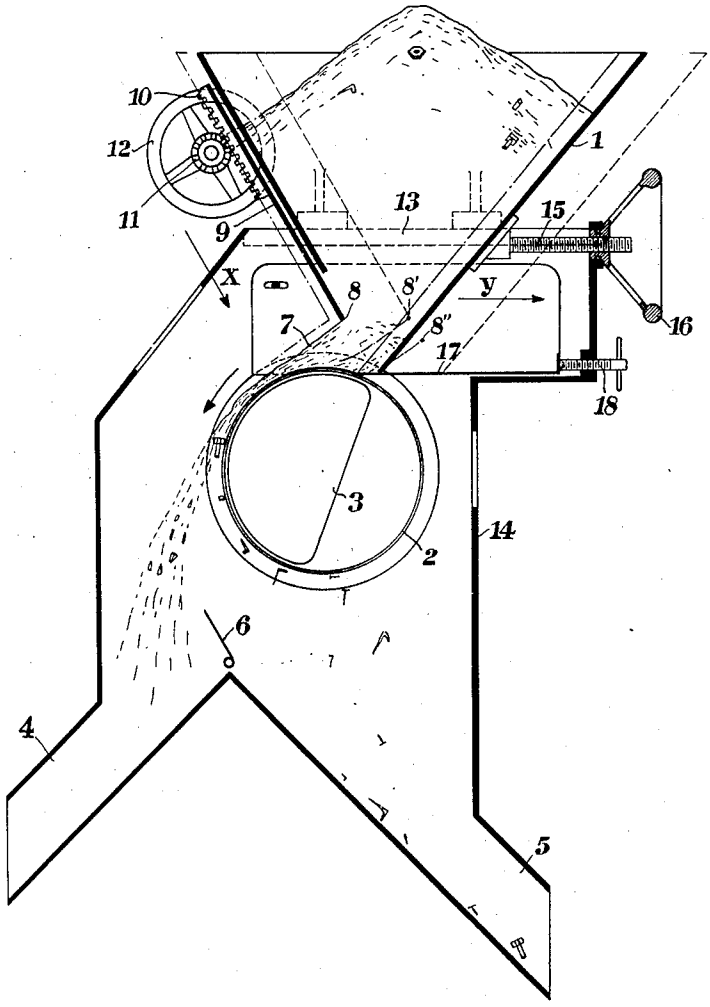
July 12, 1932. G. ULLRICH 1,866,781

CHARGING DEVICE OF THE HOPPER TYPE

Filed March 22, 1928



Inventor
George Ullrich
By Knight Bros
Attys

Patented July 12, 1932 1,866,781

UNITED STATES PATENT OFFICE

GEORG ULLRICH, OF MAGDEBURG, GERMANY, ASSIGNOR TO FRIED. KRUPP GRUSONWERK AKTIENGESELLSCHAFT, OF MAGDEBURG-BUCKAU, GERMANY

CHARGING DEVICE OF THE HOPPER TYPE

Application filed March 22, 1928, Serial No. 263,850, and in Germany May 28, 1927.

This invention relates to charging devices for the feeding of materials of any kind, the said charging devices being of the type wherein the material to be fed is contained in a hopper, a rotary drum or cylinder on which the material rests and the rotation of which allows and promotes the discharge of the material from the hopper, being arranged below said hopper.

In such devices, where a slide or damper has been provided in the charging hopper with the object of regulating the quantity of material fed, such regulation was not effected in a satisfactory manner, because when the quantity of material fed was small, the feeding opening or slot was so small that it was liable to become clogged or choked, whereas when a wide opening was provided, the contents of the hopper were liable to pass through it too rapidly. Moreover, the wear of the drum or cylinder was considerable, as the material passing through the narrow space between the drum and the slide was liable to be jammed against the surface of the drum, which was thus furrowed. These difficulties were especially troublesome with the feeding of materials comprising particles of relatively large size. The principal object of the invention is to overcome these difficulties, while enabling the quantity of material fed to be regulated within wide limits in a simple manner.

According to the invention means are provided whereby relative adjustment between the drum and the hopper can be accomplished.

In order that said invention may be clearly understood and readily carried into effect, the same will now be described more fully with reference to the accompanying drawing illustrating in sectional elevation an example in which the drum is associated with a magnet so that the material fed is at the same time separated into magnetic and non-magnetic material.

Below a charging hopper 1 is mounted a drum 2 which rotates about a fixed magnet 3. The non-magnetic material falls over the drum 2 into a discharge conduit 4, whilst the magnetic material is attracted by the magnet 3 and passes into another discharge conduit 5. An adjustable damper or flap valve 6 may be arranged to cooperate in the separation of the streams of material. As is well known, the material rests upon the drum 2 with a given angle of inclination which depends on the nature of the material. If the line 7 determining the angle in question passes in front of the circumference of the drum 2, the material will flow out even when the drum is stationary, but when the line strikes the circumference of the drum the material will be discharged only if the drum rotates, and if for instance the lower edge 8 of the discharge slide is moved so far that the line 7 no longer strikes the drum 2 but strikes a bottom plate or the like closing the hopper, a discharge cannot take place even when the drum is rotating.

The movement of the edge 8 for the purpose of regulating the rate of feeding can be effected in various ways. In this modification a toothed rack 10 is secured to the slide 9, carrying the edge 8 and mounted on the discharge side of the hopper 1, the rack being actuated by means of a pinion 11 and hand wheel 12. Moreover, the hopper 1 is adjustable in the horizontal direction on guide ledges 13 of the casing 14. The adjustment is effected by means of the screw spindle 15 and hand wheel 16. The bottom part of the hopper is guided in a trough 17 the bottom plate of which extends to the circumference of the drum 2, and can be adjusted by means of a screw 18.

The dotted lines in the drawing indicate the extreme position of the hopper in one direction and the dot and dash lines indicate its extreme position in the other direction. It will be seen that when the drum is not rotating and the edge 8 is moved to the position 8′, the flow of material will be obstructed; a further movement of the slide valve 9 to bring its lower edge into the position 8″ will result in a complete prevention of the discharge or flow of the material.

The control of the movement of the edge 8 by means of the movement of the hopper has the advantage that the cross sectional area of passage for the material will be left almost

unchanged, so that any choking by material with large particles will not take place even when the quantity of material charged is a minimum, and the aforesaid wear due to the narrowing of the slot will be avoided. The relative adjustment of the edge 8 may alternatively be effected by the movement of the drum and trough. Instead of the magnetic drum a magnetic roller with an endless conveyor band may be used. For the purpose of handling material which does not flow easily, it is advisable to construct the device so that the hopper 1 or the trough 17 can be shaken.

When a separation of the material is not required, a simple drum or roller can be used instead of a magnetic drum.

The hopper 1 may also be made to rock or swing about a horizontal axis, in which case the trough 17 would have to be made arcuate.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a charging device for a magnetic separator, a rotating magnetic discharge drum, a hopper supplying material to said drum, an adjustable slide coordinated with the hopper and adjusting the discharge area of said hopper and means for changing the amount of the discharge area which is in contact with the drum, but leaving the discharge area of the hopper substantially unchanged, by displacing the hopper relatively to the drum.

2. The combination of a rotating magnetic drum, a hopper comprising a slide and means for regulating the discharge area of the hopper by adjusting said slide, a trough interposed between drum and hopper, having its bottom substantially tangential to the drum, means for adjusting said trough in its longitudinal direction, and means for changing the amount of discharge area in contact with the drum, by moving the hopper along the bottom of the trough.

3. A charging device comprising a material feeding hopper having an inclined wall, a rotating drum supporting and discharging the material fed through said hopper at a natural angle of inclination, and means for adjusting the relative positioning of said drum and hopper in a rectilinear tangential direction whereby the amount of material discharged by said drum is regulated.

The foregoing specification signed at Berlin, Germany, this 2nd day of March, 1928.

Dr. Ing. h. c. GEORG ULLRICH.