No. 622,763. Patented Apr. 11, 1899.

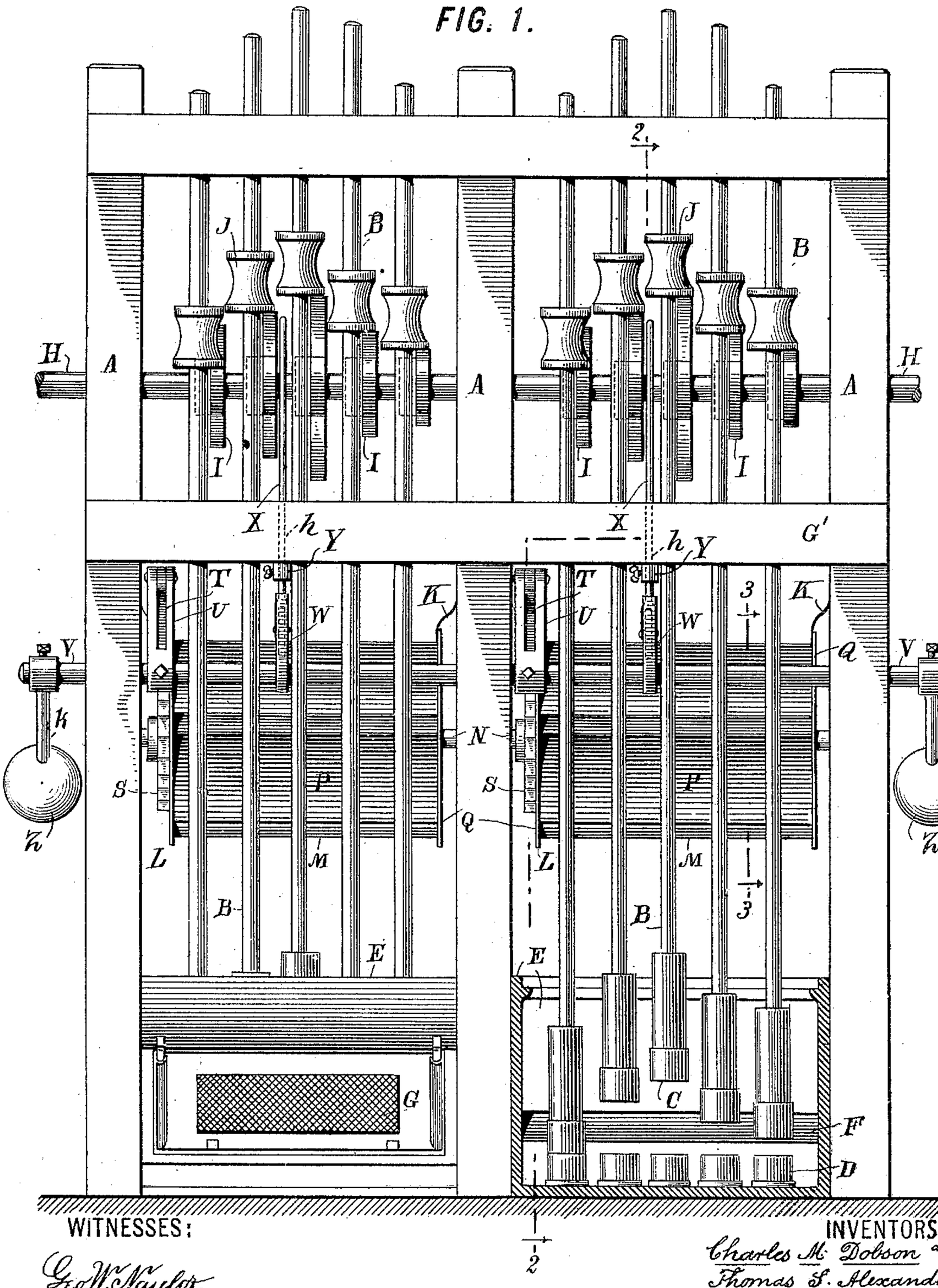
C. M. DOBSON & T. S. ALEXANDER.

ORE FEEDER FOR STAMP BATTERIES.

(Application filed Nov. 4, 1897.)

(No Model.) 3 Sheets—Sheet 1

FIG. 1.



WITNESSES:

Geo. W. Naylor.

Fred White

INVENTORS:

Charles M. Dobson and

Thomas S. Alexander,

BY

Wilkinson & Fraser & Co.

ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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FIG. 3.

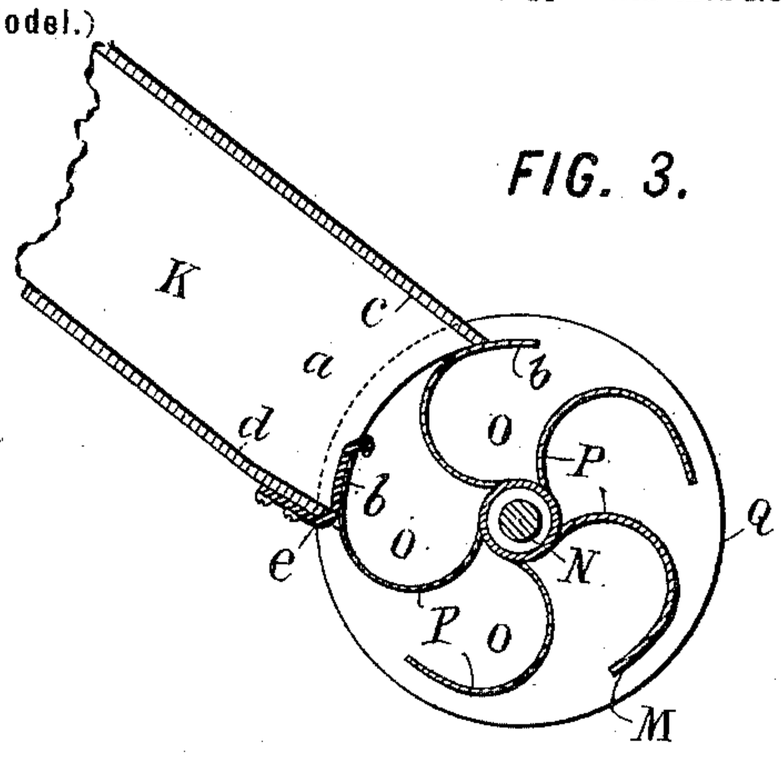

FIG. 2.

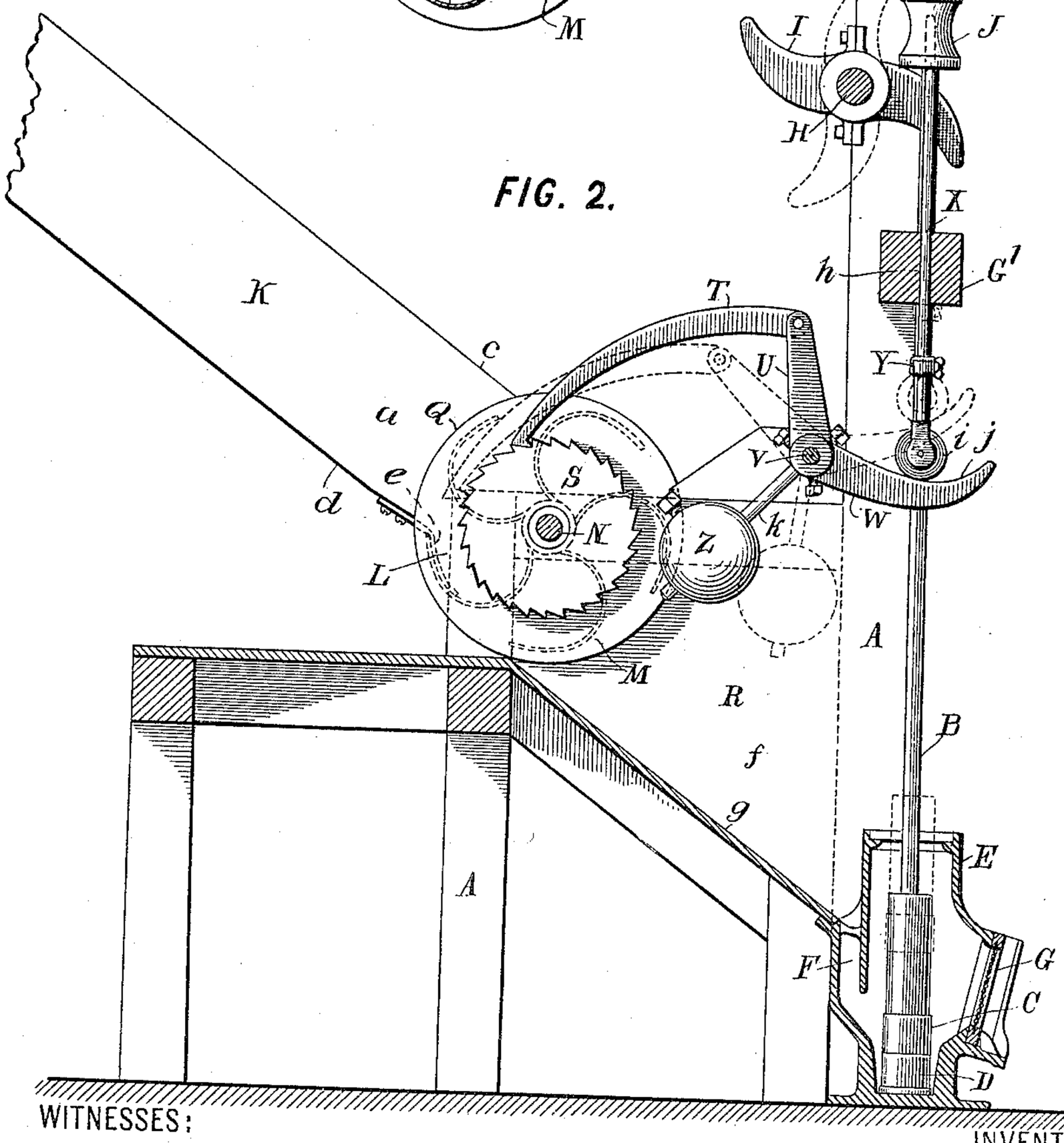

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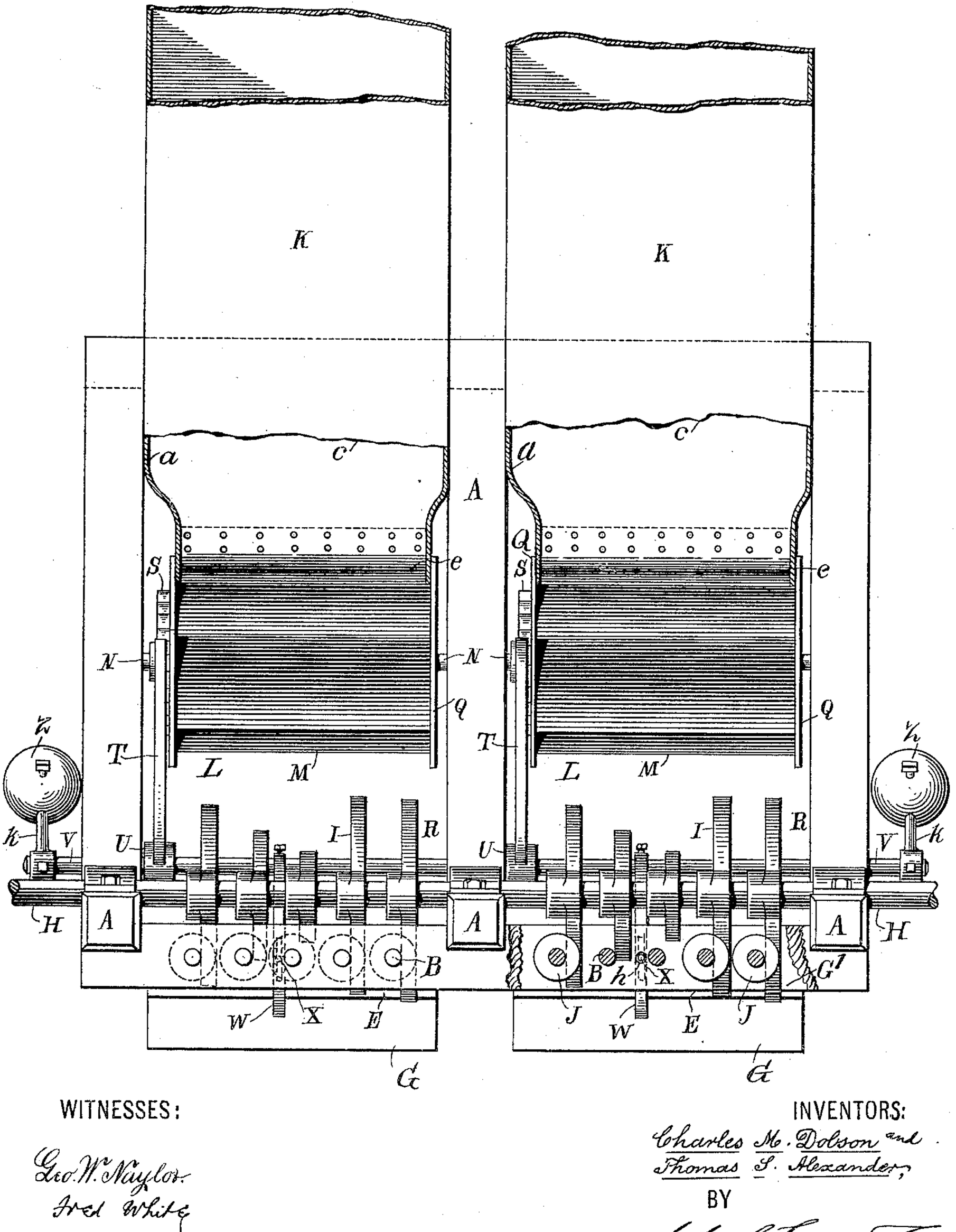
FIG. 4.



WITNESSES:

Geo. W. Naylor.
Fred White

INVENTORS:

Charles M. Dobson and
Thomas S. Alexander,

BY

Stetson & Fraser
ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES M. DOBSON AND THOMAS S. ALEXANDER, OF NEW YORK, N. Y., ASSIGNORS OF ONE-THIRD TO ERNEST SCHERNIKOW, OF SAME PLACE.

ORE-FEEDER FOR STAMP-BATTERIES.

SPECIFICATION forming part of Letters Patent No. 622,763, dated April 11, 1899.

Application filed November 4, 1897. Serial No. 657,329. (No model.)

To all whom it may concern:

Be it known that we, CHARLES M. DOBSON, a citizen of the United States, and THOMAS S. ALEXANDER, a subject of the Queen of Great Britain, both residing in the city, county, and State of New York, have invented certain new and useful Improvements in Ore-Feeders for Stamp-Batteries, of which the following is a specification.

This invention relates to automatic ore-feeders for stamp-mills and aims to provide certain improvements therein.

Heretofore various devices have been employed for automatically feeding ore to stamp-batteries, those most generally used being operated by a ratchet-and-pawl or similar connection between the middle stamp of a battery and a movable table of the feeder, the stamp-tappet operating a bumper with its descent, the motion of which is transmitted to revolve a drum on the periphery of which the ore is carried, to revolve a table on the surface of which the ore is disposed, to revolve blades on such a table, or to jar a tray carrying the ore in such manner that a substantially continuous graduated feed of ore shall be discharged from the feeder into the chute of the stamp-mill. In such ore-feeders the ore comes from the ore-crusher through a chute to the ore-bin of the feeder, from which it is gradually discharged to the stamps. In many cases ore-feeders of this class could not be used by reason of inability to adapt them to the particular requirements of the stamp-battery or the particular character of ore, difficulty being especially experienced when wet ore is to be fed.

Our invention aims to provide an ore-feeder which will automatically feed predetermined quantities of ore in periodical discharges, which can be used as effectively with wet ore as with dry ore, and which shall be simple, strong, and convenient of construction.

To this end we provide certain improvements, which will be hereinafter fully set forth with reference to the accompanying drawings, in which—

Figure 1 is a fragmentary front elevation, partly in vertical section, of a stamp-mill containing two batteries of five stamps each. Fig. 2 is a vertical section thereof, cut on the line 2 2. Fig. 3 is a fragmentary vertical section thereof, cut on the line 3 3; and Fig. 4 is a plan view, partly in section.

Referring to the drawings, let A represent the framework of a ten-stamp battery; B, the stamps thereof; C, the stamp-heads; D, the dies; E, the mortar; F, the feed-inlet thereto; G, the discharge-outlet therefrom; G′, the guide-block for the stamps; H, the cam-shaft; I, the stamp-cams; J, the tappets, and K the crusher-chute of an ordinary stamp-battery. These parts may be of any usual or suitable construction, the parts shown being of well-known form and operation, the chute K receiving crushed ore from the crusher or other source of supply and discharging it toward the stamps, the ore entering the mortars at the inlet F and distributing itself over the dies, on which it is crushed by the falling of the stamps until it is sufficiently reduced to flow out through the screen of the discharge-outlet G from the mortars. Each battery of five stamps is operated by a like number of cams, which successively lift and drop the stamps. The stamps fall to an extent determined by the amount of ore in the mortar when the mortars are fully charged, the stamps being arrested by striking the ore at some distance above the dies, and as the ore is reduced and discharged the stamps fall lower at each drop until finally they strike on the dies. The mortar should then be supplied with more ore.

According to our improvements the automatic ore-feeder L is introduced between the chute K and the mortar, this ore-feeder operating automatically to feed predetermined charges to the mortar at the time when the charge in the mortar is reduced to a predetermined limit. The improved feeder is operated by the fall of the center stamp, as has been the case with prior feeders, but is passive up to the time when its operation is required, being effected only by the unusual extent of fall of the center stamp consequent upon the reduction of the charge in the mortar. Any one of the stamps may be utilized to operate the feeder; but the center stamp is generally employed for this purpose, since

its stroke is more likely to accord with the charge in the mortar than would be the case with the other stamps. A bumper-rod operated by the tappet and guided in the guide-block G′ is preferably used to transmit motion from the stamp to the ore-feeder.

Referring especially to Figs. 2 and 3, we will now describe in detail the preferred construction of our improved ore-feeder and the preferred details of the operating mechanism therefor.

The ore-feeder comprises a drum M, mounted to revolve on a horizontal axis N, having bearings in the framework A, which drum has a plurality of buckets O, separated by partitions P, extending from the center outwardly, and opening at the periphery of the drum, the ends of the buckets being closed by imperforate disks Q, which project outwardly a suitable distance beyond the outer edges of the partitions P. The outer edges of the partitions all terminate at an equal distance from the axis of the drum and have a portion which is arc-shaped, forming an arc of a circle struck from the axis of the drum, so that the drum is essentially a cylinder having longitudinal openings in its walls, the openings constituting the mouths of the buckets.

The chute K fits in between the end walls or disks Q of the drum with a sufficiently snug fit to prevent undue leakage between the end of the chute and the drum, and on its lower side walls *a* it is preferably arc-shaped to correspond with the shape of the outer cylindrical portion *b* of each partition P. The chute is preferably closed at top by a wall *c*, extending to the plane traversed by the part *b* of the partitions as the drum revolves, and at bottom it has a closed wall *d*, on which is the flexible or elastic wiper *e*, of rubber or leather, which is of sufficient length to project some distance within a bucket and sufficiently flexible to yield and permit the edge of the bucket to pass it when the drum is revolved. This wiper bridges the space between the bottom of the chute and the adjacent edge of an advancing bucket and extends from one wall to the other of the drum, so that escape of ore passing from the chute to the bucket is prevented.

The drum is revolved intermittently to discharge ore from its buckets successively and at suitable times. When inactive, it constitutes a closure for the end of the chute, ore falling down the chute being caught in the bucket, and when the bucket is full being backed up in the chute, where it must remain until the next bucket is advanced to receive it. Thus in case of a large sudden feed to the chute the ore therein will be taken therefrom as required in predetermined quantities by successive buckets, so that overfeeding of the chute will not impair the regularity of feed to the stamps.

The drum is located conveniently to the stamps, preferably within a chute R, consisting of side walls *f* and an inclined bottom wall *g*, built in the framework A and leading to the inlet F of the mortar.

The mechanism for revolving the drum consists, preferably, of a ratchet-and-pawl construction and a bumper-rod. As shown, a ratchet-wheel S is mounted on the shaft N and is engaged by a gravity-pawl T, carried by a lever-arm U, fulcrumed on a shaft V, which lever has another arm W, engaging the bumper-rod X. A stop Y limits the rise of the bumper-rod and a weight Z holds the arm W in engagement with the bumper-rod and sustains the latter, restoring the parts to position after each depression of the bumper-rod by the tappet J. The bumper-rod is a straight rod mounted to move vertically in a guide-hole *h*, bored through the guide-block G′ beneath the tappet J of the center or other stamp of a battery. At its lower end it connects with the arm W, preferably by means of a roller *i*, which makes a rolling contact with a cam-face *j* on the arm, this face being shaped to graduate the transmission of motion to the arm from the bumper-rod, so that the speed of descent of the arm shall at first be slow compared to the speed of the bumper-rod and shall gradually increase until the maximum speed is reached at the end of the stroke of the bumper-rod. The descent of the arm W swings the weight Z upward and the arm U outward, causing the pawl T to revolve the ratchet one or more teeth, according to the extent of swing. The bumper-rod descends with the latter part of the downstroke of the center stamp and is free to ascend as soon as the cam lifts the stamp. As the stamp rises the weight Z will tilt the arms U and W, cause the bumper-rod to follow the stamp up, and throw the pawl T in position for engaging another notch of the ratchet. The proportion of the stroke of the stamp in which the bumper-rod shall participate is determined by the stop Y, which is adjustable on the rod, and, as shown, consists of a collar set thereon to strike the under side of the guide-block G′ and prevent further upward movement of the rod when it has risen to half the maximum lift of the stamp. The weight will hold the bumper-rod, with the stop, against the guide-block, so that the upper end of the rod will stand in the construction shown at the point indicated in dotted lines in Fig. 2, at which position it will not be struck by the tappet of the stamp until the stamp is able to descend more than half its full stroke. As soon as the stamp descends to this or a greater extent it will depress the bumper-rod with it, and as its descent increases it will depress this rod sufficiently to oscillate the lever-arms W and U and the pawl T to the extent necessary to feed the ratchet forward one or more teeth. This will revolve the drum step by step until the contents of one of its buckets is discharged into the chute R, which owing to the accumulation of the discharged ore above the dies will limit the fall of the stamps to less than half their maximum drop, so that the

bumper-rod will not be again struck by the tappet above it until the stamp of this tappet has crushed enough of the ore beneath it to permit it to again descend to a predetermined point for operating the rod.

The buckets are shown in dotted lines in Fig. 2, the parts being here shown in the position of just having completed a movement of the drum, bringing a fresh bucket opposite the chute K and discharging the contents of a full bucket into the chute R. The lever and pawl are shown in this view in dotted lines in their passive positions.

In Fig. 3 the buckets are shown in one of the intermediate positions incident to turning. From this view it will be seen that before the flap *e* of the chute K is entirely passed by one bucket, so that it may fall to the next, the latter will be sufficiently near to the chute to insure that the flap shall fall into the bucket, thus preventing spilling of ore between buckets.

In operation the parts may be adjusted to suit the varying conditions of use. The arms U and W are adjustable on the shaft V, as by being provided with set-nuts, the weight Z is similarly adjusted, as by being supported from an adjustable arm *k* and being adjustable longitudinally on this arm, and the stop Y is adjustable along the rod X, so that the limit of movement of this rod can be varied as desired.

It will be seen that our invention provides improvements which can be readily and advantageously availed of, and it will be understood that the invention is not limited to the exact details of construction and arrangement set forth as constituting its preferred form, since it can be employed according to such modifications as circumstances or the judgment of those skilled in the art may dictate without departing from the spirit of the invention.

What we claim is—

1. A revolving ore-feeder, in combination with a bumper-rod adapted to be operated by an ore-stamp, a lever operated by said rod, and a connection between said lever and feeder for operating the latter from the lever, and means for restoring the lever and bumper-rod, said lever and rod having the one a cam-face and the other a reciprocal face engaging and traveling on said cam-face, for graduating the speed of movement of the lever relatively to the speed of movement of the rod.

2. In ore-feeders, a drum, in combination with a shaft V having arms U and W, a cam-face *j* on said arm W, a ratchet S on said drum, a pawl T connected to said arm U for operating said ratchet, a bumper-rod X adapted to be operated by an ore-stamp, and in operative engagement with the cam-face on said arm W, and an adjustable stop Y for said rod.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

CHAS. M. DOBSON.
THOMAS S. ALEXANDER.

Witnesses:
FRED WHITE,
GEORGE H. FRASER.