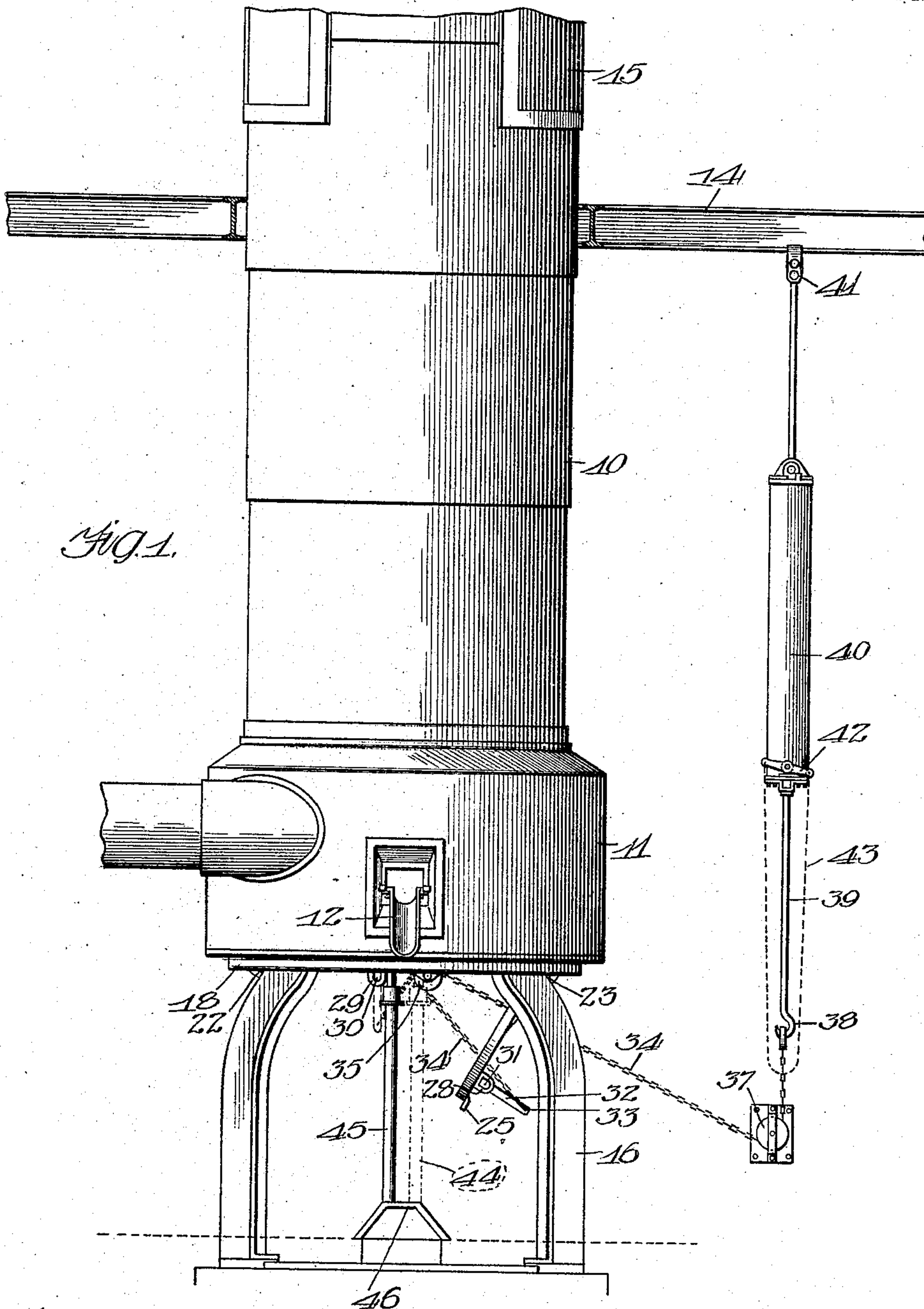


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 BOTTOM DOOR HOIST FOR FURNACES OR CUPOLAS.  
 APPLICATION FILED JUNE 12, 1908.

911,726.

Patented Feb. 9, 1909.  
 2 SHEETS—SHEET 1.



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Fig. 2.

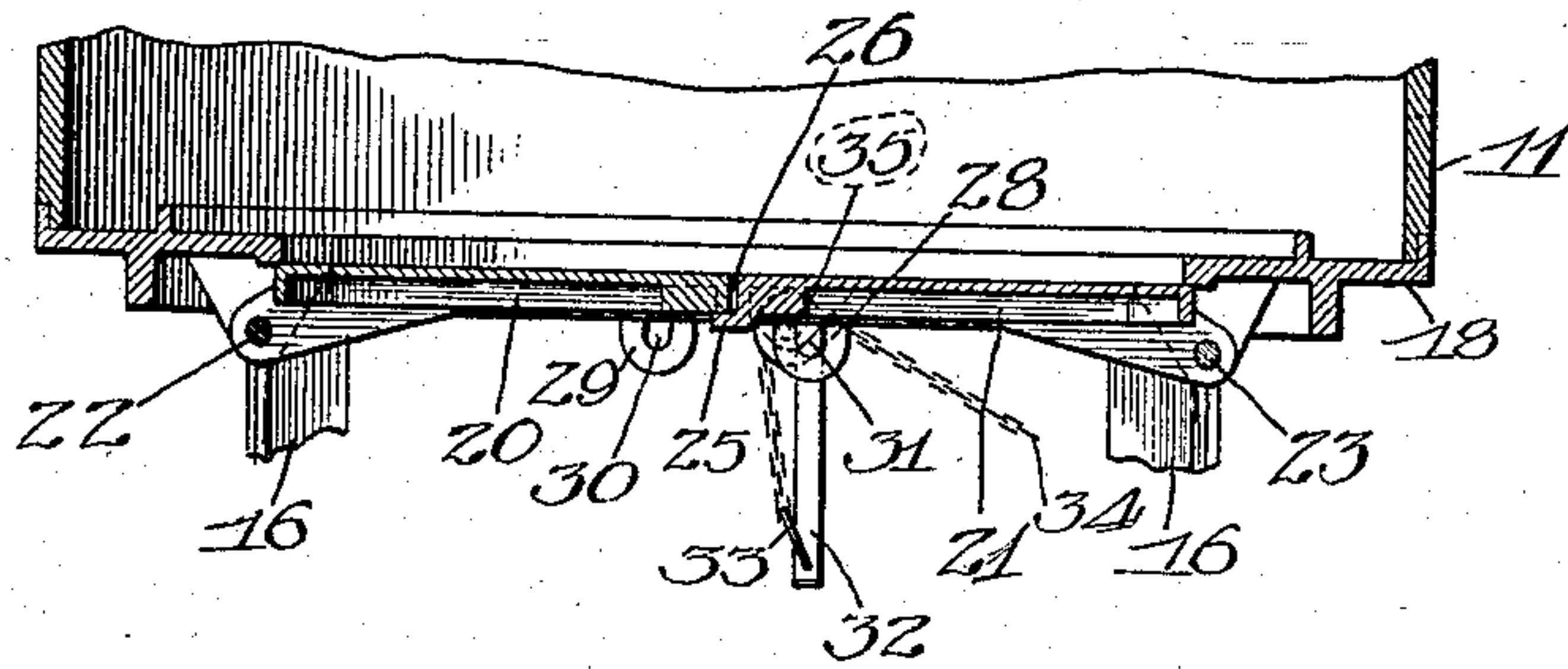


Fig. 3.

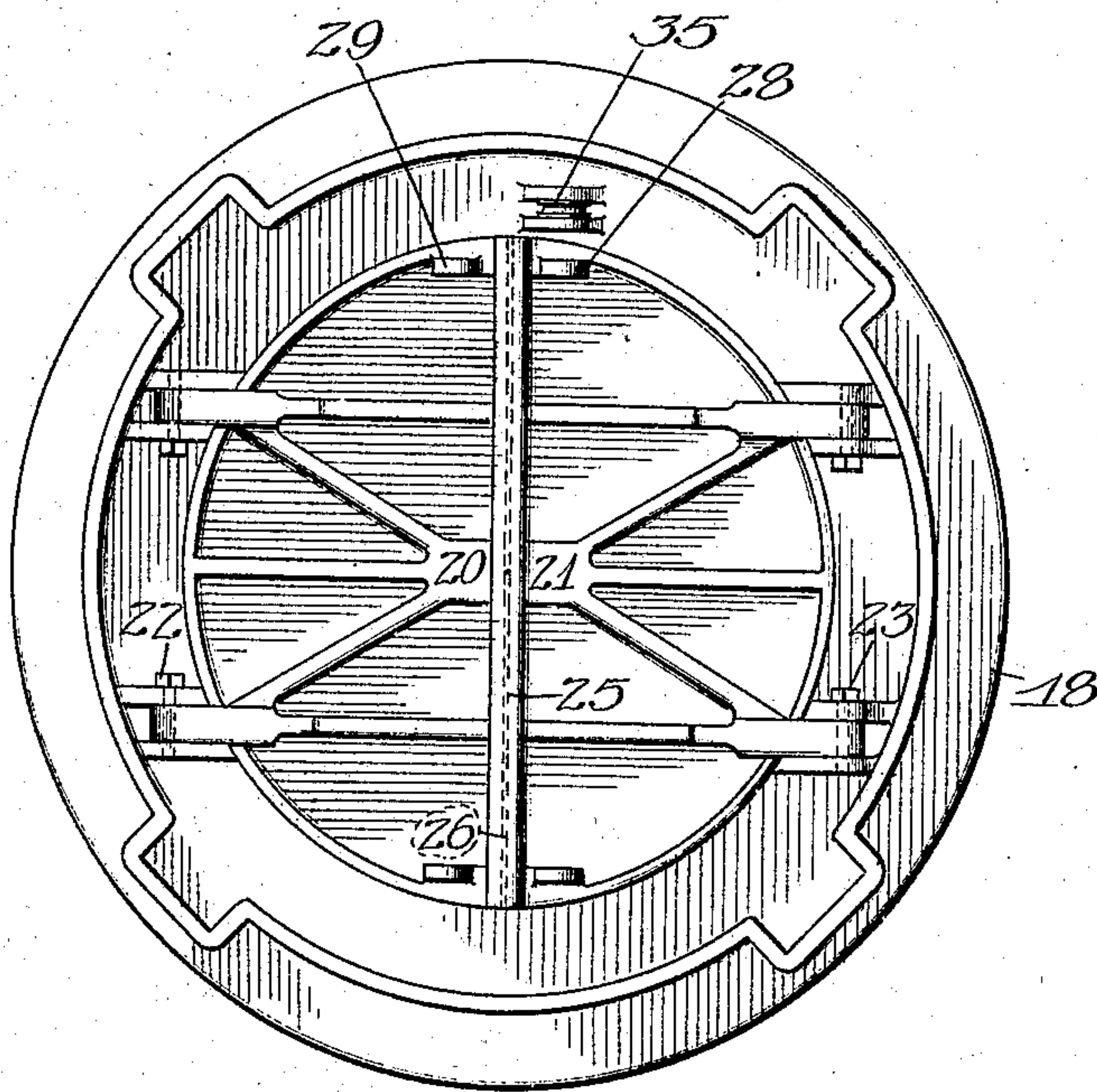
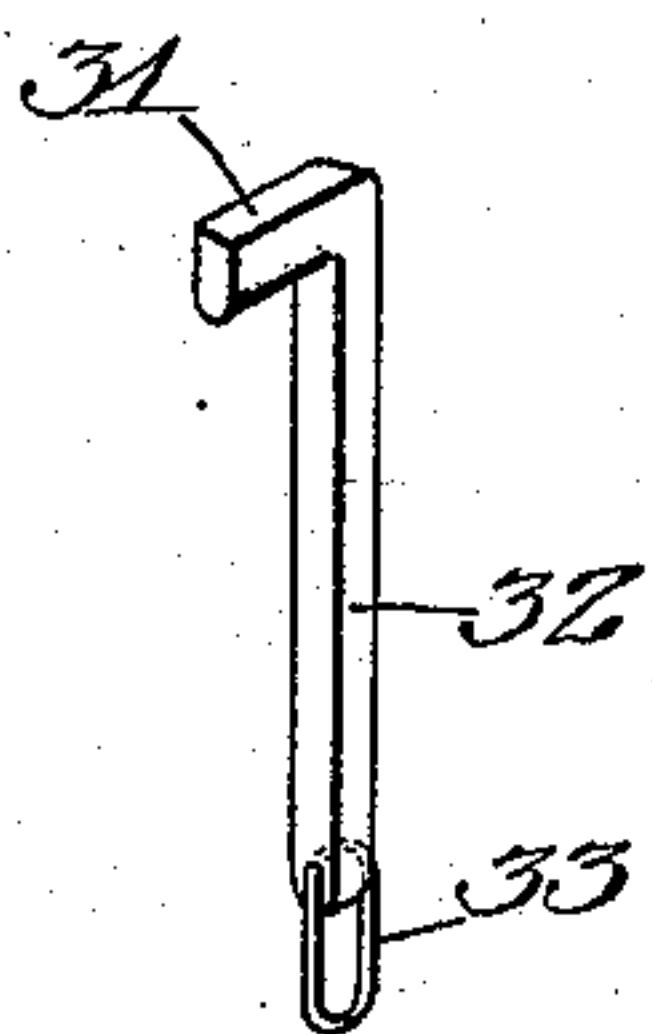


Fig. 4.



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# UNITED STATES PATENT OFFICE.

JAMES HYSLOP, OF HARVEY, ILLINOIS, ASSIGNOR TO WHITING FOUNDRY EQUIPMENT COMPANY, OF HARVEY, ILLINOIS, A CORPORATION OF ILLINOIS.

## BOTTOM-DOOR HOIST FOR FURNACES OR CUPOLAS.

No. 911,726.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed June 12, 1908. Serial No. 438,138.

*To all whom it may concern:*

Be it known that I, JAMES HYSLOP, subject of Great Britain, residing at Harvey, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Bottom-Door Hoists for Furnaces or Cupolas, of which the following is a specification.

This invention relates to mechanism for closing and holding in place the bottom or dumping doors of a furnace or cupola such as is used in iron foundries and other places where the melting of iron and steel is required. The usefulness of the invention will be more apparent when it is remembered that the opening closed by these doors is frequently six or eight feet in diameter and that the doors are made of a couple of inches of thick cast iron and located at such a height that a man may freely walk under the furnace bottom of which the doors form a part.

The object of the invention is to provide mechanism for closing doors of the class described which can be easily and cheaply made, installed and attached to the device, which is efficient in operation and is not readily liable to get out of order.

The invention consists in a power operated mechanism which engages each door at some distance below its normal plane, so that the door is firmly moved into and temporarily held in finished position and it also consists in mechanism by means of which the lifting mechanism may be readily attached and detached from the bottom of the door.

The invention also consists in details of construction which will be hereafter more fully described and claimed as the specification proceeds.

Referring to the drawings Figure 1, is a front elevation of a foundry cupola or furnace having the device of this invention applied thereto. Fig. 2 is a sectional detail view through the bottom doors. Fig. 3 is an inverted bottom view of the cupola showing the doors. Fig. 4 is a detail view of a detachable post by which the lifting mechanism proper is attached to the door.

Referring again to Fig. 1, we see the ordinary cylindrical cupola 10 having near its bottom the enlarged portion 11, from which the discharging spout 12 extends in the ordi-

nary manner. Near the upper portion of the cupola is a charging floor 14 on which material may be carried to the charging door 15 in the ordinary manner. This furnace or cupola is mounted upon a plurality of legs 16 which, in the particular furnace from which these drawings were taken, are about 8 feet in height, so that a man may walk in between the supporting legs and under the cupola floor or bottom 18 without difficulty. The body portion 10—11 of the cupola is open at the bottom except as closed by the bottom or discharging doors 20 and 21, hinged respectively at 22 and 23. One of the doors, as 21, has a projecting flange 25 which engages the opposite door so as to close the crack 26 which exists between the doors when closed. As heretofore stated these doors are very heavy and mechanical power is required to lift the doors into closed position and a strong mechanism is required to hold them and the working charge within the furnace in place when the cupola is in operation. The device of this invention relates to such mechanism. In order that such closing of the doors may be readily effected, each door is provided with a depending lug 28 and 29 having therein a non-circular hole 30 in which a non-circular tooth 31 on the detachable rod or post 32 is adapted to detachably fit. The lower end of this post or rod 32 carries a loop or ring 33 in which a chain 34 is securely fastened. This chain is permanently but loosely mounted upon a small pulley 35 journaled in suitable bearings depending from the bottom 18 of the furnace proper. From this pulley 26 the chain passes under another pulley 37 mounted upon another suitable support and thence to the hook 38 upon the piston rod 39 of an ordinary cylinder hoist 40 suspended at 41 to the charging stage 14 or any other suitable support. This cylinder hoist has suitable operating valves controlled by the lever 42 and chain 43, so that by properly manipulating the valves the rod 39 may be lifted thereby pulling the chain 34 in such a direction and to such an extent that the right hand door of Fig. 1 is moved from that position to its position in Fig. 2. When this position is reached the operator places under said door a post 44, shown in dotted lines of Fig. 1, which post holds door 21 in the position of Fig. 2 ex-



actly as the post 45 resting on any suitable support, such as the inverted steel shape 46 holds the door 20.

In the complete operation of the device, assuming that both doors 20 and 21 are down or in a more vertical position than that of the right hand door as seen in Fig. 1, the operator first takes the post 32 and inserts the tooth 31 in the opening 30 in lug 29 on door 20. He then manipulates the valve mechanism of the hoist 41 until said door 20 is lifted to regular or closed position and held in that position while he puts in place one or more supporting posts 45 to hold said door 20 in position as shown. He now removes the tooth 31 from the lug 29 and inserts it in the opening 30 in the lug 28 on door 21 as shown in Fig. 1 and again manipulates the valve of the hoist to lift that door to closed position, when he then inserts the post 44 to hold the door permanently in position after which he detaches the tooth 31 from the lug 28 and lets the post 32 and attached chain hang loosely at the side of the door.

When the furnace has been used and the operator desires to discharge the slag and other residue in the bottom of the furnace he simply takes a sledge hammer or other convenient tool and knocks out the posts 44 and 45 from beneath the doors, thereby allowing them to drop, under the influence of their weight and the weight upon them, and discharge the contents of the cupola. When the cupola has thus been emptied it is thoroughly cleaned, the doors are again hoisted into position and the cupola is ready for recharging and use.

Special attention is called to the fact that by using the member 32, non-rotatively connected to each door in succession, in connection with the pulley 35 located in the plane of the floor the hoist mechanism exerts a far greater pull upon the door than would be possible were the lifting chains connected directly to the door on substantially the level of the pulley.

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

1. In mechanism of the class described the combination with a cupola or furnace having an open bottom and pivotally mounted doors adapted to close the same, of a detachable post adapted to be non-rotatively connected at one end to one of said doors in depending position therefrom and lifting mechanism connected to the other end of said post capable of operating through said post to close the

door and mechanism for finally holding the door in permanently closed position.

2. In mechanism of the class described the combination of a cupola having an opening in its bottom, doors pivotally mounted, adjacent to the bottom of said cupola and adapted to swing to a position where they close the opening in the bottom, a pulley located in approximately the bottom plane of the cupola, a chain, rope or other lifting member passing over said pulley, means for detachably securing said lifting member to the door to be closed, means for applying power to the opposite end of said lifting member so as to move the door and mechanism for finally holding the door in closed position.

3. In mechanism of the class described, the combination with a cupola or furnace having an open bottom and a pivotally mounted door for the same, of a detachable post adapted to be non rotatably connected at one end to said door in depending position therefrom and lifting mechanism connected to the other end of said post capable of operating through said post to close the door and mechanism for finally holding the door in permanently closed position.

4. In mechanism of the class described, the combination with a cupola or furnace having an open bottom and a pivotally mounted door for the same, of a post in depending position from said door having a non circular portion adapted to engage a non circular opening in said door, lifting mechanism connected to the other end of said post capable of operating through said post to close the door and mechanism for finally holding the door in permanently closed position.

5. In mechanism of the class described, the combination with a cupola or furnace having an open bottom and a door adapted to close the same, of a detachable post adapted to be non rotatably connected at one end to said door in depending position therefrom, said non rotative connection comprising a non circular hole in one of said members entered by a non circular portion of the other of said members, and lifting mechanism connected to the other end of said post capable of operating through said post to close the door.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

JAMES HYSLOP.

Witnesses:

MAE E. THOMAS,  
H. W. BENTON.