Jan. 6, 1925. 1,521,819

H. LENZ

FEED HOPPER

Filed April 17, 1922

Fig. 5.



Fig. 6

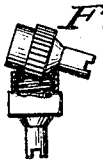


Fig. 1.

Fig. 4.

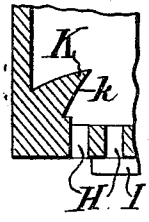


Fig. 3.

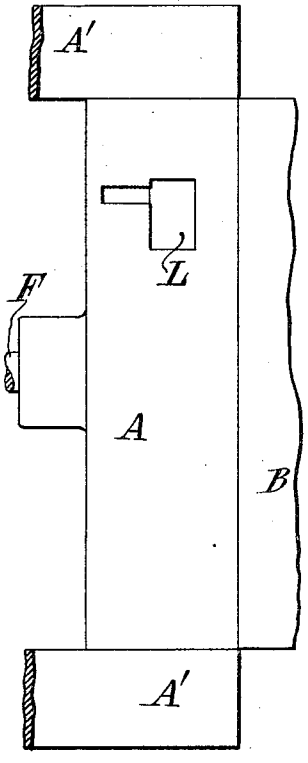
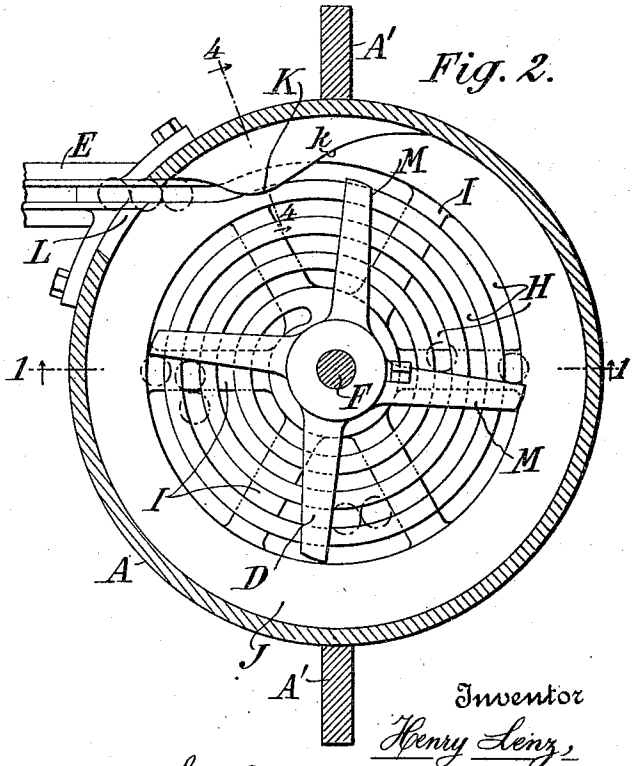


Fig. 2.



Inventor

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UNITED STATES PATENT OFFICE.

HENRY LENZ, OF MASPETH, NEW YORK, ASSIGNOR TO A. SCHRADER'S SON, INCORPORATED, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

FEED HOPPER.

Application filed April 17, 1922. Serial No. 554,283.

To all whom it may concern:

Be it known that I, HENRY LENZ, a citizen of the United States of America, residing in Maspeth, Long Island, county of Queens, and State of New York, have invented certain new and useful Improvements in Feed Hoppers, of which the following is a specification.

The present invention relates to an automatic feed mechanism and aims to provide certain improvements therein. More particularly, it relates to a feed hopper adapted to automatically position and continuously feed elements having an enlarged part and a reduced part forming a shoulder therewith to a track, preparatory to having some mechanical or other operation performed thereon.

In devices of this character heretofore proposed, considerable difficulty has been experienced when it was endeavored to feed hollow or partly hollow elements, particularly so when the enlarged part contained the hollow portion. This was due to the fact that the reduced parts have a tendency to seat or engage in the enlarged hollow parts and jam the feed at the outlet opening.

According to the present invention, I overcome this tendency by providing a suitable baffle or kick-off element which insures a proper continuous feeding of the elements to the outlet opening. I also prefer to make the outlet opening sufficiently large, so as to discharge the elements therethrough if for any reason the track connecting with the hopper groove becomes clogged or blocked.

According to the present invention, I provide a stationary hopper formed with a curved or spiral groove in its base which is preferably flat, and a rotatable propeller arm movable thereon to urge the elements toward the outlet opening after they become seated in the groove. Means are also provided for insuring a limited continuous feeding of elements to the hopper from a suitable receptacle connected therewith, so that the feeding mechanism can be operated for a considerable period without attention. As hereinbefore stated, suitable means are provided for preventing the jamming or blocking of the feed. The invention also includes other features of improvement which will be hereinafter more fully set forth.

In the drawings, wherein I have illustrated one embodiment of my invention particularly adapted for feeding valve cap parts to a suitable track,—

Figure 1 is a diametrical section of the feed mechanism taken on the line 1—1 of Fig. 2, looking in the direction of the arrows.

Fig. 2 is a section taken on the line 2—2 of Fig. 1, looking in the direction of the arrows, the cover plate being omitted.

Fig. 3 is a side elevation of the device, the outlet track being omitted.

Fig. 4 is a detail section of the baffle element or kick-off device, and taken substantially on the line 4—4 of Fig. 2.

Fig. 5 is an elevation, partly in section, of one of the elements adapted to be fed by the feed hopper.

Fig. 6 is a similar view of two such elements in superimposed position.

Referring to Fig. 1, wherein the feed mechanism is shown in assembled relation, let A indicate the feed hopper proper, which has associated with it the element supply receptacle B, the cover plate C, the propelling means D and the outlet track E. The feed hopper A and the supply receptacle B are preferably stationarily mounted upon a suitable support, while the cover plate C and the propelling means D are mounted to rotate within the hopper by being fixedly mounted upon a rotatable shaft F extending centrally through the feed mechanism.

The hopper A, which may be made of any suitable material, is preferably made in the form of a flat hollow cylinder having a solid base G provided with one or more curved spiral grooves H formed therein. These grooves preferably extend through the base of the hopper, and, in order to maintain the integral construction of said base with the side walls, suitable ribs I are retained in the base during the process of forming the grooves H. These ribs are of a thickness not to interfere with the elements moving in the grooves. An inclined wall J connects the top face of the base with the side wall of the hopper. The function of said inclined wall will presently be made apparent. This wall J merges with a baffle or kick-off element K located somewhat in advance of an outlet opening L, connecting with the spiral groove H in the hopper, the function of which will be-

come clear as the description of the invention progresses.

For the purpose of moving the elements which seat in the spiral groove in the base of the hopper toward the outlet end of said groove, any suitable means may be provided. As herein shown, this means consists of the propeller D, which is mounted on the shaft F and adapted to move over the upper face of the base of the hopper. This propeller is preferably formed with a plurality of spaced arms M arranged in the form of a cross, but it will be understood that any other arrangement may be resorted to within the spirit of the invention. In order to reduce the frictional engagement between the propeller arms and the elements in the hopper to a minimum, and to do away with all sharp edges which would have a tendency to indent and abrade the elements being fed, the propeller arms have their edges and ends bevelled or rounded.

The cover plate C, which is fixedly mounted on the shaft F and rotatable within the hopper A, is preferably positioned within said hopper a suitable distance below the top edge thereof, whereby to provide an element holding receptacle. This cover plate is preferably formed with a flat top face which constitutes the bottom of said element holding receptacle, and is provided with an opening N through which the elements are adapted to drop onto the base of the hopper. The size of this opening N and the speed of rotation of said cover plate may be so regulated that the number of elements permitted to pass through said opening may be approximately the same as those fed out of said hopper onto the track E. It is preferable, however, that the number of elements passing through said opening into the hopper be slightly greater than the rate of feed to the track E, the excess of elements being adapted to be discharged through the opening L, which is made considerably larger than the size of the element, and thus permits of elements being discharged therethrough over one side of the track when said track becomes clogged or blocked for any reason.

While it is desirable that the cover plate C always carry a sufficient supply of elements, it is obvious that too great a supply, owing to its weight, would prevent the proper feeding of elements through the opening N. Hence, in order to overcome this tendency, the element supply hopper B is provided. This hopper, which may be of any desired shape, is herein shown as cylindrical in form and as adapted to seat on the outer edge of the hopper A in a suitable groove O provided for this purpose. This hopper B is formed with an inclined bottom P, the lowermost edge of which has an opening Q through which the elements may gradually drop onto the cover plate as the quantity of elements thereon decreases. The bottom of the receptacle B and the cover plate C may thus be considered as partitions in the feed mechanism, the openings in said partitions serving to regulate the supply of elements to the hopper.

An inspection of Figs. 1, 2 and 4 will disclose that the baffle or kick-off element K is positioned slightly in advance of the outlet opening at the terminal of the spiral groove, and that its upper edge overhangs said groove. The purpose of this construction is to prevent the feeding of elements to the track which are superimposed. This will be readily appreciated when one considers that the present device is designed for feeding hollow or partly hollow elements having an enlarged part and a reduced part having a shoulder therebetween, particularly so when the enlarged part contains the hollow portion. When it is endeavored to feed such parts there is a tendency for the elements to seat one on top of the other when being fed in the groove, and it is the baffle or kick-off element K which throws off the upper or superposed element so that a proper feed at the outlet is provided. A consideration of Fig. 1 discloses that the underside of the cover plate C is provided at its outer edge with a bevelled surface R complementary to the bevelled surfaces J in the hopper. These two bevelled surfaces also function as a kick-off for separating the moving elements within the hopper when they become superposed.

In the operation of the device, the feed hopper A, carrying the element supply receptacle B, is stationarily mounted upon a suitable support by means of the ears A'. The cover plate C and the propeller D are caused to revolve within said hopper by any suitable means, such as a pulley or gear (not shown) connected with the shaft F. The shaft F being rotatable, a suitable bushing S may be mounted within the hub of the hopper to reduce the friction of said shaft with respect thereto. The elements which it is desired to automatically position and continuously feed to the outlet track, preparatory to having some mechanical operation performed thereon, are placed in the receptacle B. As herein shown, these elements consist of valve caps of the well known Schrader type, the object of feeding them to a suitable track being to position them preparatory to cutting the screwdriver projection in the smaller end thereof. Now, as the cover plate C rotates, the cap elements will fall thereon through the opening Q. When a sufficient quantity of these elements have accumulated on the plate, certain of them will find their way through the

opening N to the hopper. In the hopper they will be agitated more or less by the revolving spaced arms M, and will eventually become positioned within the spiral groove H, the screw-driver projection being the part of the cap which seats in the groove. The caps which thus become seated are carried along by the arms M until they reach the end of the groove which leads to the outlet track E. If, perchance, any of these caps moving in the groove have a second cap superimposed thereon, said second cap will be kicked off when the cap in the groove passes under the kick-off element K. This kicking off action is gradual, owing to the gradually curved cam surface *k* on the kick-off element K, against which the superimposed element will ride before being finally removed from its superposed position. Likewise, if the quantity of caps within the hopper becomes large and certain of said caps become interlocked or superposed, these caps will be separated when they find their way along the outer inclined edge of the groove where the cooperating bevelled surfaces J and R will function as kick-offs to separate the caps so positioned. If for any reason the track E becomes clogged or blocked with caps, the additional caps moving toward the outlet opening in the groove and to the track are discharged through the enlarged opening L over one side of the track. A suitable chute may be positioned under this opening to receive the discharged caps and direct them to a receiving receptacle.

From the foregoing description and operation it will be appreciated that I have provided an efficient automatic feed mechanism for elements of the character described, said mechanism being simple in construction, continuous in operation, and requiring very little inspection on the part of an operator, who can very readily take care of a battery of a dozen or more such feed mechanisms.

While I have shown and described the feed mechanism as being primarily adapted to feed valve caps, it will be understood that the present device is capable, with slight modification, of feeding any elements having an enlarged portion and a shank or reduced portion. It will also be understood that I do not wish to be limited to a mechanism having a spiral groove, as for some purposes a different shaped groove may prove efficient. Accordingly, I do not wish to be limited to the precise embodiment of the invention as herein disclosed, as various modifications may be resorted to without departing from the spirit of the invention.

What I claim is:—

1. A feed mechanism comprising a stationary hopper having a spiral feed groove greater than 360° in length.

2. A feed mechanism comprising a hopper having a spiral groove therein greater than 360° in length and means for moving elements in said groove toward the end thereof of greatest radius.

3. A feed mechanism comprising a stationary hopper having a feed groove therein and means regulating the supply of parts thereto comprising a plate having a hole therein through which the fed parts may enter the hopper.

4. A feed mechanism comprising a stationary hopper having a feed groove therein and means regulating the supply of parts thereto, said means comprising a partition plate in said hopper and said plate having an opening permitting a limited number of elements to enter the groove containing section of the hopper.

5. A feed mechanism comprising a stationary hopper having a feed groove therein and means regulating the supply of parts thereto, said means comprising a rotatable partition plate in said hopper and said plate having an opening permitting a limited number of elements to enter the groove containing section of the hopper.

6. A feed mechanism comprising a stationary hopper having a feed groove therein and means regulating the supply of parts thereto, said means comprising a plurality of partitions dividing the hopper into a series of superposed compartments, and each partition having an opening permitting the parts to successively pass from the upper to the lower compartment.

7. A feed mechanism comprising a stationary hopper having a feed groove therein and means regulating the supply of parts thereto, said means comprising a plurality of partitions dividing the hopper into a series of superposed compartments, each partition having an opening permitting the parts to successively pass from the upper to the lower compartment, said openings being normally out of alignment and at least one of said partitions being movable relatively to the other one.

8. A feed mechanism comprising a stationary hopper having a feed groove therein and means regulating the supply of parts thereto, said means comprising a plurality of partitions dividing the hopper into a series of superposed compartments, and each partition having an opening permitting the parts to successively pass from the upper to the lower compartment, and at least one of said partitions being movable about an axis passing through the hopper.

9. A feed mechanism comprising a hopper having a groove therein and an outlet track connecting with said groove, and means within the hopper for preventing a jamming of the fed elements at the outlet.

10. A feed mechanism comprising a hopper having a groove therein and an out-

let track connecting with said groove, and means for preventing a jamming of the fed elements within the hopper at the outlet, said means comprising a baffle or kick-off element within the hopper in advance of the outlet.

11. A feed mechanism comprising a hopper having a groove therein and an outlet track connecting with said groove, and means for preventing a jamming of the fed elements within the hopper at the outlet, said means comprising a baffle or kick-off element within the hopper in advance of the outlet, and an enlarged clearance opening surrounding the outlet.

12. In combination, a feed mechanism for elements having an enlarged part and a reduced part comprising a hopper having means therein in which the reduced part of said elements are adapted to seat, an outlet in said hopper, a track connecting with said outlet, means for preventing a jamming of said elements within the hopper, and means urging said elements onto said track.

13. A feed mechanism comprising a substantially cylindrical hopper having a conical surface connecting its interior side and base, and a disk-like cover plate for said hopper having a complementary conical surface in proximity to that on the hopper.

14. A feed mechanism comprising a stationary substantially cylindrical hopper having a conical surface connecting its interior side and base, and a rotatable disk-like cover plate for said hopper having a complementary conical surface in proximity to that on the hopper.

In witness whereof, I have hereunto signed my name.

HENRY LENZ.