May 29, 1923. 1,456,787

J. DLESK

MACHINE FOR FILLING BALL RETAINERS

Filed July 14, 1920 3 Sheets-Sheet 1

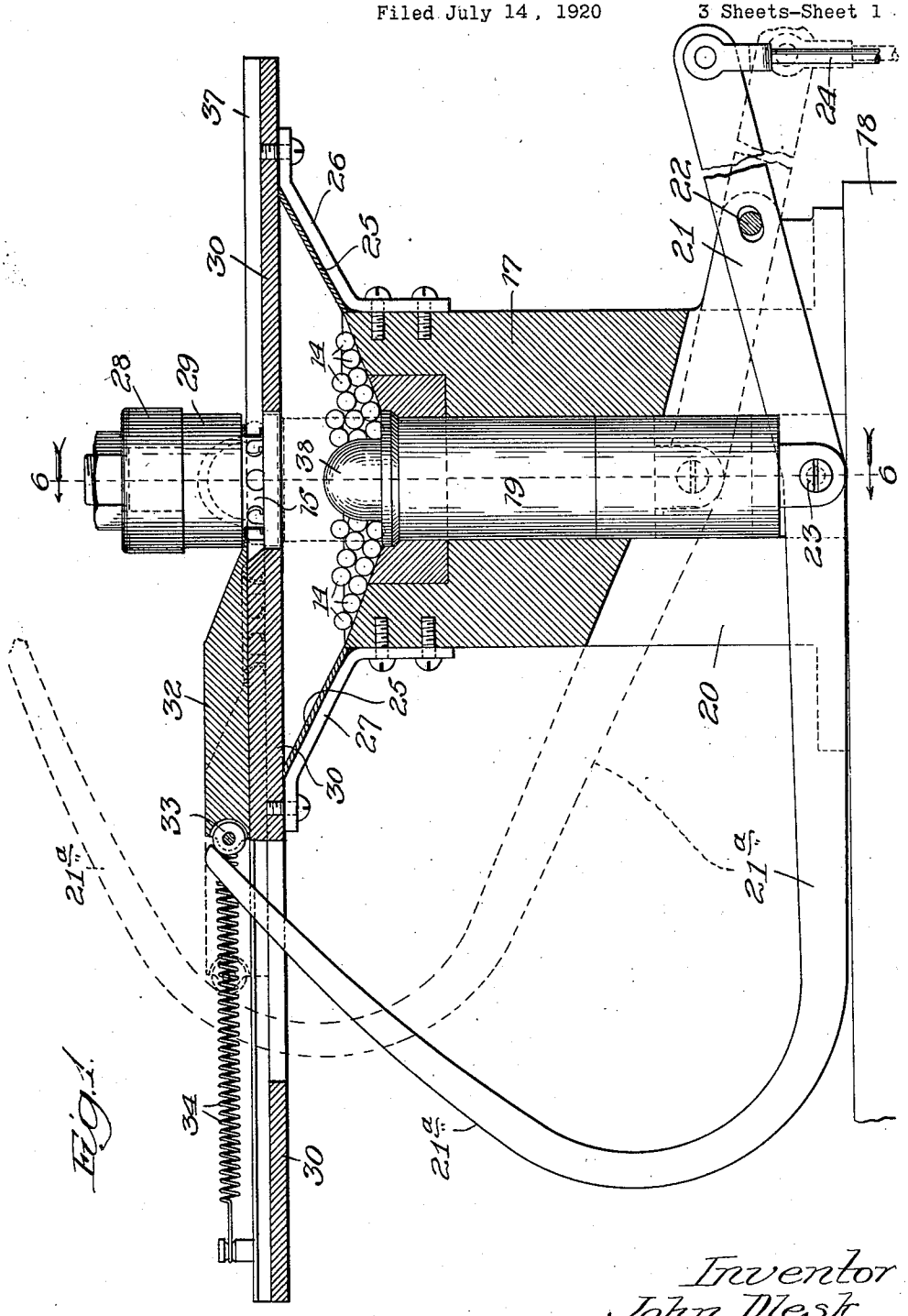



Fig. 1.

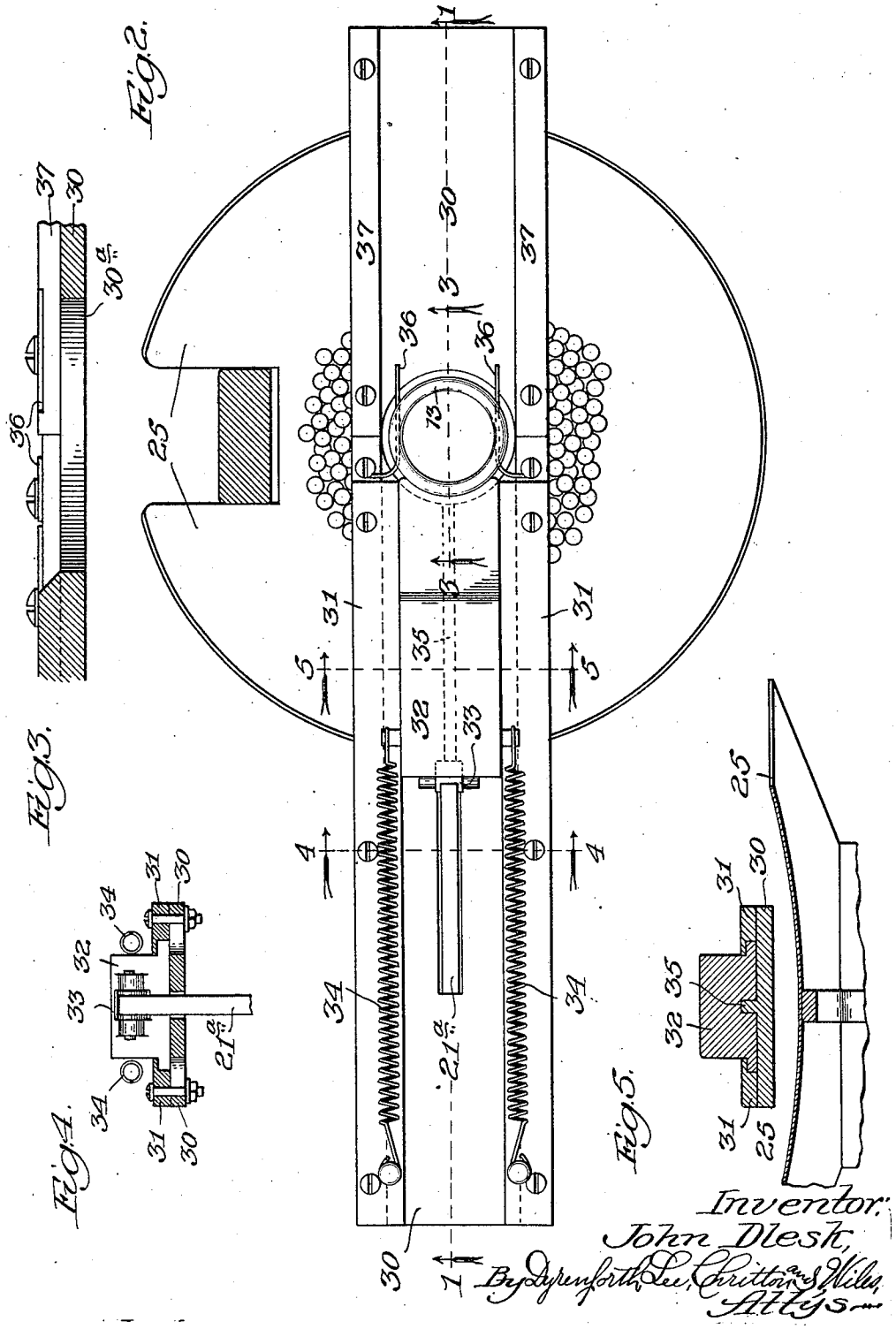
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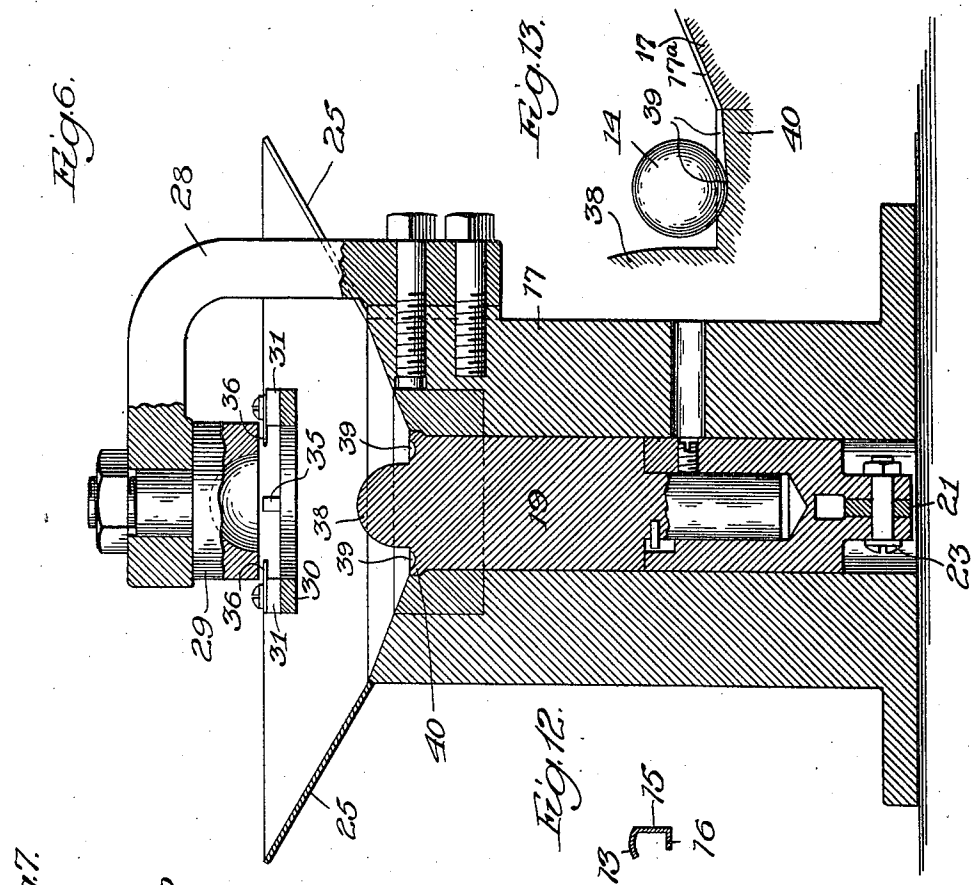


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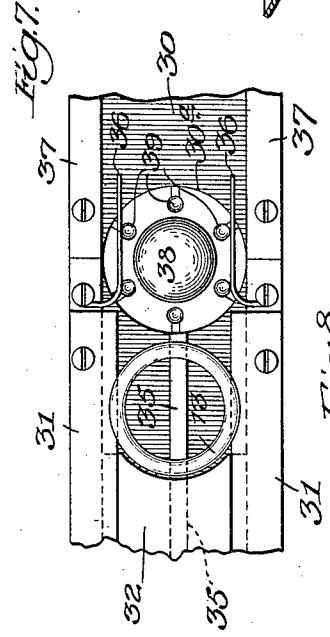
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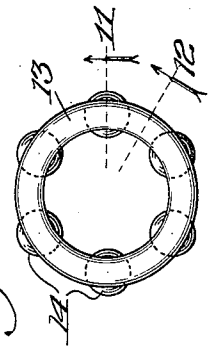






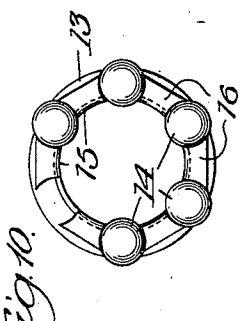












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# UNITED STATES PATENT OFFICE.

JOHN DLESK, OF BERWYN, ILLINOIS, ASSIGNOR TO U. S. BALL BEARING MFG. COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## MACHINE FOR FILLING BALL RETAINERS.

Application filed July 14, 1920. Serial No. 396,241.

*To all whom it may concern:*

Be it known that I, JOHN DLESK, a citizen of the United States, residing at 1406 Union Avenue, Berwyn, in the county of Cook and State of Illinois, have invented a new and useful Improvement in a Machine for Filling Ball Retainers, of which the following is a specification.

This invention relates to a machine for filling ball retainers and is fully described in the following specification and shown in the accompanying drawing in which:

Fig. 1 is a vertical section through the machine on the line 1, 1 of Fig. 2;

Fig. 2 is a plan view;

Fig. 3 is a partial enlarged section on the line 3, 3 of Fig. 2;

Figs. 4 and 5 are partial vertical sections on the lines 4, 4 and 5, 5 of Fig. 2;

Fig. 6 is a vertical section on the line 6, 6 of Fig. 1;

Fig. 7 is a partial detail in plan of the guide way with a ball retainer therein;

Figs. 8, 9 and 10 are front, side and back elevations respectively of a ball retainer with the balls assembled therein; and

Figs. 11 and 12 are sections on the lines 11 and 12 respectively of Fig. 8.

Fig. 13 shows the upper end of the plunger 19 and adjacent parts on an enlarged scale.

This machine is intended to be used for filling ball retainers of the type shown in Figs. 8 to 12 inclusive. The ball retainer 13 consists of an annular ring 13 which is preferably arcuate in cross section as shown in Fig. 11 so as to substantially fit the contour of the balls 14 and has a series of arms 15 projecting from the inner edge of the ring 13, these arms terminating in widened or fan-like ends 16 which are bent back so as to overlie the ring 13 all of them lying in the same plane. The openings between the ends 16 are so proportioned that the balls are inserted by forcing them in normally to these ends.

My machine for doing this has a short column 17 which is adapted to be secured to any suitable support 18 and has a vertical bore in which is slidable a plunger 19. The transverse slot 20 is formed in the bottom of the column 17 in which the lever 21 is pivotally mounted to swing about the fulcrum pin 22. The lever 21 is pivotally connected to the plunger 19 by means of a pin 23 the opposite end of the lever being connected by means of a link 24 with a foot lever (not shown).

The upper end of the column 17 is made in the form of a hollow form which is continued in the circular hopper 25 which is supported by the brackets 26 and 27 which are secured to the column 17. Another bracket 28 is secured to the column 17 as shown in Fig. 6 and supports a die 29 in alignment with the plunger 19.

The brackets 26 and 27 also serve to support the run-way 30 to the sides of which are attached the guides 31, between which slides the slide 32. This slide carries a roller 33 and two springs 34 which keep the roller 33 pressed back against the curved finger $21^a$ which is an extension of the lever 21. The lever is normally maintained in the full length position shown in Fig. 1.

The run-way 30 is provided with a central guide 35 so that when a ball retainer 13 is placed thereon as shown in Fig. 7 the guide way 35 will pass through two of the openings between the ends 16. The run-way 30 is provided with a circular opening $30^a$ in alignment with the plunger 19 so that the plunger may pass therethrough. The guide 31 stops short of the opening $30^a$ and springs 36 are provided which serve to hold the ball retainers 13 centrally over the opening $30^a$, to which position it is pushed by the slide 32, as shown in Fig. 1. Straight sides 37 are provided at the edges of the run-way 30 at the right of the opening $30^a$.

The upper end of the plunger 19 is provided with a rounded tapering portion 38 surrounded by a flat annular shoulder in which are placed a series of depressions 39 which correspond with the openings in the ball retainer 13. The upper end of the column 17 is provided with slight radial grooves or depressions $17^a$ which register with depressions 39 in the end of the plunger 19 when the latter is at the bottom of its stroke. A slight shoulder 40 is placed on the upper end of the plunger 19 and the bore of the column 17 is correspondingly recessed. This provides for a definite bottoming position of the plunger 19 and at the same time provides for the proper agitation of the balls 14 in the hopper. The method of operation of this machine is as follows:

Balls 14 of a suitable size are placed in the hopper 25. The lever 21 is then moved

so as to raise the cam finger 21ª to the dotted line position at which time the springs 34 retract the slide 32 to the position shown in Fig. 7, at which time a ball retainer 13 is placed so that two of the opposite openings therein pass over the guide 35. Upon returning the lever 21 to a normal position, a ball retainer 13 is moved by the slide 32 to the position shown in Fig. 2. The parts are now in the full line position shown in Figs. 1 and 2 with balls 14 partly covering the top of the plunger 19. Upon the next actuation of the lever 21 the plunger 19 is raised and the rounded central portion causes all the balls to be removed therefrom except those which are lined within the depression 39, each of these depressions lying immediately under one of the openings in the bottom part of the ball retainer 13. The plunger now moves on up and a rounded central portion 38 passes thru the ball retainer 13 which is held stationary by the bottom part of the die 29 and the balls 14 resting in the depressions 39 are forced into the openings of the ball retainer.

The slide 32 is now retracted and a new retainer placed over the guide 35 as before.

While I have shown and described but a single embodiment of my invention it is to be understood that it is capable of many more modifications. Changes, therefore, in the construction and arrangement may be made which do not depart from the scope of the appended claims in which it is my intention to claim all novelty inherent in my invention as broadly as possible in view of the prior art.

What I claim as new and desire to secure by Letters Patent is:

1. In a machine for filling ball retainers, a hopper for the balls, an integral plunger reciprocable vertically thru said hopper and adapted to be lowered beneath the balls in the hopper, means on said plunger for holding a predetermined number of balls thereon and means for holding a ball retainer so that the balls held on the plunger will be forced by said plunger into the ball retainer on the next upward reciprocation thereof.

2. In a machine for filling ball retainers, a hopper for the balls, an integral plunger reciprocable vertically thru said hopper and adapted to be lowered beneath the balls in the hopper, depressions in the upper end of said plunger for holding a predetermined number of balls thereon and means for holding a ball retainer so that the balls held on the plunger will be forced by said plunger into the ball retainer on the next upward reciprocation thereof.

3. In a machine for filling ball retainers, a hopper for the balls, a plunger reciprocable vertically thru said hopper and adapted to be lowered beneath the balls in the hopper, means on said plunger for holding a predetermined number of balls thereon, means for holding a ball retainer so that the balls held on the plunger will be forced directly by said plunger into the ball retainer on the next upward reciprocation thereof and a tapered central end on said plunger adapted to center said retainer.

4. In a machine for filling ball retainers, a hopper for the balls, a plunger reciprocable vertically thru said hopper and adapted to be lowered beneath the balls in the hopper, means on said plunger for holding a predetermined number of balls thereon, means for feeding ball retainers to a position above said plunger, and means for guiding said retainers so that the balls held on the plunger will be forced by said plunger into the ball retainer on the next upward reciprocation thereof, said feeding means being operably connected to the plunger operating mechanism.

5. In a machine for filling ball retainers, a hopper for the balls, a plunger reciprocable vertically thru said hopper and adapted to be lowered beneath the balls in the hopper, means on said plunger for holding a predetermined number of balls thereon, means for holding a ball retainer so that the balls held on the plunger will be forced into the ball retainer on the next upward reciprocation thereof, a guideway for said retainers at right angles to the plunger and a block slidable therein for pushing the empty retainers into registration with said plunger.

6. In a machine for filling ball retainers, a hopper for the balls, a plunger reciprocable vertically thru said hopper and adapted to be lowered beneath the balls in the hopper, means on said plunger for holding a predetermined number of balls thereon, means for holding a ball retainer so that the balls held on the plunger will be forced into the ball retainer on the next upward reciprocation thereof, and a ridge on the side of the plunger for agitating the balls in the hopper.

JOHN DLESK.