

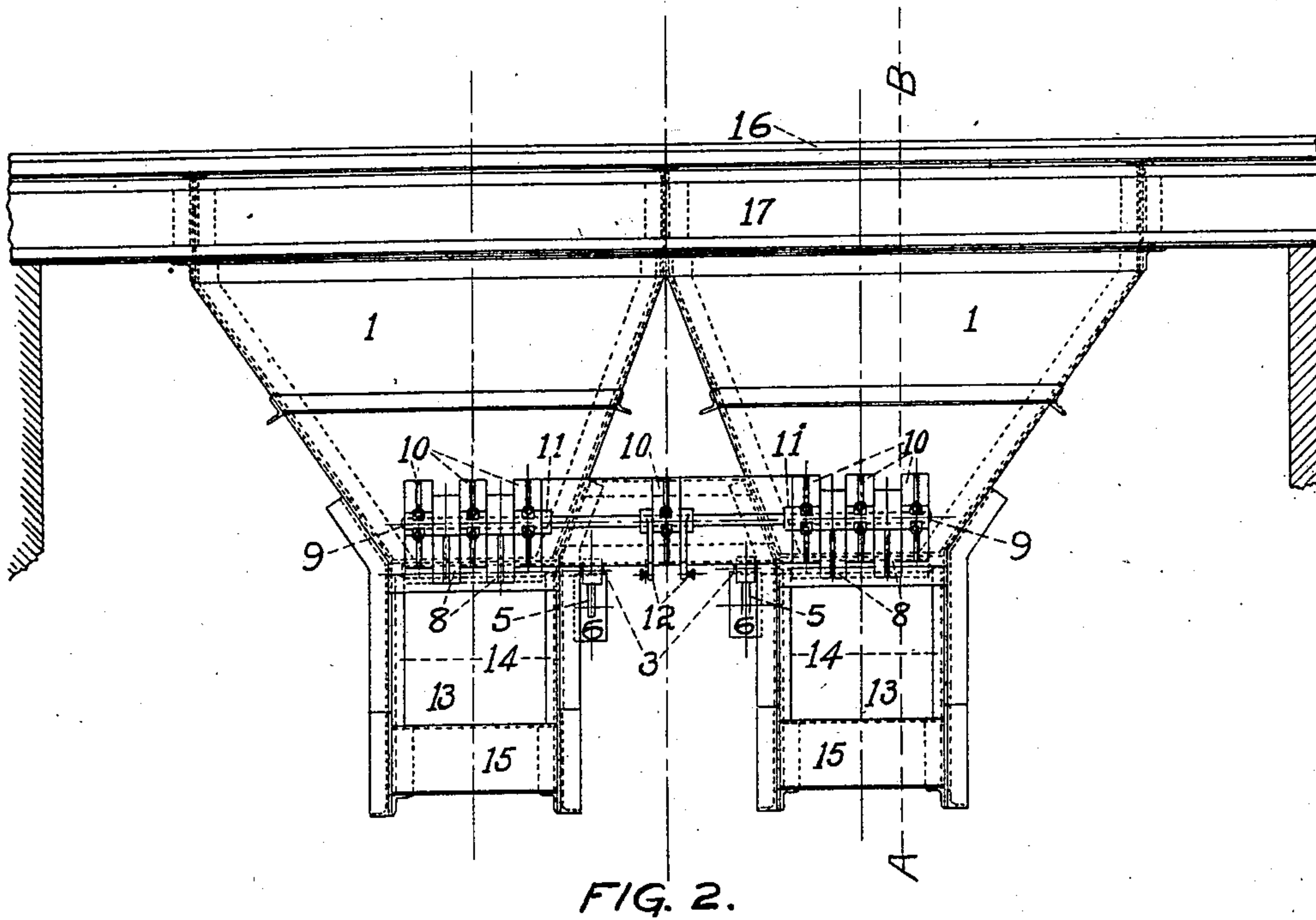
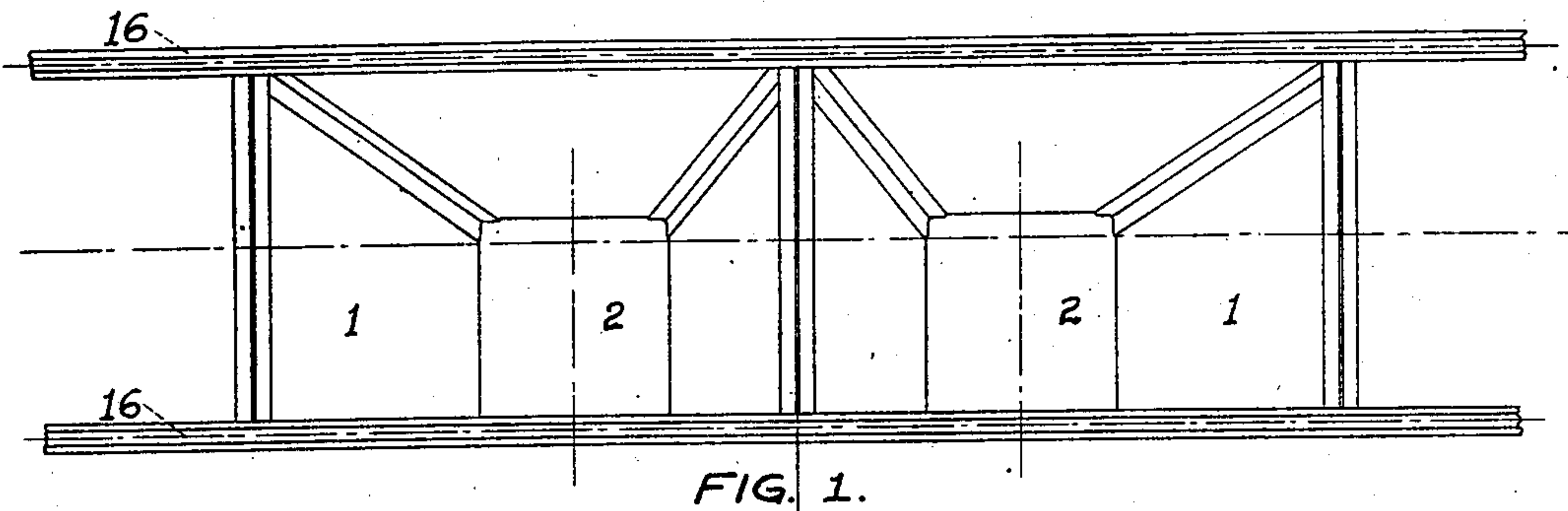
No. 730,922.

PATENTED JUNE 16, 1903.

M. W. JOHNSON, JR.
DEVICE FOR CHARGING BLAST FURNACES.
APPLICATION FILED JAN. 16, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES:
J. Lawellum Walker
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INVENTOR,
Mark W. Johnson Jr.
By [Signature] Attorney

No. 730,922.

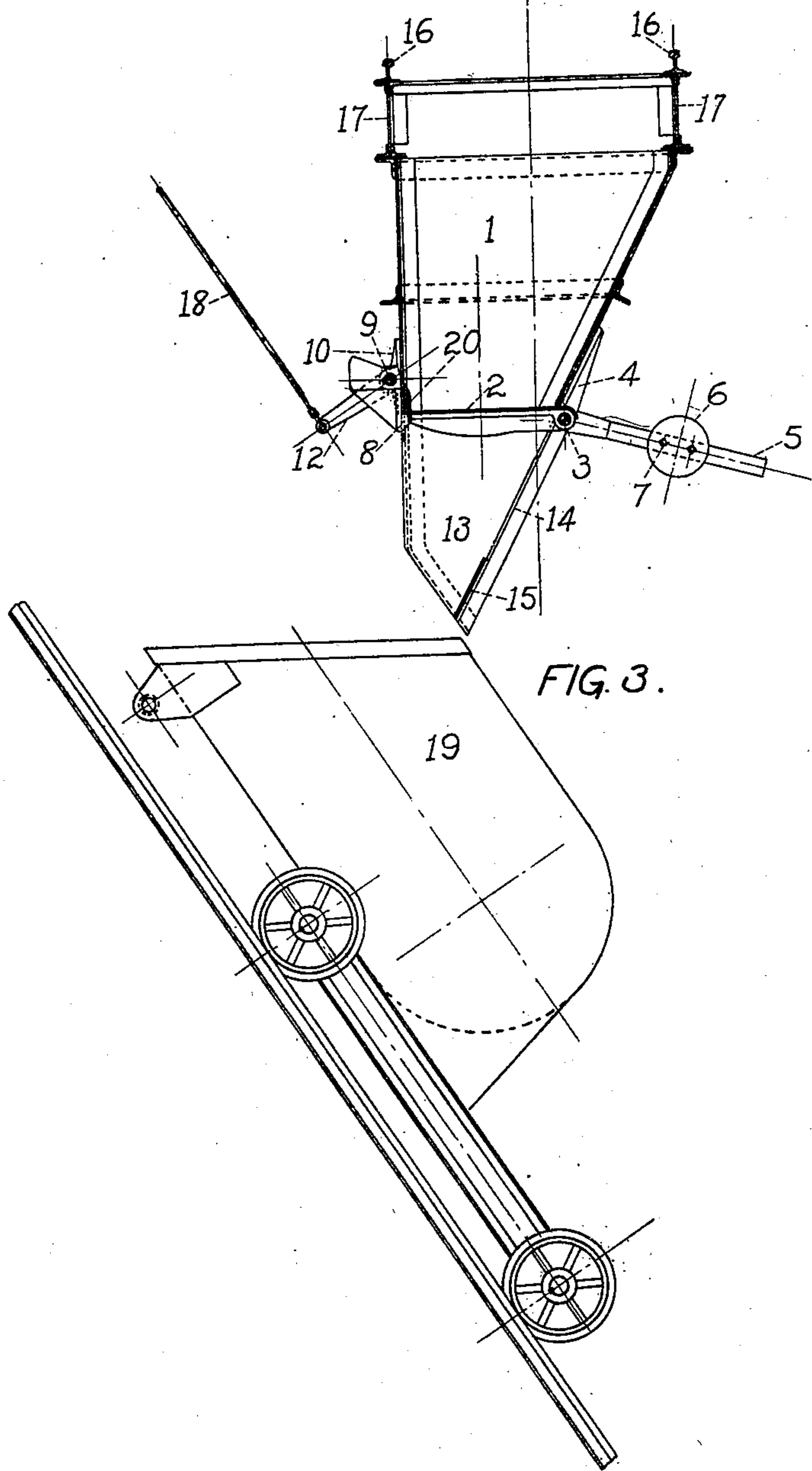
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3 SHEETS—SHEET 2.



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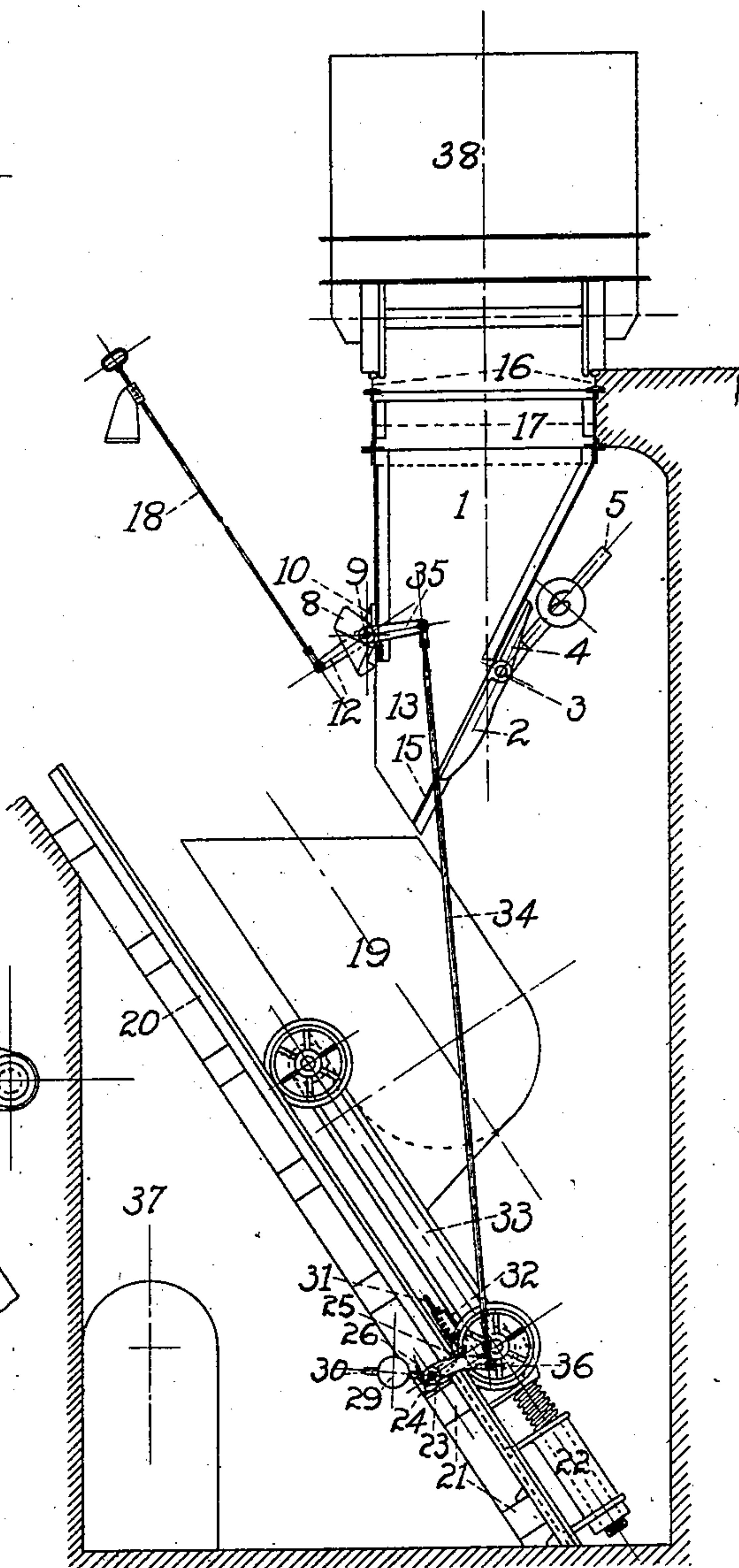
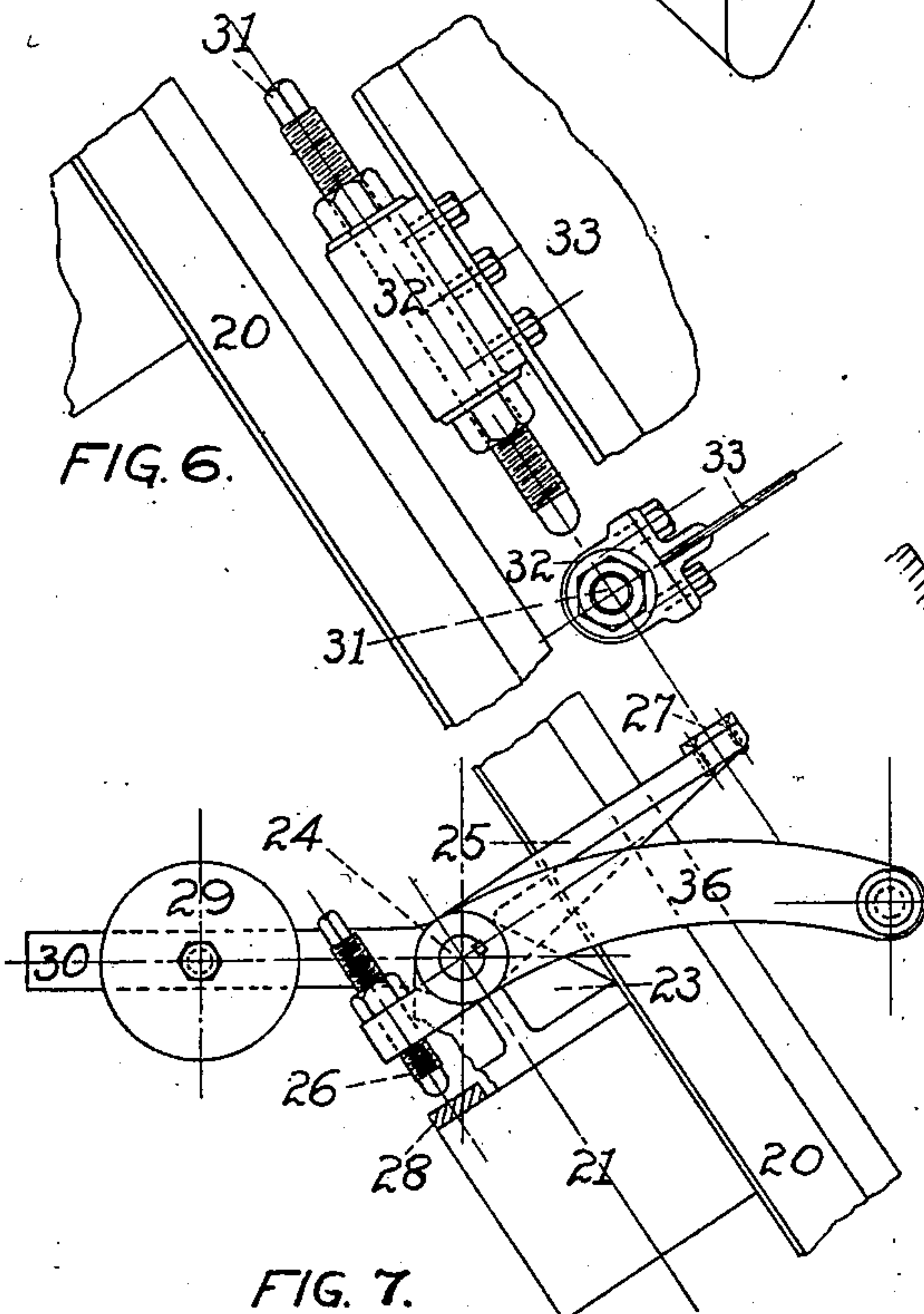
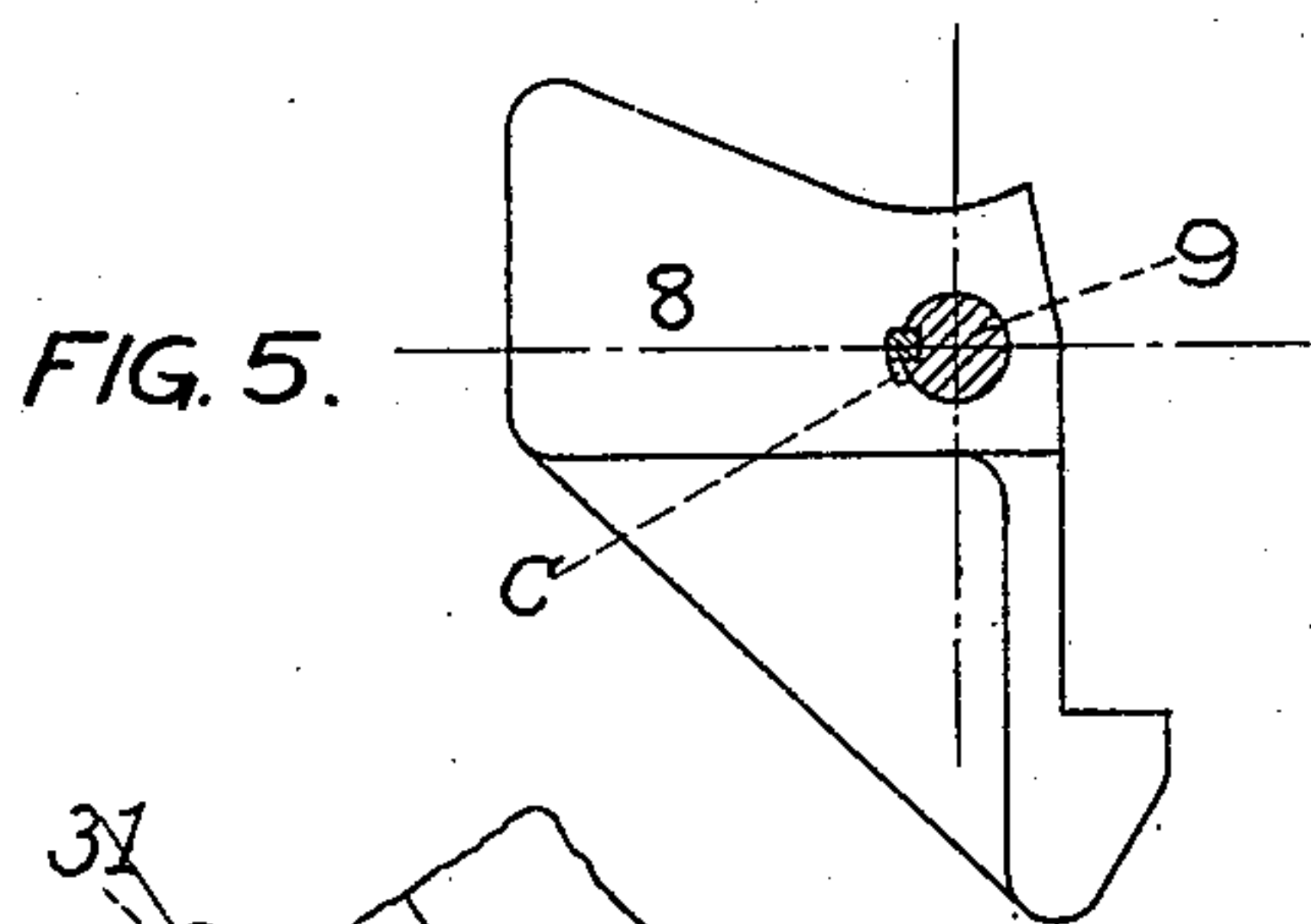


FIG. 4

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UNITED STATES PATENT OFFICE.

MARK W. JOHNSON, JR., OF BIRMINGHAM, ALABAMA.

DEVICE FOR CHARGING BLAST-FURNACES.

SPECIFICATION forming part of Letters Patent No. 730,922, dated June 16, 1903.

Application filed January 16, 1903. Serial No. 139,259. (No model.)

To all whom it may concern:

Be it known that I, MARK W. JOHNSON, JR., a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Devices for Charging Blast-Furnaces, of which the following is a specification.

My invention relates to devices for charging blast-furnaces.

The object of my invention is to provide between a scale-car carrying the material from the source of supply and a skip to elevate it to the furnace an intermediate vessel, thus permitting the car to discharge its load independently of the position of the skip and the skip to receive its load independently of the position of the scale-car, and when two skips balancing each other are used, one being up when the other is down, a further object is to provide such intermediate vessel for each skip adapted simultaneously to receive the load discharged from the car.

A further object is to provide devices, including an automatic trip, to discharge the load from the intermediate vessel into the skip when the skip is in position to receive the load.

With these and other objects in view, as will more fully appear, my invention consists of the constructions and combinations hereinafter described, and set forth in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a plan view of scale-car track and hoppers. Fig. 2 is a front elevation of same. Fig. 3 is a side elevation in section through the line A B of Fig. 2 and also shows the skip in position to receive the load. Fig. 4 is an assembled view showing the scale-car, hopper, skip, pit, and buffer for skip, also the automatic tripping devices and the emergency hand tripping connection, the hopper being shown in section on the line A B of Fig. 2. Fig. 5 is a detail of the releasing-pawl. Fig. 6 is a detail of attachment to skip for operating the automatic trip, and Fig. 7 is a detail showing the automatic trip.

Like parts are represented by similar numerals in the several views.

In the drawings I have represented the in-

termediate vessel in the form of a hopper 1, two of them being shown abutting each other, secured to beams 17 beneath that portion of the scale-car track 16 under which the skip lands, the arrangement being such that the scale-car may discharge its load into both hoppers simultaneously. I further provide the hoppers with suitable discharging devices, including an automatic trip and an emergency-lever, which I will now describe.

A trap-door 2 swings upon a shaft 3, held by hinge-straps 4, and is provided with a lever 5, having a counterweight 6 slidably mounted thereon. The weight can be adjusted to the desired position and tightened on the lever by set-screws 7. The door 2 fits within the sides of a chute 13 and when open rests against guards 14 and forms the bottom of the chute, of which a plate 15 is a continuation from the edge of the door to the point of discharge into the skip. When closed, the door strikes a jamb 20 and is engaged beneath by a latch-pawl 8, which locks it in its closed position. The latching device consists of a shaft 9, journaled in a hanger 10, carrying a lever 12, and the pawl 8. The pawl is keyed to the shaft; but the keyway in the pawl is cut away at c beneath the key, as shown in Fig. 5, so that the pawl may move out when the door is closed without moving the shaft. Levers 12 and 35 are keyed to the shaft 9 for the operation of said pawls, as hereinafter described.

The skip travels upon an inclined track 20, which is supported by cross-ties 21, resting upon a wall 37, and lands against a buffer 22. The automatic tripping device consists of a shaft 24, journaled in boxes 23, attached to one of the cross-ties 21, levers 25, 30, and 36 being fixed to said shaft, the lever 30 carrying a counterweight 29 to return the levers 25 and 36 to normal position.

A trigger-bar 31, carried upon the skip reach-beam 33 by a head 32, when the skip is landing in position to receive a load strikes the contacting plate 27 on the lever 25 and rotates the shaft 24, causing the lever 36 through the pivoted link 34 to move the lever 35, and thereby release the pawl 8, allowing the trap-door to fall and discharge the load into the skip. The rising of the skip

releases the lever 25, and the counterweight 29 through the connections described rotates the shafts 24 and 9 until the adjusting-screw 26, Fig. 7, in the lever 25 strikes the plate 28, attached to a cross-tie 21, thus returning the connections to normal position, the pawl 8 locking the door in its closed position. The trigger-bar 31 is preferably screw-threaded and provided with nuts bearing against each end of the head 32, as shown in Fig. 6, longitudinally to adjust said bar, and the lever 25 has a set-screw 26 for adjusting and defining its position, said screw bearing against the plate 28 under the influence of the counterweight 29. The plates 27 and 28 are preferably made of hardened metal to resist wear.

A hand-lever 18, attached to the lever 12 on the shaft 9, is provided to be used in case of emergency when for any reason the automatic trip fails to operate.

The operation is as follows: The scale-car having arrived from the source of supply in position over the hopper, the load is delivered to the hopper and the car is free to go for another load for the same or some other furnace, the intermediate vessel taking care of the load until the skip lands in position to receive it, thus affording great facility in the work. The arrangement is especially advantageous when two skips are employed, for the car can deliver its load to the intermediate vessels or hoppers simultaneously, and the skips alternately receiving the loads from the respective hoppers gives the car ample time in which to go about its work in supplying the same or other furnaces.

In Fig. 3 I have shown the trap-door in its closed and in Fig. 4 in its open position. It will be seen that the trigger-bar 31 and the screw 26 are adapted to be adjusted so as to operate just as the skip is landing against the buffer 22, thereby releasing the pawl 8, and the load, moving the trap-door into open position, drops into the skip. The rising of the skip permits the counterweight 29 to return the connections to normal position, which allows the pawl 8 to resume its locking position, and the counterweight 6 operates to throw the trap-door into closed position, the keyway in the pawl being cut away at c, allowing the door in closing to push out the pawl without turning the shaft and connections, the pawl returning by gravity underneath the door and locking same.

Having thus described my invention, I claim—

1. The combination with a scale-car to carry the load from the source of supply and skips to elevate said load to the furnace, of intermediate vessels adapted to divide and receive the load from said car and independently deliver same to said skips.

2. The combination with a scale-car to carry the load from the source of supply and skips to elevate said load to the furnace, of

intermediate vessels adapted to divide and simultaneously receive the load from said car, and means automatically to discharge said vessels into said skips when the latter reach a predetermined position.

3. In a device such as described, the combination with a skip and a hopper having a swinging trap-door with means automatically to return it to closed position, of a latch to lock said door in its closed position, and means automatically to move said latch to release said door by the movement of said skip.

4. In a device such as described, the combination with a hopper having a swinging trap-door operated by the weight of the load, with means automatically to return it to closed position, of a latch consisting of a shaft and a pawl on said shaft adapted automatically to engage and lock said door in its closed position without turning said shaft, and means on said shaft adapted to move said pawl and release the door.

5. In a device such as described, the combination with a skip and a hopper having a swinging trap-door and a latch to lock it in closed position, of a tripping device having connections to said latch, and means on said skip adapted to contact with and move said tripping device and thereby release said latch.

6. In a device such as described, the combination with a skip and a hopper having a swinging trap-door and a latch to lock it in closed position, of a tripping device having connections to said latch, means on said skip to contact with and move said tripping device to release said latch, and means automatically to return said tripping device and connections to normal position.

7. In a device such as described, the combination with a skip and a hopper having a swinging trap-door operated by the weight of the load, with means automatically to return it to closed position, and a latch to lock it in closed position, of a stationary tripping device having connections to said latch, means on said skip to contact with and move said tripping device to release said latch and means automatically to return said tripping device and connections to normal position, said latch being adapted to pass and engage said door independently of said tripping device and connections.

8. In a machine such as described, the combination with a skip, a hopper having a door, and a latch for said door, of a tripping device having connections to said latch, means on said skip to contact with and move said tripping device to release said latch, said tripping device being adapted automatically to return and having an adjustable part to adjust and limit said return.

9. In a device such as described, the combination with a skip, a hopper having a self-closing door and a latch for said door, of a tripping device having connections to said

latch, an adjustable part on said skip to contact with and move said tripping device to release said latch.

5 10. In a device such as described, the combination with a skip, a hopper having a door and a latch for said door, of a tripping device having connections to said latch, an adjustable part on said skip to contact with and move said tripping device to release said

latch, said tripping device being adapted automatically to return and having a part to adjust and limit said return.

In testimony whereof I have hereunto set my hand this 10th day of January, A. D. 1903.

MARK W. JOHNSON, JR.

Witnesses:

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J. W. SHOOK.