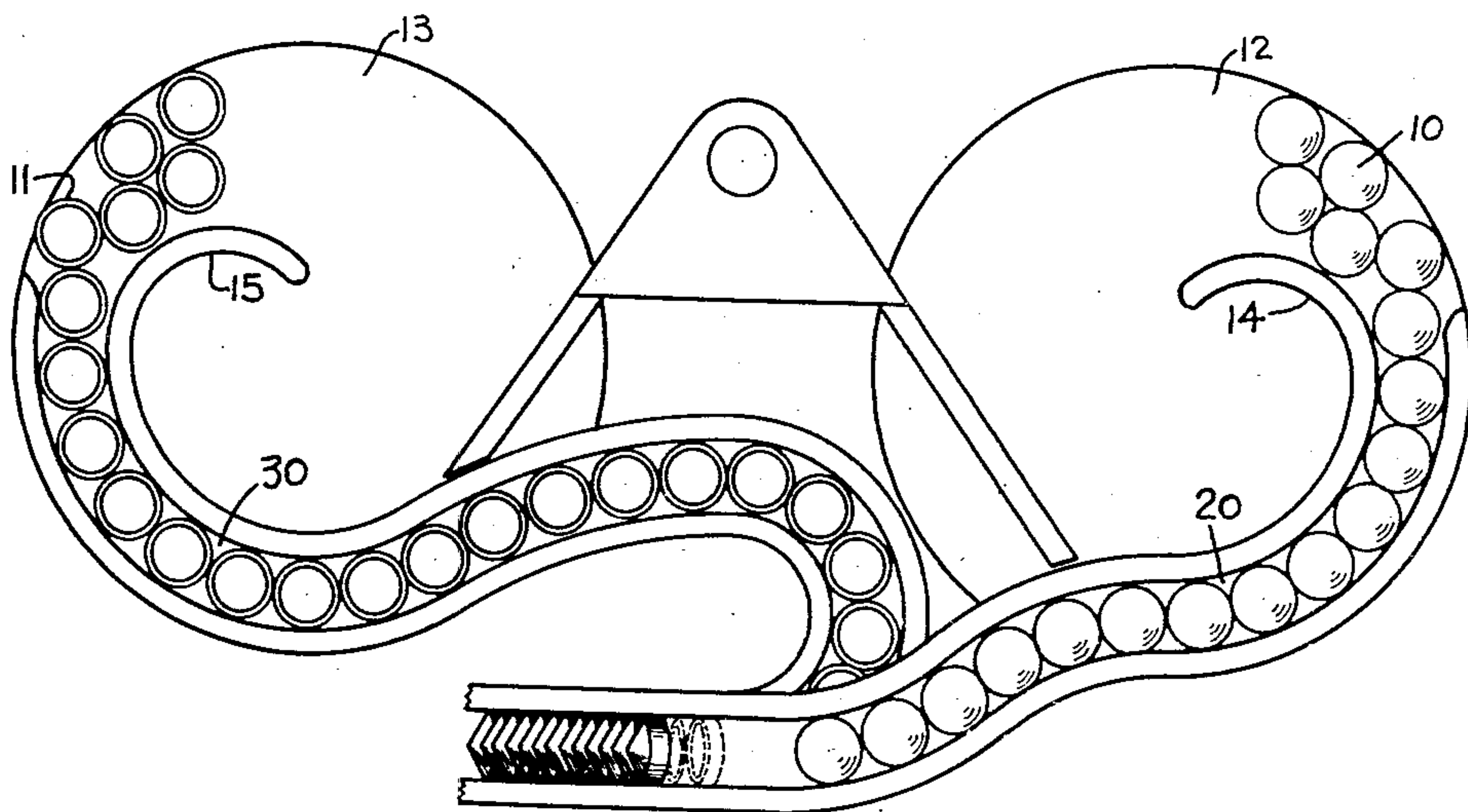


Fig. 1

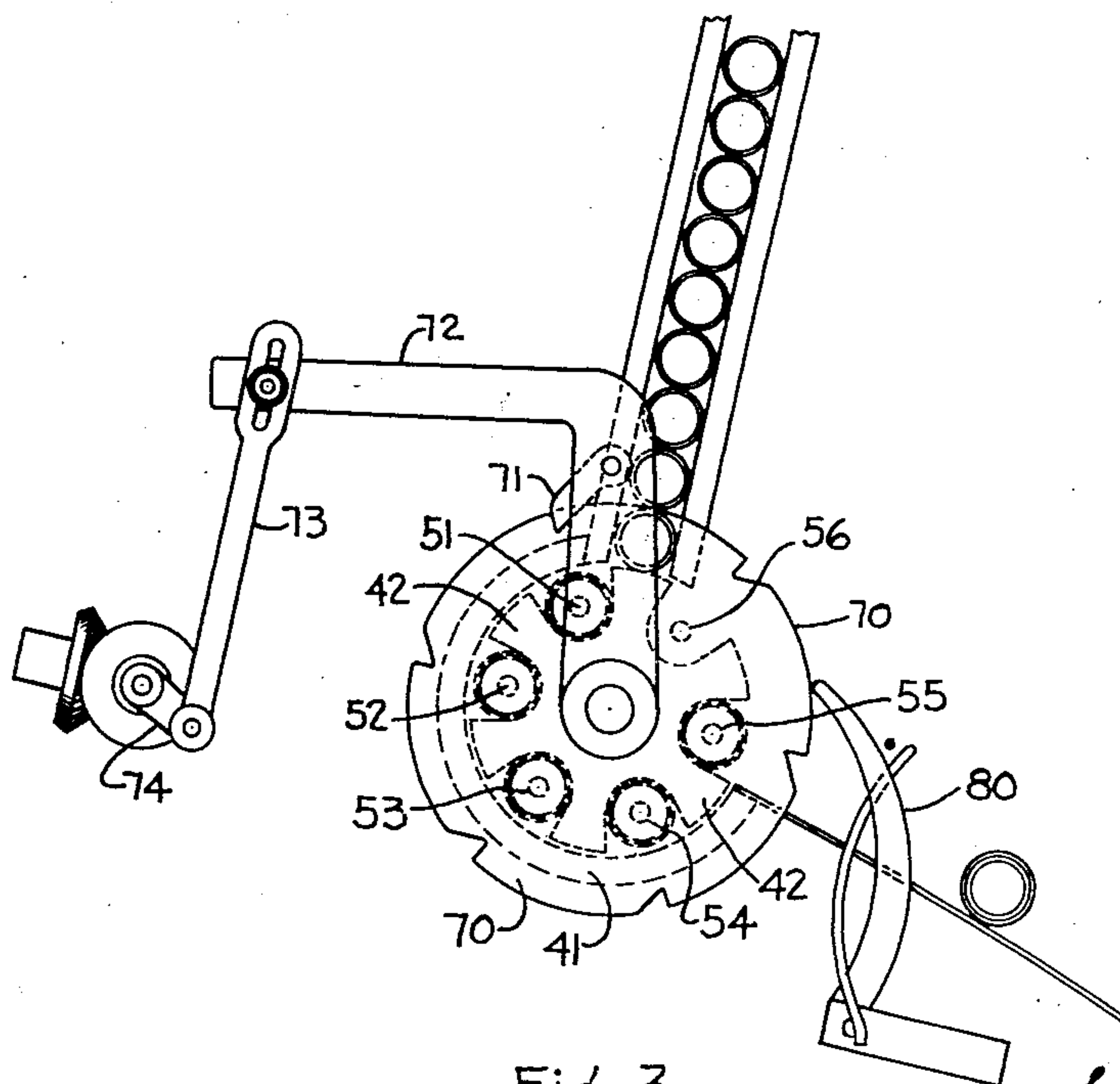


Fig. 3

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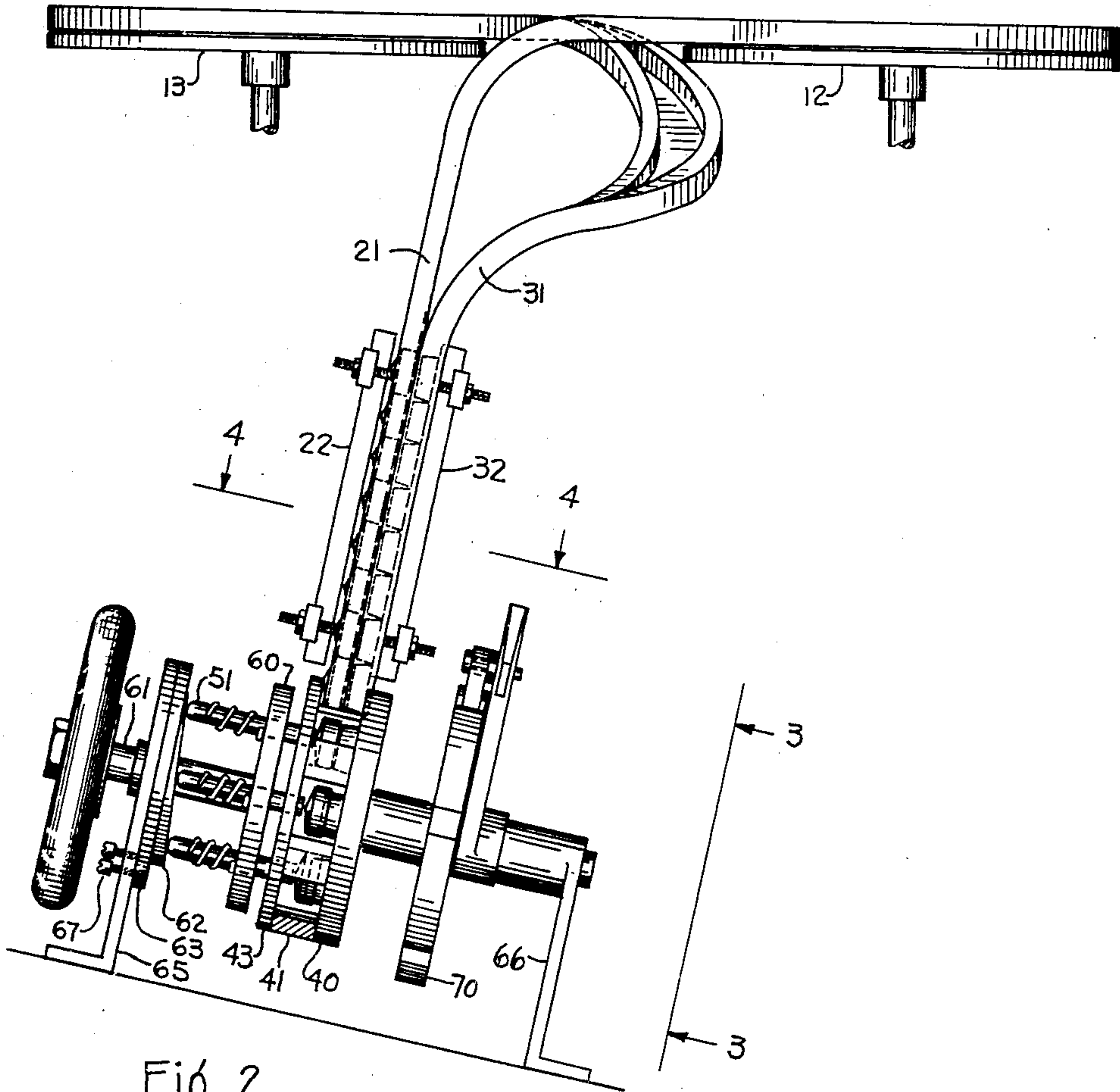


Fig. 2

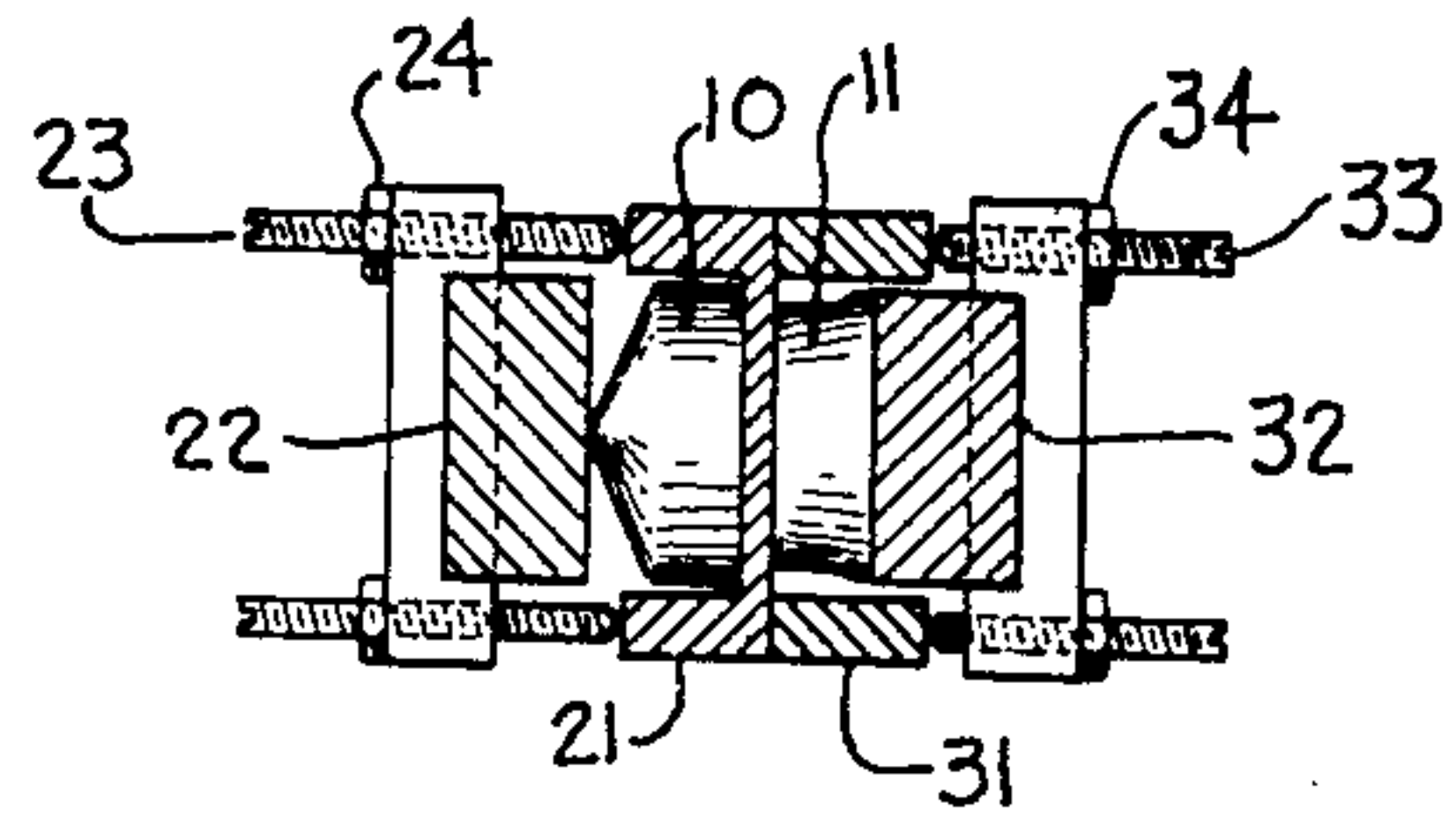


Fig. 4

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## UNITED STATES PATENT OFFICE

2,183,600

## ASSEMBLY

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Application January 15, 1938, Serial No. 185,244

2 Claims. (Cl. 29—84)

This invention relates to a means for and method of assembling concentric, cooperating elements, more particularly, metal-cap-and-ring container closures.

Heretofore the assembling of small metal parts, such as the caps and rings for container closures, either was done by hand or entailed the use of apparatus which dangerously exposed the operators to moving and rotating mechanisms and frequently produced imperfect closures.

It is the object of this invention to overcome such defects and to provide a simple and effective method and means for assembling such elements.

The invention is exemplified by the hereinafter-described apparatus for assembling metal-cap-and-ring closures of the type described in application Serial No. 745,714, filed September 27, 1934. This apparatus is illustrated in the accompanying drawings in which—

Fig. 1 is a plan view of a portion of the apparatus for assembling metal-cap-and-ring closures;

Fig. 2 is a front elevation of the apparatus;

Fig. 3 is a side elevation taken in the direction 3—3 of Fig. 2; and

Fig. 4 is a cross section taken on line 4—4 of Fig. 2.

Essentially the apparatus of this invention comprises means for providing a supply of aligned caps and rings, means for compressing a cap and a ring into mutual frictional engagement, and means for intermittently feeding a unit consisting of an aligned cap and ring from said supply to said compressing means.

More specifically, caps 10 and rings 11 (Fig. 1) are sorted out on horizontal rotating turntables 12 and 13, respectively. The caps and rings are guided by flanges 14 and 15 to their respective channels 20 and 30 which are juxtaposed for a portion of their travel and have a common terminus, serving to hold and align a supply of caps and rings. When the caps 10 reach the downwardly extending section 21 of channel 20 (Fig. 2), they fall by gravity until they reach the terminus of the channel where they are stopped by meeting an arm of the star wheel 42 (Fig. 3) or by falling into a pocket formed by two adjacent arms of the wheel. Likewise, when the rings 11 reach the downwardly extending section 31 of channel 30, they fall by gravity and are similarly stopped by star wheel 42.

In order to maintain a single file or row of contiguous rings the floor of channel 31 at its lower portion comprises a guide rod 32 (Fig. 4), which is adjustably affixed to the walls of channel 31

by studs 33 and nuts 34, and is thus adapted to be moved so as to increase or decrease the clearance between itself and the bottom of channel 21. Similarly, in order to maintain a single file or row of contiguous caps, a guide rod 22 (Fig. 4) is inserted in the open portion of channel 21; this guide rod also is adjustable, being affixed to the walls of channel 21 by studs 23 and nuts 24, and is thus adapted to be moved so as to vary the clearance necessary for cap 10.

With this mechanism, a unit consisting of single ring and a cap to be associated therewith are fed synchronously into one of the pockets formed by the arms of star wheel 42, the cap in registry with and superposed upon the ring. The next cap and the next ring are held in the terminus of the channels 21 and 31, respectively, by the cap and ring in the star wheel and subsequently, while the star wheel is rotating, by one of the arms thereof (Fig. 3), until another open space or pocket between two adjacent arms of the star wheel coincides with the terminus of the channels.

The cap and ring units in the pockets of the star wheel are then in position to be tightly pressed together while being rotated with the star wheel. The star wheel 42 is part of the compressing mechanism, which adjoins the terminus of channels 21 and 31, is journaled on supporting frames 55 and 56, and comprises a disc 40 affixed to the lower end of channel 31. Disc 40 is provided with a central opening in which axle 61 is freely journaled. Axle 61 is affixed to and rotates star wheel 42, and is itself intermittently driven by ratchet wheel 70 (Fig. 3) through pawl 71 mounted on arm 72, oscillated by crank member 73 through link 73.

Guide member 41 (Fig. 2) affixed to disc 40 surrounds star-wheel 42 for a portion of its periphery and serves to hold the cap and ring units in place between the adjoining arms of the star wheel 42 while the latter is rotating. A series of plungers 51 to 56 (Figs. 2 and 3) are positioned in the pockets of the star wheel, passing through plate 43 (Fig. 2), which is affixed to and turns with the star wheel, and also through disc 60, which is affixed to and rotated by axle 61 and serves as a guide for the plungers, they being forced by springs away from the star wheel and actuated axially in the star wheel by wedge-shaped immovable cam 62, affixed to cam plate 63 mounted rigidly on frame 65.

Plungers 51 to 56, while rotating with axle 61, compress the cap and the ring of each unit into mutual functional engagement during one-half



of a revolution. When a tightly compressed cap-and-ring assembly reaches point 54 (Fig. 3), it is released by the plunger and drops from the pocket of the star-wheel into a hopper (not shown) in condition for mounting over the mouth of, and sealing, a container.

As shown in Fig. 3, channels 21 and 31 descend obliquely, cap channel 21 being situated above ring channel 31 and the axis of the aligned caps and rings being therefore acutely inclined to the horizontal; and this inclination, together with the similar inclination of the guide members of the compressing mechanism, serves to superpose the cap on the ring, facilitating the compression.

The provision of a number of auxiliary elements insures the faultless operation of the invention. Thus, among other things, adjustment screws 67 are provided to alter the bias of cam 62; and spring-actuated pawl 80, (Fig. 3) serves as a stop, preventing the reverse rotation of ratchet wheel 70 while pawl 71 executes its idle stroke.

In operation, channels 20 and 30 are loaded with their respective caps and rings, preferably by means of the rotating turntables 12 and 13. Then, after passing to the common terminus of the channels, the aligned caps and rings, a unit at a time, enter the pockets of the star wheel 42. Next, the plungers are actuated by the elevated portion of cam 62, causing the cap and the ring of each unit carried by the star wheel to be tightly compressed into mutual frictional engagement during the next half revolution of the star wheel. Finally, the cam surface releases the plungers sequentially and they are sequentially returned to their original positions by spring action. In this manner the tightly compressed cap-and-ring assemblies are freed, and, as they pass the end of guide member 41 at 55 (Fig. 3),

slip from the pockets of the star wheel 42, which are then ready to receive new charges of cap-and-ring units.

The invention may be variously otherwise embodied—e. g. by reversing the position of cap and ring, compressing the ring upon the cap; by compressing one cap upon another; or by assembling non-metal elements—within the scope of the appended claims.

We claim:

1. Apparatus for assembling concentric cooperating elements comprising a pair of channels for holding and axially aligning a supply of pairs of elements, said channels descending obliquely to a common terminus, with one channel above the other, an intermittently rotating wheel having pockets adapted to receive aligned pairs by gravity from said common terminus, a plunger in each of said pockets, and a cam for sequentially actuating said plungers to force the elements of a pair into mutual frictional engagement.

2. Apparatus for assembling concentric cooperating elements comprising a pair of channels for holding and axially aligning a supply of pairs of elements, said channels descending obliquely to a common terminus, with one channel above the other, an intermittently rotating wheel having pockets adapted to receive aligned pairs by gravity from said common terminus and so disposed as to superpose one element of each pair lightly on the other, a plunger in each of said pockets, and a cam for sequentially actuating said plungers to force the elements of a thus superposed pair into mutual frictional engagement.

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