

No. 682,158.

Patented Sept. 10, 1901.

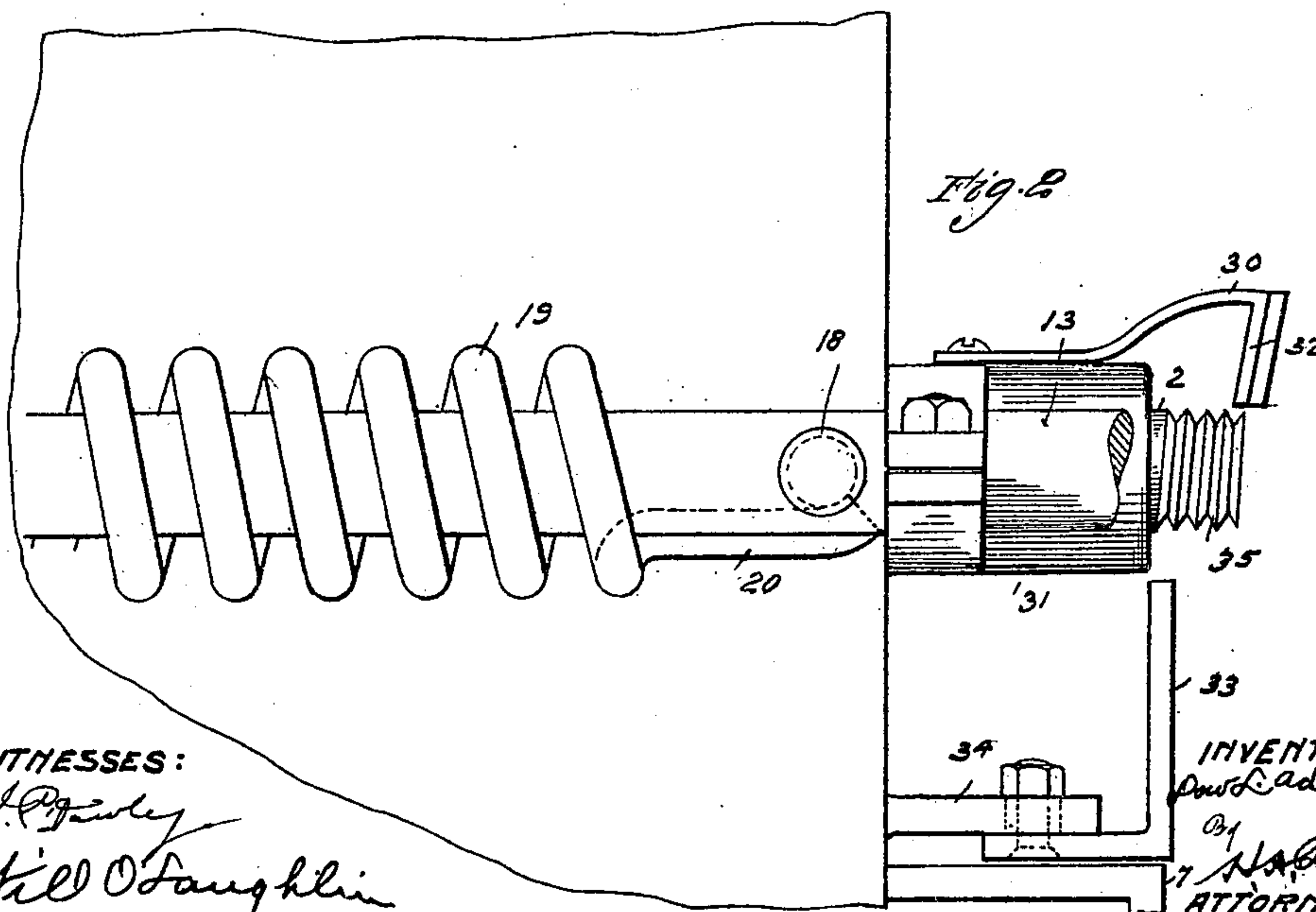
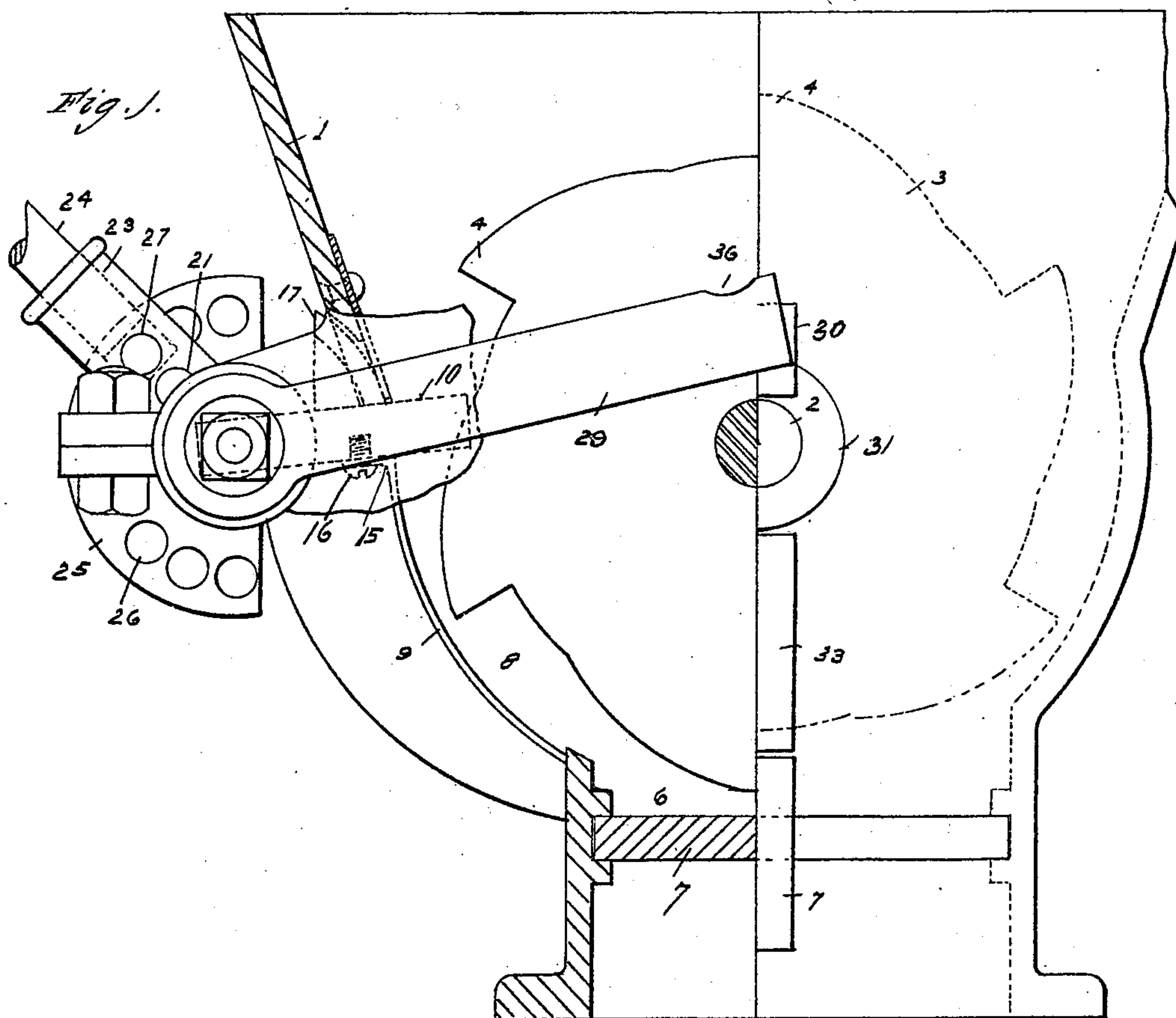
D. L. ADELSPERGER.

APPARATUS FOR GRINDING, CRUSHING, OR FEEDING.

(Application filed May 23, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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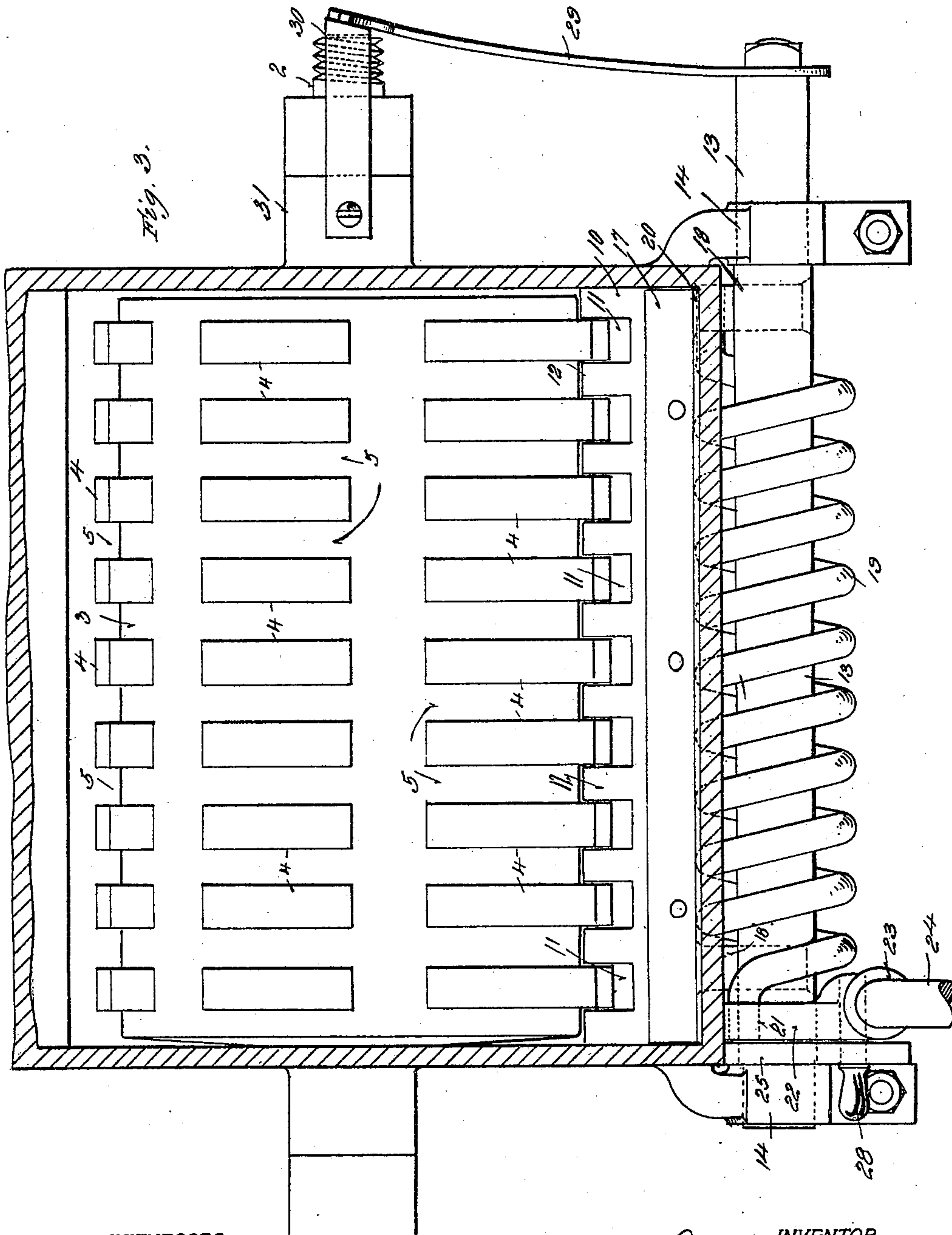
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2 Sheets—Sheet 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR GRINDING, CRUSHING, OR FEEDING.

SPECIFICATION forming part of Letters Patent No. 682,158, dated September 10, 1901.

Application filed May 23, 1901. Serial No. 61,498. (No model.)

To all whom it may concern:

Be it known that I, DOW L. ADELSPERGER, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Apparatus for Grinding, Crushing, or Feeding, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to improvements in apparatus for grinding, crushing, or feeding, and has for its object to provide a construction whereby in case of the passage of any hard foreign substance through the apparatus such substance will be diverted from the ordinary path of discharge of the product of the apparatus, so that the normal output will be uniform and free from such hard substances.

20 The particular form of apparatus chosen for purposes of illustration is one in which the structure is adapted for the purpose of feeding material to an attrition-mill or other grinding-mill, although the apparatus has to some extent a crushing or grinding function, in that if the material is coarse and unbroken or only partly broken it will deliver the material in a finer condition than that in which it is received. It sometimes occurs that hard substances—such as nuts, bolts, pebbles, or other hard foreign bodies—are present in the material to be treated and are not discovered until the material has passed through the crusher or feeding apparatus, and sometimes not even then. When one of these hard bodies becomes thus mingled with the output of the apparatus, it is apt to endanger the grinding-mill either by breaking it or by causing sparks, which may in turn cause a fire if not removed prior to the introduction of the material into said mill, and even if its passage is discovered it is a matter of considerable difficulty and loss of time and material to remove it prior to the delivery of the output to the attrition or grinding mill.

45 My present invention in its preferred form has for its object to divert the product or output of the apparatus upon the passage of such a hard foreign body through the same, so that the portion of the product containing said hard foreign body will be discharged at

a different point from the normal discharge, such action occurring automatically and insuring that the output at the normal point of discharge shall be free from substances dangerous to the grinding or attrition mill by means of which it is subsequently treated.

To these and other ends my invention consists in certain novel features, which I will now proceed to describe and will then specifically point out in the claims.

In the accompanying drawings, Figure 1 is a side elevation, partly in vertical section, of an apparatus embodying my invention in one form. Fig. 2 is a detail front elevation, and Fig. 3 is a plan section.

In the said drawings, 1 indicates a hopper, and 2 a shaft mounted therein and carrying a grinding, crushing, or feeding roll 3 of any approved construction. In the present instance I have shown this roll as being provided with a plurality of circular rows of teeth 4, separated by intervening spaces 5. This shaft and its roll may be driven in any suitable manner.

6 indicates the normal discharge-outlet of the hopper, which is controlled by a cut-off slide 7 in the manner usual in devices of this character. In one side of the hopper, adjacent to the roll 3, is formed an opening 8, which serves as an emergency-outlet in the manner hereinafter described, being normally closed by a door or valve 9. This door or valve is secured to or otherwise suitably connected with a yielding bar 10, arranged in close proximity to the roll 3, so that the material operated upon must pass between said bar and roll. In its preferred form this bar is provided with a series of recesses 11 in its free margin, coinciding with the circular rows of teeth 4 on the roll and with projecting teeth 12, which fit within the annular grooves or spaces 5 of the roll. The yielding bar 10 is mounted on a rock-shaft 13, which is preferably located outside of the hopper, being supported in bearings 14 from the hopper and the yielding bar extending through the opening 8 in the side of the hopper at the upper end of said opening. When this construction is employed, the upper end of the valve or door 9 is secured directly to the under side of the bar, and in the present in-

stance I have shown said valve or door as provided at its upper end with a flange 15, which is secured to the bar by screws 16. The bar 10 is provided on its upper surface with a
 5 curved guard or shield 17, which coöperates with the upper edge of the opening 8 and serves to keep that portion of said opening above the bar closed throughout the range of movement of the bar. As a convenient mode
 10 of securing the bar to the rock-shaft I have shown said bar as provided with projecting pins or shanks 18, which pass through corresponding apertures in the rock-shaft and are secured by upsetting or riveting. The bar
 15 10 is normally held at its upward limit of motion by means of a spring 19, which is preferably coiled around the rock-shaft and has one end connected with said shaft and the other end connected with the hopper or some
 20 other fixed part. In the present instance I have shown one end of the spring as resting against one of the pins or shanks 18, as indicated in dotted lines at 20 in Figs. 2 and 3. The other end of the spring 19 is inserted in
 25 an aperture 21 in a collar 22, which is loosely mounted on the rock-shaft 13, and this collar is provided with a socket 23, in which may be inserted the end of a removable lever 24, by means of which the collar may be turned
 30 upon the shaft, so as to regulate the tension of the spring. In order to secure the collar after adjustment, there is provided on the hopper a segmental tension-plate 25, having a circular series of apertures 26 therein, while
 35 the socket-piece 23 is provided with an aperture 27, which may be caused to register with any one of the apertures 26. When the parts are in this position, a pin 28 may be passed through both apertures and will serve to secure the tension-collar in the position to which
 40 it has been adjusted.

With an apparatus constructed as above described when any hard object of sufficient size is introduced when it attempts to pass
 45 down between the yielding bar and the roll the bar will be depressed by the engagement of said object between it and the roll, and this yielding of the bar will at the same time open the door or valve 9, so that that portion
 50 of the product which contains the foreign substance will be discharged through the opening 8, which thus constitutes an emergency-outlet for the product of the apparatus. The normal outlet 6 thus discharges only
 55 such parts of the product as are free from any hard substances which would tend to injure the machinery by which said product is further treated, while those portions of the product which contain objectionable foreign
 60 bodies are discharged through the emergency-outlet, such emergency discharge taking place automatically.

It will be understood, of course, that the tension-spring 19 may be so regulated as to
 65 adapt it to accomplish its functions in a satisfactory manner. Ordinarily this spring may

be relied upon to return the parts to their normal position and close the emergency-outlet after the passage of the foreign body through this latter. In order to insure, how- 70
 ever, that the yielding bar will not return to its normal position and close the door or valve 9 before the foreign body has had time to pass out through the emergency-outlet, I provide means for positively holding the door or 75
 valve open during a predetermined period of time after the yielding of the bar. In its preferred form this mechanism consists of a yielding arm 29, preferably a spring-arm, secured to the rock-shaft 13 at or near one end 80
 thereof and of a length sufficient to extend across the shaft 2 of the roll. When the parts are in their normal position, this arm 29 rests against a stop 30, located immediately above the end of the shaft 2 and supported in any 85
 suitable manner—as, for instance, by mounting it on the bearing-box 31 of said shaft. It will be observed that the working face 32 of the stop 30 extends slightly beyond the end of the shaft 2 and is preferably inclined 90
 toward the same, as shown most clearly in Fig. 2. Below the shaft 2 there is mounted an adjustable stop 33, which may be moved in or out along a line parallel with the shaft 2 and which may be mounted in any suitable 95
 manner—as, for instance, by being adjustably clamped to a slotted lug 34, extending from the frame of the hopper. The end of the shaft 2 is provided with a spiral thread 35.

When the parts are normal, the free end 100
 of the arm 29 rests against the stop 30, and when the yielding bar is depressed the end of said arm 29 passes over the end of the shaft 2 and moves downward below said shaft, its elasticity throwing it inward toward the 105
 stop 33, which stop by its position determines the limit of the inward motion of the arm. As soon as the foreign body has passed between the bar and roll the spring 19 tends to return the parts to their normal position; but 110
 such return is prevented by the engagement of the arm 29 with the under side of the shaft 2. The point where this engagement takes place is determined by the position of the stop 33. This portion of the shaft being 115
 threaded, the upper edge of the arm engages with the thread, and, if desired, that portion of the arm which contacts with the thread may be shaped to better engage the same, as indicated at 36 in Fig. 1. As the shaft 2 con- 120
 tinues to rotate the engagement of the free end of the arm 29 with the thread thereon moves the free end of said arm outward toward the end of the shaft, and when said arm reaches the end of the shaft the spring 19 is 125
 then permitted to return the parts to their normal position, thereby closing the emergency-outlet and bringing the arm 29 once more into contact with the stop 30. By properly adjusting the stop 33 the distance from 130
 the end of the shaft 2 at which the arm 29 will engage the thread thereon may be regu-

lated, and this regulation will also determine the length of time during which the emergency-outlet will remain open after the passage of the foreign body between the yielding bar and roll.

While I have hereinbefore described my invention as employed in connection with a feeding device, yet it is obvious that it also may be embodied in a crushing-mill or a grinding-mill, if desired. Moreover, while I have employed the term "bar" to indicate the yielding member which coöperates with the roll for the purpose of actuating the emergency valve or door, this coöperating part may be given any suitable shape other than that shown, or a plurality of such parts may be employed, and the yielding movement may be other than the vibratory movement hereinbefore set forth. Nor do I wish to be understood as limiting myself to the precise details of construction hereinbefore described, and shown in the drawings, as the same may be modified without departing from the principle of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus of the character described, provided with a normal point of discharge of the products thereof, the combination, with a roll, of a yielding bar arranged in close proximity to said roll, means controlled by the yielding of said bar for diverting the product from said normal point of discharge, and means for retarding the return of the parts to their normal position, substantially as described.

2. In an apparatus of the character described, the combination, with a roll, and a yielding bar arranged in close proximity to said roll, of a hopper or casing provided with a normal discharge-outlet and an emergency-outlet, and a door or valve for said emergency-outlet connected with and operated by the yielding bar, substantially as described.

3. In an apparatus of the character described, the combination, with a hopper or casing, and a roll mounted therein, said hopper or casing being provided with a normal discharge-outlet and an emergency-outlet, of a yielding bar arranged in close proximity to said roll, a rock-shaft on which said bar is mounted, and a door or valve for the emergency-outlet connected with and operated by said yielding bar, substantially as described.

4. In an apparatus of the character described, the combination, with a roll, of a hopper or casing provided with a normal discharge-outlet and an emergency-outlet, a yielding bar arranged in close proximity to the roll, a spring controlling said yielding

bar, and means for adjusting the tension of said spring, substantially as described.

5. In an apparatus of the character described, the combination, with a roll, of a hopper or casing provided with a normal discharge-outlet and an emergency-outlet, a rock-shaft mounted externally of said hopper or casing, a yielding bar carried by said rock-shaft and extending through an opening into close proximity with the roll, and a guard or shield carried by said yielding bar and serving to close that portion of the emergency-outlet above said bar, substantially as described.

6. In an apparatus of the character described, the combination, with a hopper or casing, of a roll mounted therein, a yielding bar located in close proximity to said roll, a rock-shaft on which said bar is mounted, a spring coiled on said rock-shaft and connected therewith at one end, a loose collar on said rock-shaft with which the other end of said spring is connected, and provided with an aperture, a fixed tension-plate having a series of apertures with which the aperture of the collar may register, and a pin for adjustably connecting said collar and tension-plate, said hopper or casing being provided with normal and emergency outlets, and said yielding bar having connected therewith a door or valve controlling the emergency-outlet, substantially as described.

7. In an apparatus of the character described, the combination, with a roll having a threaded shaft, of a casing having normal and emergency outlets, a rock-shaft provided with a yielding bar located in close proximity to the roll, a spring controlling said yielding bar, and a yielding arm connected with said rock-shaft and adapted to engage with the thread of the roll-shaft when the yielding bar is depressed, substantially as described.

8. In an apparatus of the character described, the combination, with a roll having a threaded shaft, of a yielding bar located in proximity to said roll, a rock-shaft on which said bar is mounted, a spring controlling said bar and rock-shaft, a yielding arm connected with the rock-shaft and adapted to engage the thread of the roll-shaft when the bar is depressed, and stops located on opposite sides of the threaded portion of said roll-shaft, that one of said stops with which the yielding arm engages when the bar is depressed being adjustable, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

DOW L. ADELSPERGER.

Witnesses:

IRVINE MILLER,
E. O. HAGAN.