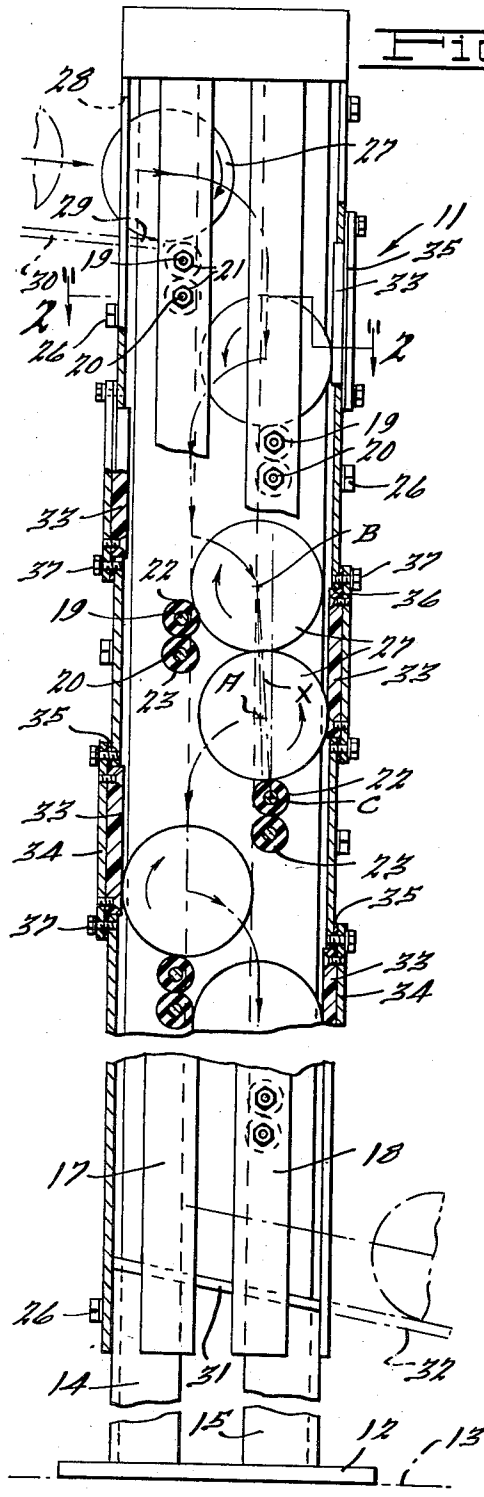
June 16, 1959 H. A. SCHURICHT 2,890,780

DEVICE FOR LOWERING PARTS WITHOUT UNDUE IMPACT

Filed May 17, 1957

Fig. 1.



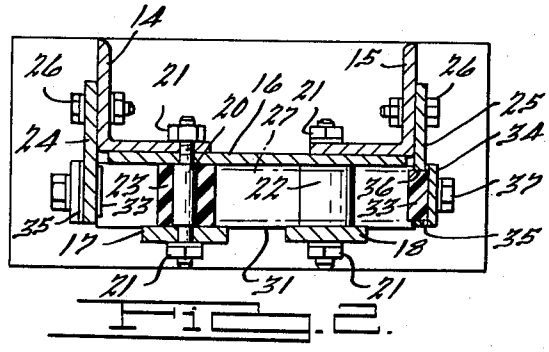


Fig. 2.

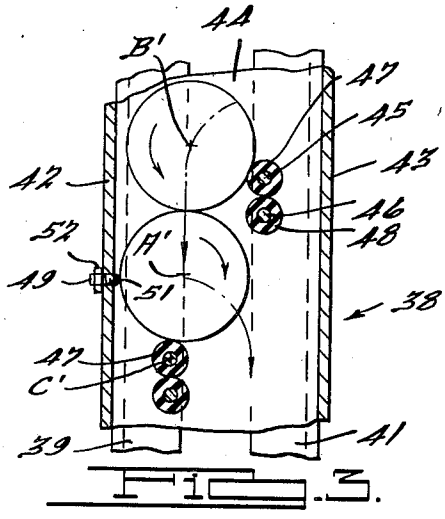


Fig. 3.

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United States Patent Office 2,890,780 Patented June 16, 1959

2,890,780

DEVICE FOR LOWERING PARTS WITHOUT UNDUE IMPACT

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Application May 17, 1957, Serial No. 659,923

7 Claims. (Cl. 193—27)

This invention relates to devices for lowering parts, and more particularly to chutes capable of lowering circular parts from an elevated inlet point to a lower discharge point without undue impact.

It is an object of the invention to provide a novel and improved chute for lowering circular parts in which the speed with which the parts are lowered may be closely controlled without the use of power mechanisms in order to insure that the parts will not be damaged.

It is another object to provide an improved device of the above nature which can be constructed for lowering parts of different diameters and for different heights, and in which unwanted acceleration of the parts may be eliminated during their downward movement.

It is a further object to provide an improved chute of this character which includes means for adjusting the rate of movement of the parts in each portion of the chute.

It is also an object to provide an improved lowering device of this character which may transfer parts such as gears in quick succession without the danger of interlocking of the parts to an extent which could halt their downward movement.

It is a further object to provide an improved device of the above nature which is simple in construction and inexpensive to maintain.

Other objects, features and advantages of the present invention will become apparent from the subsequent description, taken in conjunction with the accompanying drawings.

In the drawings:

Figure 1 is an elevational view of one embodiment of the invention, parts being broken away for clarity, and showing the construction of the bumpers and side guides;

Figure 2 is a plan view in cross section taken along the line 2—2 of Figure 1 and showing the construction of the framework of the chute as well as the manner of mounting the bumpers; and

Figure 3 is a fragmentary elevational view of a modified form of the invention which utilizes an adjustable type of side guide, especially suited for unfinished parts.

In general terms, the invention comprises a vertical chute having means for receiving circular parts at its upper end. A plurality of resilient bumpers are disposed in spaced staggered relation within the chute in such a manner that each part may roll down through the chute in a zigzag or oscillating manner, hitting each resilient bumper as it descends. The spacing between the bumpers and side walls of the device will cause each part to reverse its direction of rotation as it descends from bumper to bumper. The parts will also vibrate as they hit each resilient bumper, and the momentum of each part will thus be effectively checked at each point of deflection in its path, thus permitting the parts to be lowered and ejected undamaged at a controlled speed. Side guides are provided adjacent each bumper for controlling the position of each part with respect to the corresponding bumper, and these side guides are adjustably mounted so that the speed of descent of the parts may be varied. The disposition of the side guides with respect to the bumpers is such that interlocking of adjacent workpieces within the device which might interrupt continued descent will be prevented.

Referring more particularly to the drawings, Figures 1 and 2 show a suitable embodiment of the invention which is generally indicated at **11**. The chute comprises a base **12** mounted on floor **13** and a pair of angle iron posts **14** and **15** secured at their lower ends to base **12** and extending upwardly therefrom. As is seen best in Figure 2, a vertically extending plate **16** is secured to posts **14** and **15**, extending between these posts to form one end wall of the chute. A pair of plates **17** and **18** are secured in spaced parallel relation with respect to plate **16** by means of a plurality of studs **19** and **20** which are disposed in pairs in staggered relation along the chute. More particularly, each pair of studs **19** and **20** are in vertically spaced relation and are closely adjacent each other. Considering the uppermost pair of studs **19** and **20** shown in Figure 1, these studs extend through post **14**, side plate **16** and end plate **17**. The next pair of studs **19** and **20** are spaced below the first pair and extend through post **15**, plate **16** and plate **18**.

Each stud **19** or **20** comprises a smooth central portion disposed within the chute and threaded end portions on which are mounted nuts **21**. Annular bumpers **22** and **23** of resilient material such as neoprene are mounted on the smooth central portions of studs **19** and **20** respectively and act as bumpers as will be further described below. It will be seen from an examination of Figure 2 that by tightening nuts **21** when bumpers **22** and **23** are in place, studs **19** and **20** will serve to secure together posts **14** and plates **16**, **17** and **18** in a rigid unitary construction.

Chute **11** is further provided with side plates **24** and **25**, these plates being secured to posts **14** and **15** by appropriate means such as bolts **26**. Plates **24** and **25** extend toward plates **17** and **18** so as to form a chute which is at least partially enclosed on all four sides to guide circular workpieces such as are indicated at **27**.

The upper end of chute **11** is provided with an opening **28** in plate **24** and an inclined platform **29** leading into chute **11** so that an inclined conveyor such as is indicated by dot-dash lines at **30** may be utilized to convey parts **27** into the upper end of the chute. Likewise, the lower end of chute **11** is provided with an inclined exit platform **31** so that parts **27** may leave the chute onto an inclined conveyor **32**.

The location and spacing of bumpers **22** and **23** is such that as each part **27** enters the top of the chute it will engage the uppermost bumper **22** and will roll over this bumper toward plate **25**. The spacing between plates **17** and **18** and plate **16** is slightly greater than the thickness of parts **27**, and the spacing between the uppermost bumper **22** and wall **25** is such that the parts may drop with slight clearance past this bumper. Adjacent each pair of bumpers **22** and **23** is mounted a side guide **33**, this guide being fabricated of material such as laminated plastic which will not harm the metal parts upon contact. As seen best in Figure 1, these side guides may be mounted on walls **24** and **25** by means of mounting plates **34**, with the shims **35** being located between the mounting plates and the walls and with guides **33** projecting through apertures **36** in the wall. Bolts **37** may be utilized to secure plates **34** to walls **24** and **25**. In this manner, it will be seen that the distance which guides **33** project into the chute **11** may be varied by changing the thickness of shims **35**.

As each part **27** drops past the highest bumper **22** it

will drop until it hits the next bumper **22** and will then vibrate, reverse its rotation, and roll off this bumper. In doing so, the upper end of part **27** will pass the next uppermost bumper **23** which is spaced so that the parts may roll past it. Each part **27** will thus descend in a staggered manner reversing its rotation each time it hits a bumper **22**.

The location of each guide **33** with respect to its corresponding bumper **22** is best seen in Figure 1, which illustrates two adjacent parts **27** in contacting relation. Considering the axis of the part **27** resting on a bumper **22** to be designated by A, the axis of another part **27** resting on the first part to be designated by B, and the axis of the bumper **22** to be designated by C, the position of guide **33** is such that axis A will be spaced from a line X drawn through axes B and C in such a direction as to insure that the parts will continue to drop. In other words, the center of gravity of the part **27** which rests on bumper **22** will be at all times laterally spaced towards the center of the chute so that the part may roll off the bumper. By varying the thickness of shims **35**, the location of the center of gravity of each part **27** with respect to the bumper upon which it rests may be varied so as to control the forces tending to cause further descent of each part.

Operation

The operation of the device will be clear from the foregoing description. Assuming a part **27** enters along inclined entrance platform **29**, it will roll onto uppermost bumper **22** and will then roll down past this bumper, engaging side guide **33** and hitting the next lowermost bumper **22**. The vibration which part **27** will undergo when it hits the bumper and the frictional engagement between the bumper and part will cause the part to reverse its rotation and roll off the bumper toward side wall **24**. As it does so it will clear bumper **23** which is next above it, this bumper preventing undue upward movement of the part during its vibrational period. As the part rolls down past the second bumper it will hit the next bumper **22** below, being guided again by the adjacent guide **33**. The part will thus descend in an oscillating manner, its movement being stopped each time it hits a bumper, and will finally exit on inclined ramp **31**.

It will be noted that during its entire descent each part **27** will not engage any metallic portions of chute **11** and will thus be protected from any abrasive action which might damage the part. In this regard, it should be observed that the height of each guide **33** is such that as parts **27** approach the side walls **24** and **25** they will only engage the guides and not the walls themselves. Due to the position of the side guides **33**, parts **27** which are in contacting relation as shown in Figure 1 may still descend since the center of gravity of each part **27** resting on a bumper **22** will be located sufficiently close to the center of the chute.

Figure 3 illustrates a modified form of the invention generally similar in principle to that of Figures 1 and 2 but in which a different form of side guide is provided especially adapted for use with unfinished workpieces. The chute shown in Figure 3 is generally indicated at **38** and includes posts **39** and **41** and side walls **42** and **43** as well as an end wall **44**. The end walls which are in spaced parallel relation to end wall **44** (corresponding to plates **17** and **18** of Figures 1 and 2) are not visible in Figure 3. A plurality of pairs of studs **45** and **46** carrying bumpers **47** and **48** respectively are shown in Figure 3, these pairs of studs and bumpers being in spaced staggered relation as in the previous embodiment.

The side guides, in the embodiment of Figure 3, comprise a plurality of studs **49** threaded in apertures **51** of plates **42** and **43** in spaced relation above their corresponding bumpers **47**. These studs are locked in adjusted position by means of nuts **52**, and the studs may project a preselected distance into the interior of chute **38**. In this manner, it will be seen that the position of axis A' of a part **53** with respect to axes B' and C' of a succeeding part **53** and bumper **47** respectively may be varied. It will be noted that studs **49**, being made of metal, will not be suitable for finished parts such as gears but may be used when unfinished parts such as gear blanks are to be lowered. The height of each stud **49** with respect to its corresponding bumper **47** will be such that when a part **53** is resting on the bumper an extension of the axis of stud **49** will be closely adjacent axis A' of the part.

While it will be apparent that the preferred embodiments of the invention disclosed are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. In a chute for permitting the descent of circular metal parts without undue impact, a pair of posts, a plate extending between said posts and comprising one vertical end wall of an enclosure, a pair of plates in spaced parallel relation with said first plate, side walls secured to said posts whereby said plates and side walls comprise a chute enclosure, a plurality of studs secured between said first plate and said pair of plates, said studs being in spaced staggered relation within said enclosure, and a plurality of resilient annular bumpers mounted on said studs within said enclosure, said bumpers being relatively located so that parts will descend within said enclosure in a zigzag manner engaging successive bumpers.

2. The combination according to claim 1, further provided with means mounted on said side walls adjacent each of said bumpers for locating parts resting on said bumpers in such a position that the centers of gravity of said parts will be spaced laterally from the axes of said bumpers in a direction toward the center of said enclosure.

3. The combination according to claim 2, said last-mentioned means comprising a plurality of flat blocks of relatively soft material, apertured portions in said side walls, said blocks being mounted in said apertured portions and projecting into said chute enclosure, mounting plates for said blocks, said blocks being secured to said mounting plates, means for securing said mounting plates to said side walls, and shims disposable between said mounting plates and said side walls for varying the distance which said blocks project into said enclosures.

4. The combination according to claim 2, said last-mentioned means comprising a plurality of studs threadably mounted in said side walls and projecting into said enclosure, and lock nuts for securing said studs in their adjusted position.

5. In a chute for permitting circular parts of a predetermined diameter and thickness to descend without undue impact, a substantially vertical enclosure having end walls spaced a distance slightly greater than the thickness of said parts and having side walls spaced a substantially greater distance than the diameter of said parts, a plurality of resilient bumpers extending between said end walls in spaced staggered relationship, alternate bumpers being adjacent alternate side walls, the bumpers being relatively positioned so that parts may drop with reversing rotation from bumper to bumper in an oscillating path, and a positioning guide adjacent each bumper on the corresponding side wall, the location of each positioning guide and the vertical positioning of the bumpers being such that the axis of a part resting on a bumper will be displaced toward the chute center with respect to a line connecting the axes of the bumper and a part resting on said first part.

6. The combination according to claim 5, further provided with means for adjusting each of said positioning guides in a direction transverse to the extent of said chute.

7. In a chute for permitting circular parts to descend without undue impact, an enclosure having end walls spaced apart a distance slightly greater than the thick-

ness of the parts and side walls spaced apart a distance substantially greater than the diameter of the parts, a plurality of pairs of circular resilient bumpers, said pairs extending between said end walls and being in spaced staggered relation within said enclosure so as to guide the parts in a zigzag manner, the spacing between the upper bumper of each pair and the lower bumper of the pair next above being slightly greater than the diameter of the parts, and a positioning guide adjacent each upper bumper on the corresponding side wall, the location of each positioning guide and the vertical positioning of

the bumpers being such that the axis of a part resting on an upper bumper will be displaced toward the chute center with respect to a line connecting the axes of said upper bumper and a part resting on said first part.

References Cited in the file of this patent

UNITED STATES PATENTS

1,133,436	Gramling	Mar. 30, 1915
1,774,223	Beucler	Aug. 26, 1930
2,105,929	Rehnberg	Jan. 18, 1938
2,674,226	Manning	Apr. 6, 1954