No. 729,259. PATENTED MAY 26, 1903.

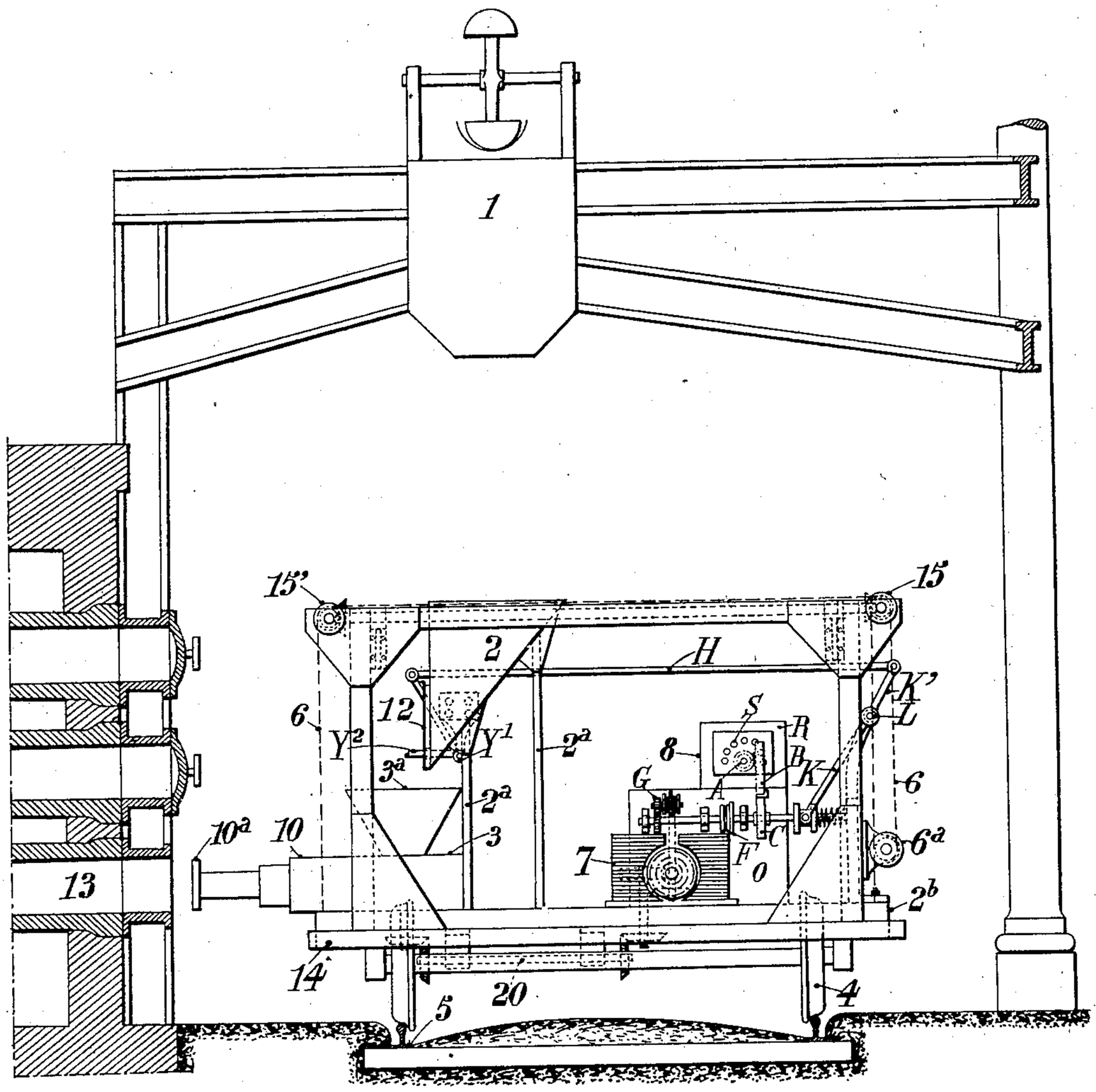
L. BERTRAND.

APPARATUS FOR CHARGING RETORTS.

APPLICATION FILED FEB. 5, 1902.

NO MODEL. 5 SHEETS—SHEET 1.

Fig. 1.



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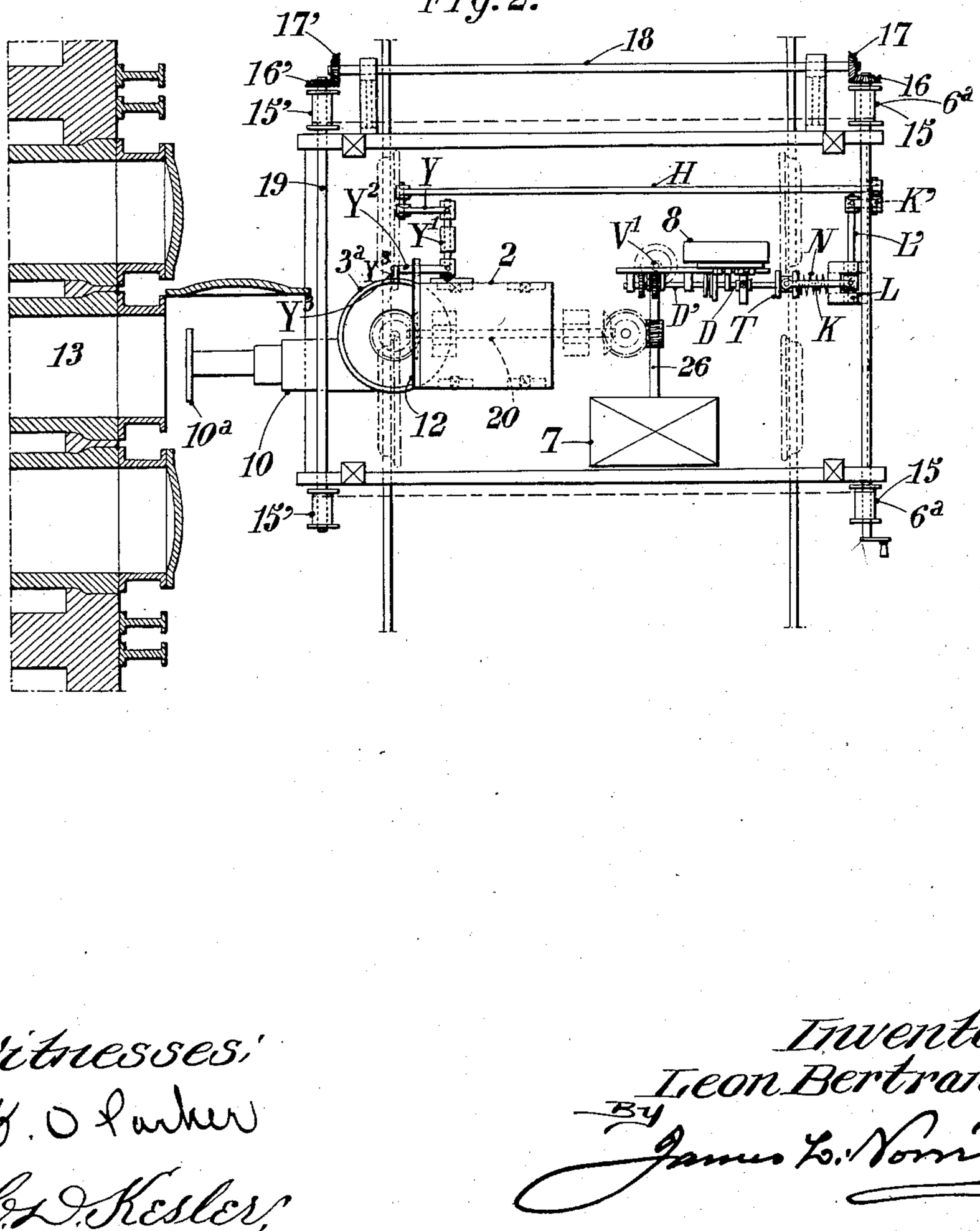
NO MODEL. 5 SHEETS—SHEET 2.

Fig. 2.



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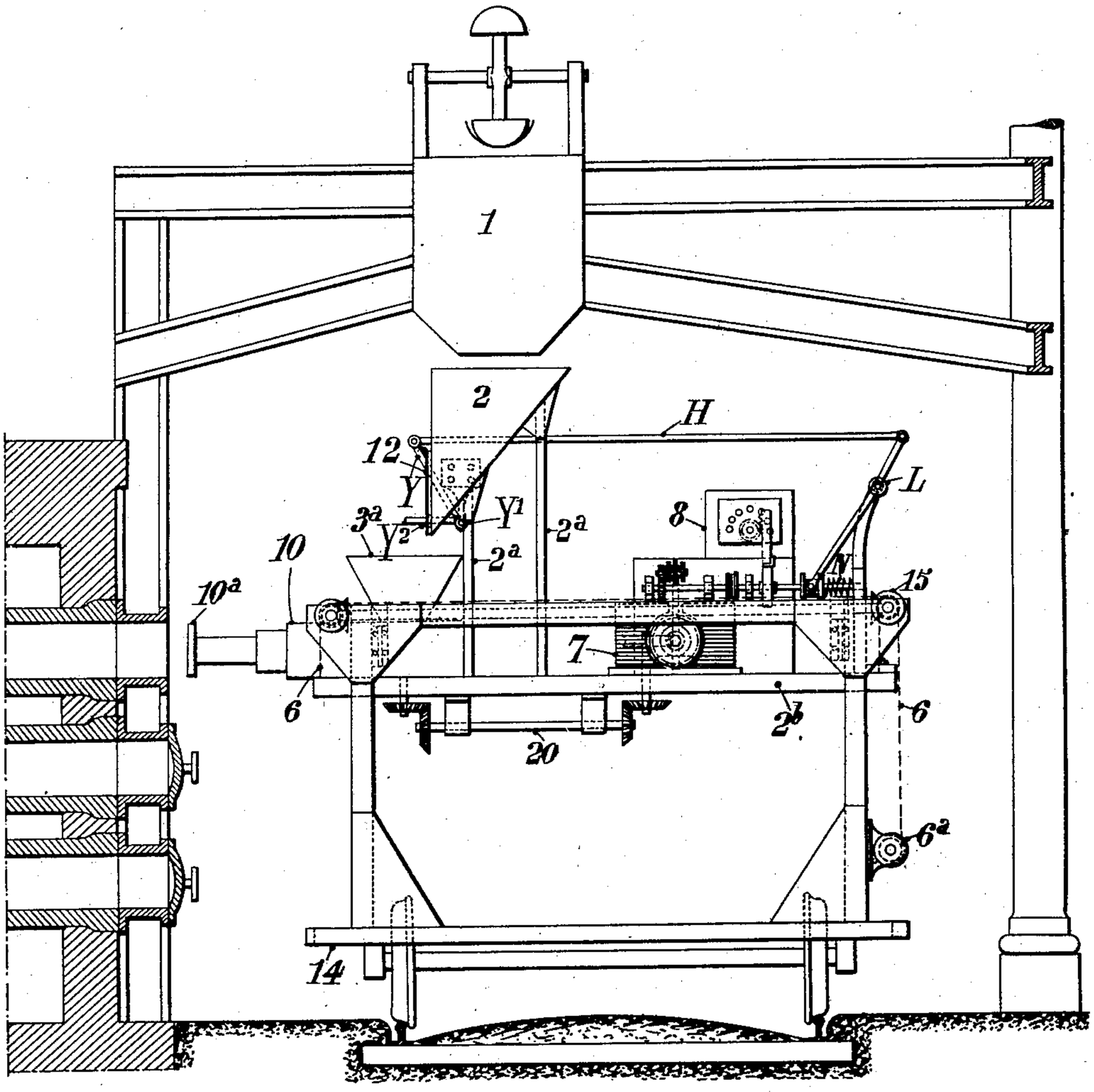
NO MODEL. 5 SHEETS—SHEET 3.

Fig. 3.



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NO MODEL. 5 SHEETS—SHEET 4.

Fig. 4.

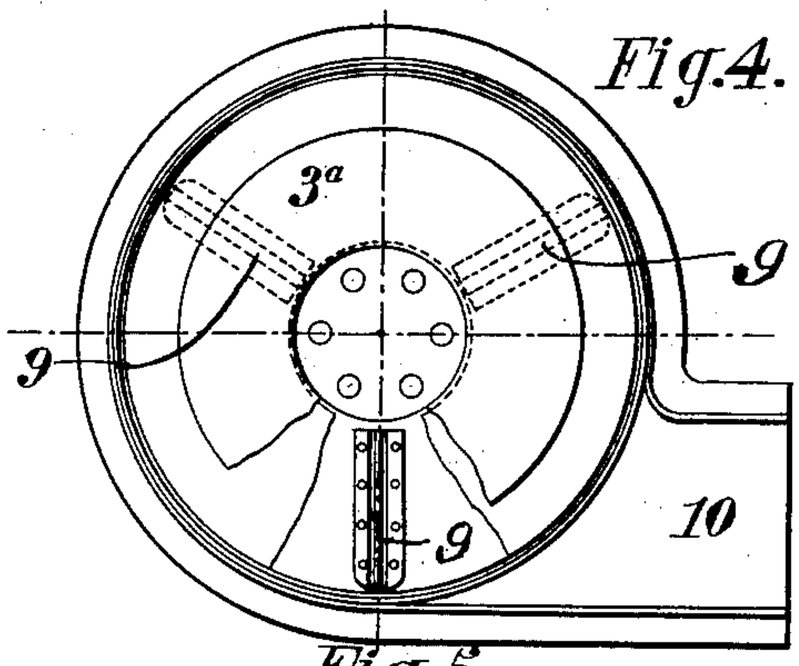
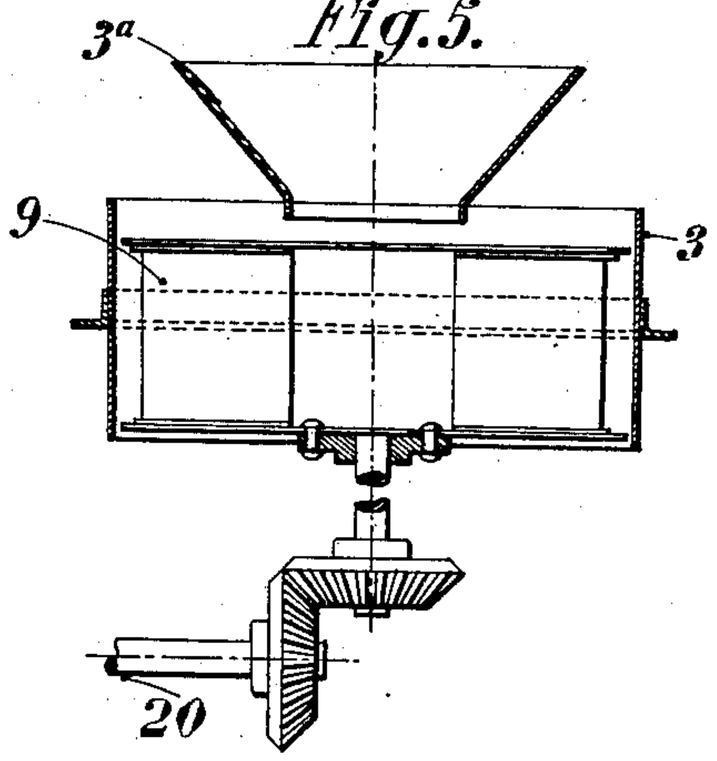


Fig. 5.



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NO MODEL. 5 SHEETS—SHEET 5.

Fig. 6.

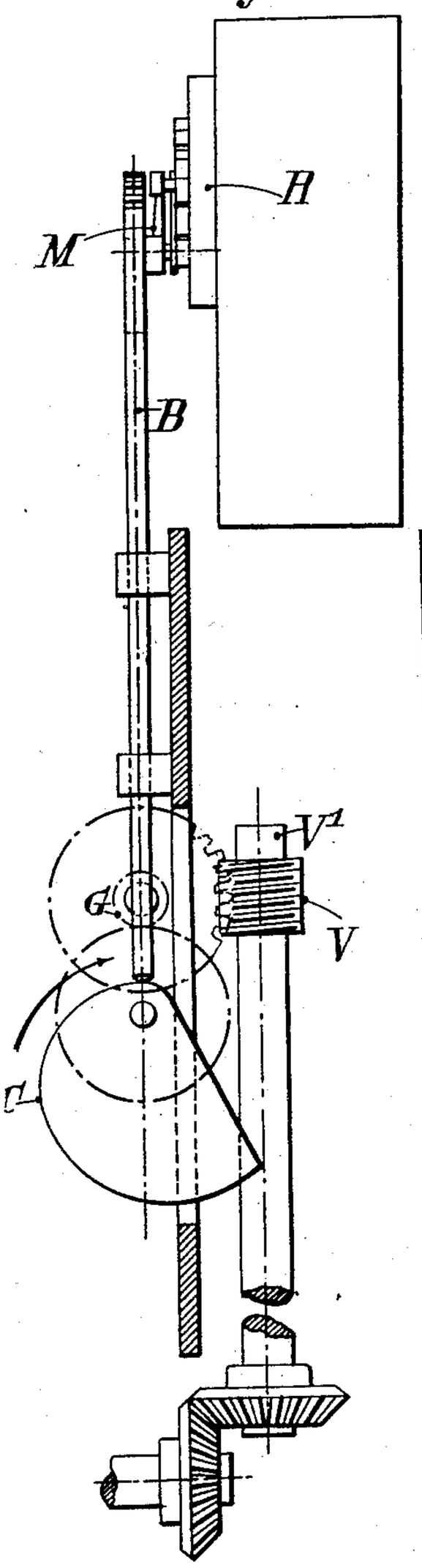


Fig. 7.

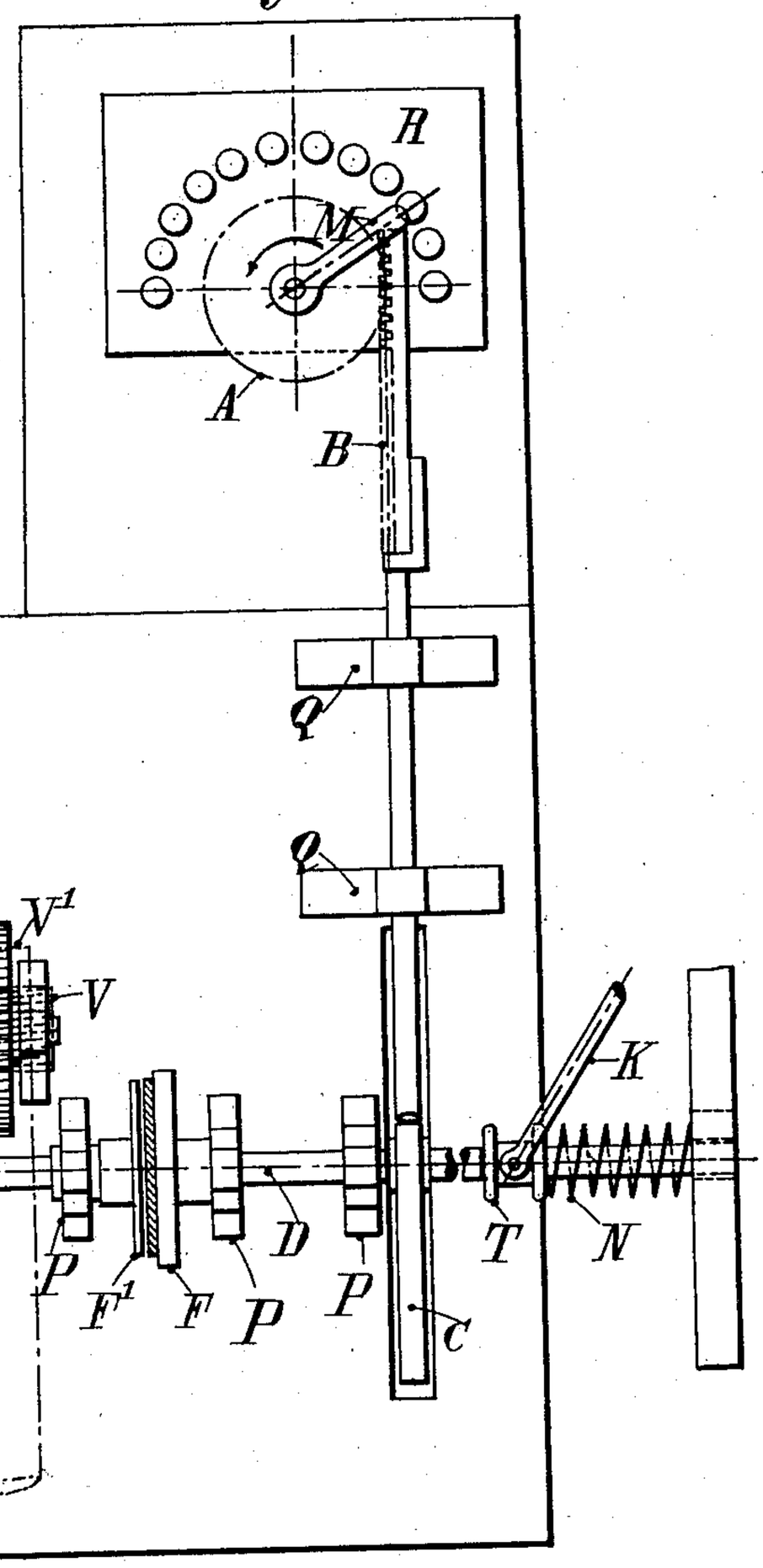
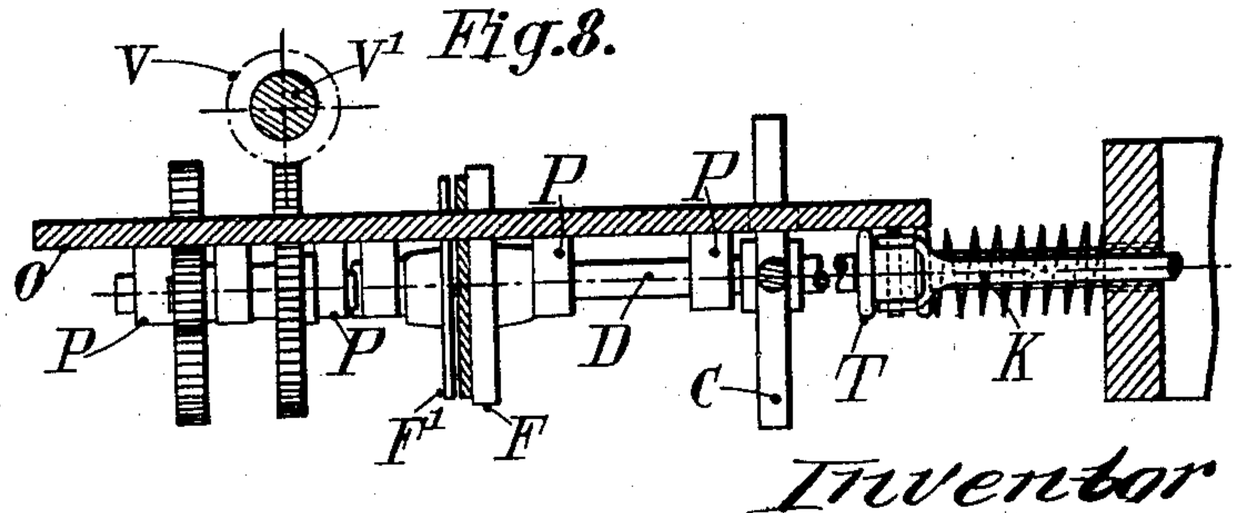


Fig. 8.



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UNITED STATES PATENT OFFICE.

LÉON BERTRAND, OF PARIS, FRANCE.

APPARATUS FOR CHARGING RETORTS.

SPECIFICATION forming part of Letters Patent No. 729,259, dated May 26, 1903.

Application filed February 5, 1902. Serial No. 92,733. (No model.)

To all whom it may concern:

Be it known that I, LÉON BERTRAND, engineer, a citizen of the French Republic, residing at 6 Rue Condorcet, Paris, France, have invented certain new and useful Improvements in Apparatus for Charging Retorts, of which the following is a specification.

This invention relates to apparatus for charging retorts, and has for its principal object to provide improved means for evenly distributing the charge of fuel throughout the entire length of the retort to the height determined upon.

A further object of the invention is to provide a device of the character specified which shall be rapid and efficient in operation.

To the foregoing and other ends my invention consists of a rotary or centrifugal charging device, preferably operated by electricity, and of means for varying the speed of said centrifugal device by introducing resistances into the electric circuit which gradually reduce the speed of rotation of said charging device, so that the coal will be uniformly fed throughout the entire length of the retort to the desired height. This result is obtained by my invention with fuel of any size, weight, or quality.

The construction and operation of my improved apparatus will be understood from the following description, and those features which I claim as new will be particularly pointed out in the claims following the description.

For the purpose of description reference is had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a view illustrating the apparatus adapted to operate in connection with a furnace consisting of three stages of retorts, the device being shown in position for charging the lowermost retort. Fig. 2 is a plan view of the same. Fig. 3 is a similar view to Fig. 1, the device being shown in position for charging the uppermost retort. Fig. 4 is a plan view, partly broken away, of the centrifugal charging device. Fig. 5 is a sectional view of the centrifugal charging device, showing its operating means in elevation. Fig. 6 is an end elevation, partly in section, of the means for controlling the speed of the centrifugal charging device. Fig. 7 is a side elevation of the controlling means illustrated in Fig. 6. Fig. 8 is a plan view of said controlling means.

Like reference characters indicate like parts in the different views.

My improved apparatus is supported on a suitable car or truck, which is mounted on wheels 4, adapted to run on tracks 5, laid along in front of a series of retorts. By this means the device can be moved from one retort to another for operating in the various retorts of a series. Arranged to be vertically movable in the framework 14 of the truck or car is a horizontal platform 2^b, Figs. 1 and 2, which is raised and lowered by means of chains 6, attached to the corners of said platform 2^b and passing over suitable guide-pulleys 15 and around an operating-pulley 6^a. This pulley 6^a is adapted to be operated by hand or otherwise. On the axis of the pulley 15 is fixed a bevel-wheel 16, gearing with a bevel-wheel 17 on a shaft 18. Another bevel-wheel 17′ on the same shaft 18 gears with a bevel-wheel 16′ on the shaft 19 of the guide-pulleys 15. Mounted on the platform 2^b are uprights or posts 2^a, which support the hopper 2. This hopper 2 is provided with a door 12 at its lower end, which is adapted when opened to allow the contents of said hopper 2 to discharge into the funnel-shaped mouth 3^a of a centrifugal charging device 3, which is also mounted on said vertically-movable platform 2^b. This centrifugal charging device 3 is provided with a nozzle 10, which is composed of telescopic sections. By constructing the nozzle 10 in this manner it is possible for an attendant or operator to catch hold of the outermost section and by drawing said section outwardly place the nozzle into the mouth of the retort 13 which is to be charged, as shown in Fig. 3. It will be observed that by providing the vertically-movable platform 2^b, operated by the chains 6 and pulley 6^a, on which are mounted the hopper 2 and the centrifugal charging device 3, I am enabled to charge retorts of different elevation by simply raising or lowering said platform to allow nozzle 10 of the charging device to be advanced into the mouth of the retort which it is desired to charge.

Suitably supported above the hopper 2 is a storage-bin 1, which is adapted to supply

fuel to said hopper 2. The hopper 2 is preferably of a size to contain sufficient fuel to charge one retort.

As so far described the operation of my device will be readily understood. The hopper 2 is supplied with fuel from the storage-bin 1. After the platform 2^b has been raised to the proper degree and the nozzle 10 of the charging device advanced into the mouth of the retort which it is desired to charge the door 12 of the hopper 2 is opened and the charge of fuel contained in said hopper is fed into the charging device 3, which projects it into the retort. It will be observed that the outer end of the telescopic nozzle 10 of the charging device 3 is enlarged or provided with a disk 10^a, Fig. 2, which fills or closes the end of the retort and retains in place the fuel fed thereinto until the door of the retort can be closed.

In devices of the kind to which my present invention relates as heretofore constructed it is found that the fuel cannot be evenly distributed throughout the entire length of the retort to a desired height, because the force which is necessary to project fuel to the farthermost end of an empty retort is obviously too great for projecting fuel to the end of the retort nearest the charging device as said retort becomes filled. To obviate this difficulty, I provide means for gradually reducing the force which projects the fuel into the retort as said retort is filled, so that while the fuel which is first fed into the empty retort will be projected the entire length thereof the remainder of the fuel will be fed with less force and will be fed a less distance along said retort. In this way the fuel will be evenly distributed throughout the retort and will not be piled unevenly in the far end of the retort, as was the case before the advent of my invention. Broadly speaking, I accomplish the result above pointed out by employing electricity as the means for operating the charging device and by introducing resistances into the electric circuit of the motor, so that the speed of said electric motor, which gives motion to the charging device through a line of gearing, will be gradually reduced.

The numeral 7, Fig. 2, represents an electric motor, of any suitable construction, which is mounted on the platform 2^b in any desired manner and which operates the centrifugal charging device 3 through the gearing 20. The rheostat of this motor 7 is shown at R.

Referring to Figs. 1, 2, 3, 6, 7, and 8, the reference-letter O designates a support for the controlling mechanism of the centrifugal charging device. This support may be in the form of a shield or board having an opening to allow the gear-wheels which it supports to project therethrough, and it may be located at any desired point on the truck or car in proximity to the rheostat and electric motor. The reference-letter V′ indicates a vertical shaft provided with a worm V, which shaft is connected to and operated by the electric motor through the motor-shaft 26. By means of this worm V the horizontal shaft D′, which is connected to the support O in any suitable manner, is operated through the gear-wheel G′, meshing with the worm V, the small gear-wheel G, which is on the shaft of the gear-wheel G′, and the large gear-wheel G^2, which is mounted on the shaft D and meshes with the small gear-wheel G, as shown in Fig. 7. It will be observed that the vertical worm-shaft V and the horizontal shaft D′ are arranged on opposite sides of the support O and that the gearing between the two projects through said support O. The reference-letters P designate the means for attaching the shaft D′ and the shaft D, hereinafter described, to the support O. Arranged upon the end of the shaft D′ is a friction-disk F′. Adjacent to this friction-disk F′ is a similar friction-disk F, which is attached to the end of a shaft D, similar to the shaft D′ just described. Fixed upon the shaft D is a cam C, Fig. 6, which is adapted when turned by the turning of the shaft D to raise the vertical bar B, which slides in suitable supports Q. This bar B is provided with rack-teeth at its upper end, as shown.

Arranged above the support O is a rheostat R, having a semicircular series of contacts S. It will be understood that these contacts are of different resistance. In the form illustrated the contact at the right of the series is of the least resistance and that at the left of the series is of the greatest resistance. Arranged below these contacts S is a toothed wheel A, which is adapted to be turned in the direction of the arrow by the raising of the rack-bar B. Upon the toothed wheel A is fixed a contact-lever M, which is adapted, when said toothed wheel A is turned, to travel from one contact-point S to the next in the direction of the arrow.

From the foregoing description it will be understood that as the contact-lever M is caused to travel from one contact S to the next the resistance increases gradually, and the speed of the electric motor 7 will therefore be gradually reduced.

Surrounding the shaft D and bearing at one end against the upright framework of the apparatus and at the other end against a sleeve T, rigidly mounted upon the shaft D, is a coil-spring N, which serves to force the friction-disk on the shaft D into contact with the friction-disk on the shaft D′. The sleeve T is contracted or has an annular groove, and into this annular groove fit the forked ends of a lever K, which is pivoted at L. Attached to the upper end K′ of the lever K is a rod H, which is connected to a bell-crank lever composed of an upper arm Y, a horizontal shaft Y′, to which the upper arm is rigidly connected, mounted in suitable bearings on the support 2^a, and a lower arm Y^2, also rigidly connected to the rod Y′, which lower arm Y^2 is provided with a bent portion Y^3 adjacent to the door 12 of the hopper 2. It will also

be seen from an inspection of Fig. 2 that the fulcrum L of the lever K is composed of a rod L', to which the upper end K' of the lever K is rigidly connected. By means of the horizontal rod Y' of the bell-crank lever and the horizontal rod L' of the lever K, I am enabled to place the rod H, which connects the upper arm of the bell-crank lever with the upper end K' of the lever K, off to one side of the apparatus, as shown in Fig. 2, so as to get it out of the way. When the door 12, which is hinged at its upper end, is opened in the direction of the arrow, Fig. 1, it bears upon the bent portion Y^2 of the bell-crank lever Y, raising the lower arm of said lever and moving the upper arm thereof toward the right, which action moves the rod H and the upper end of the lever K toward the right and the lower end of lever K toward the left, thus releasing the tension of the spring N, as hereinafter described. By means of the lever K and the contracted sleeve T the spring N is normally held in compressed condition, and the friction-disks F and F' are thus also normally out of contact with each other; but when the rod H is acted upon by the opening of the door 12 of the hopper 2, as above described, the pressure of the lever K against the contracted sleeve T is released and said spring N is allowed to expand, forcing the shaft D longitudinally toward the shaft D'. This action of the spring N against the sleeve on the shaft D causes the friction-disk F to be forced against the friction-disk K' on the continuously-operating shaft D', and in this way the shaft D is operated from the shaft D'.

When it is desired to separate the friction-disks F and F', the door 12 of the hopper 2 is closed and the lower arm of the bell-crank lever Y is shoved down by hand if preferred, which movement causes the upper arm of said lever, the rod H, and the upper end of the lever K to move to the left and the lower end of lever K to move to the right, thus compressing the spring N and permitting the disks F and F' to separate.

From the foregoing description the operation of my device will be readily understood. A charge of fuel sufficient for one retort is first fed from the storage-bin 1 into the hopper 2. The door 12 of said hopper 2 is then opened by hand or in any other desired manner to allow the fuel to be fed into the centrifugal device 3. When the door 12 of the hopper 2 is opened, the rod H and lever K are operated, which action allows the spring N to force the friction-disk F on the shaft D against the friction-disk F' on the shaft D'. This action causes the shaft D, with its cam C, to be turned, and as said cam turns the rack-bar B is raised, the wheel A is turned, and the contact-lever M is caused to travel from one contact-point S to the next, thus making the circuit of the motor which operates the centrifugal charging device through contacts of gradually-increasing resistance, and consequently gradually decreasing the speed of said centrifugal charging device. In this way it will be seen that when the door 12 of the hopper is opened and while the centrifugal charging device is running at full speed the fuel will be projected the entire length of the empty retort; but as said retort becomes filled the speed of the charging device is gradually reduced and the fuel is projected a less and less distance along the retort until it is completely filled. By this means I am enabled to evenly distribute the charge of fuel throughout the entire length of the retort.

The particular form of centrifugal charging device which I prefer to employ in constructing my improved apparatus is illustrated in Figs. 4 and 5. It is provided with the casing 3, the funnel-shaped mouth 3^a, and the vertical blades 9, which are operated through suitable bevel-gearing by the horizontal shaft 20, which is itself operated by the electric motor 7, as clearly shown in Figs. 1, 2, and 3.

It will be understood that many changes may be made in the specific details of construction hereinbefore described without departing from the spirit of my invention. I therefore do not limit myself in any way except as defined in the following claims.

I claim—

1. The combination of a motor; a charging device operated by said motor; a feed device adjacent to said charging device; and means, thrown into operation by said feed device, for reducing the speed of said motor.

2. The combination of an electric motor; a charging device operated by said motor; a feed device adjacent to said charging device; and means, thrown into operation by said feed device, for introducing resistances into the circuit operating said motor to reduce the speed of said motor.

3. The combination of a motor; gearing operated by said motor; a charging device operated by said gearing; and means operated by said gearing for reducing the speed of said motor.

4. The combination of an electric motor; gearing operated by said motor; a charging device operated by said gearing; and means, operated by said gearing, for introducing resistances into the circuit operating said motor, to reduce the speed of said motor.

5. The combination of an electric motor; a charging device operated by said motor; a feed device adjacent to said charging device; a shaft, operated by said motor, having a friction-disk thereon; a second shaft, having a friction-disk thereon, said friction-disk being located adjacent to the friction-disk on said first-mentioned shaft; a cam on said second shaft; a beam arranged to be raised and lowered by said cam, said beam having a rack at its upper end; a toothed wheel in engagement with the rack on said beam; a contact-arm on said wheel; a rheostat having a series of contact-points arranged to be traversed by said contact-arm, each of said contact-points

being in circuit with said motor; and means operated by said feed device for throwing the friction-disks on said first and second shafts into frictional contact with each other.

6. The combination of an electric motor; a charging device operated by said motor; a feed device adjacent to said charging device; a door for said feed device; a shaft, operated by said motor, having a friction-disk thereon; a second shaft having a friction-disk thereon, said friction-disk being located adjacent to the friction-disk on said first-mentioned shaft; a beam arranged to be raised and lowered by said cam, said beam having a rack at its upper end; a toothed wheel in engagement with the rack on said beam; a contact-arm on said wheel; a rheostat having a series of contact-points arranged to be traversed by said contact-arm, each of said contact-points being in circuit with said motor; a contracted sleeve on said section, a stationary spring bearing at one end against said contracted sleeve, a lever in engagement with said contracted sleeve, and a rod in connection with said lever, said rod being extended into proximity with the door of said feed device, for the purpose specified.

7. The combination of a motor, a charging device operated by said motor, and means operated by said motor for gradually reducing the speed of said motor.

8. The combination of a motor, a charging device operated by said motor, and means operated by said motor for gradually decreasing the speed of said motor, said means being initially thrown into operation by hand.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LÉON BERTRAND.

Witnesses:
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HIPPOLYTE JOSSE.