

No. 771,487.

PATENTED OCT. 4, 1904.

F. McCARTHY.
SKULLING MACHINE.

APPLICATION FILED MAR. 7, 1904.

NO MODEL.

2 SHEETS-SHEET 1.

Fig. 2.

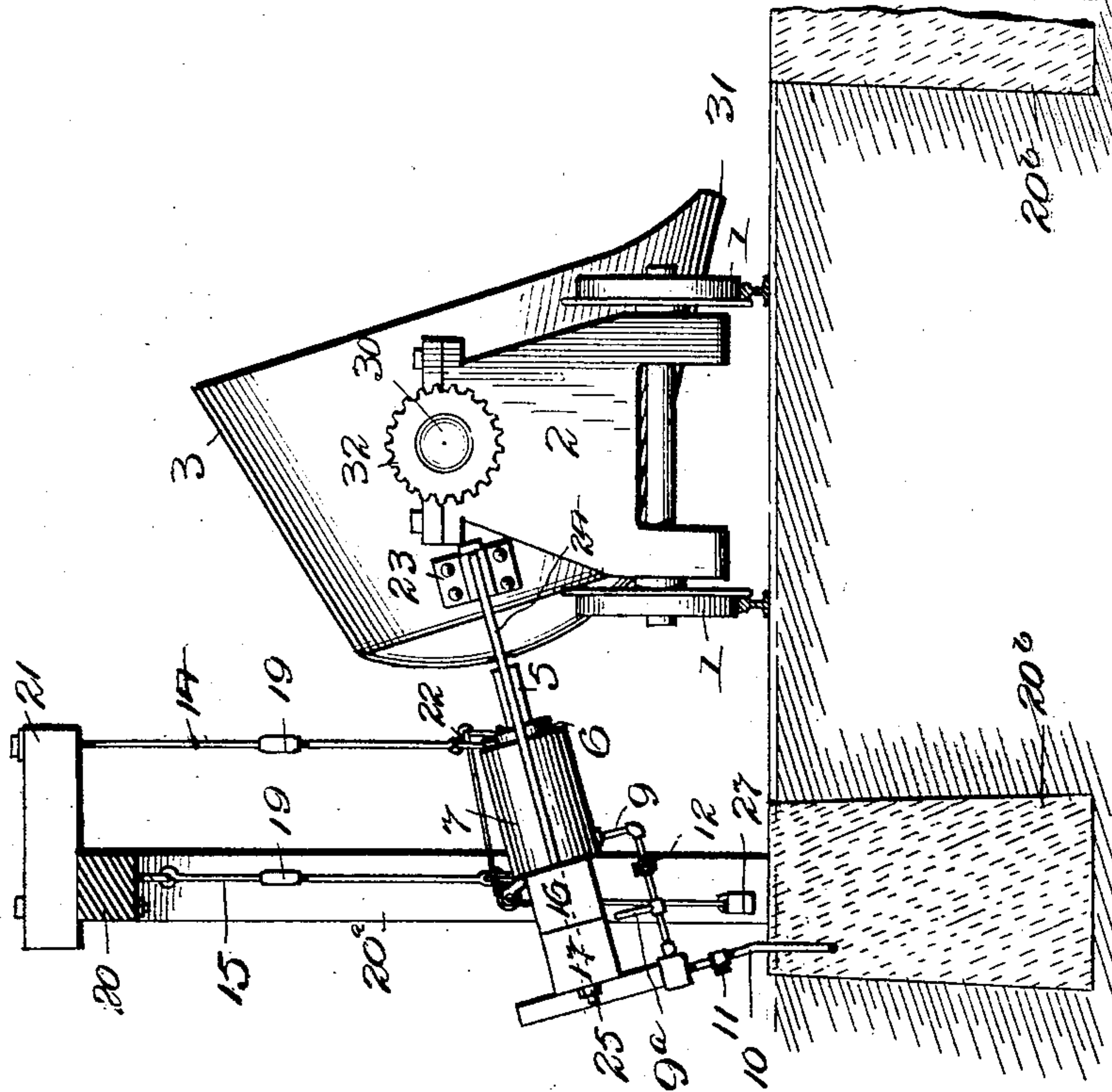
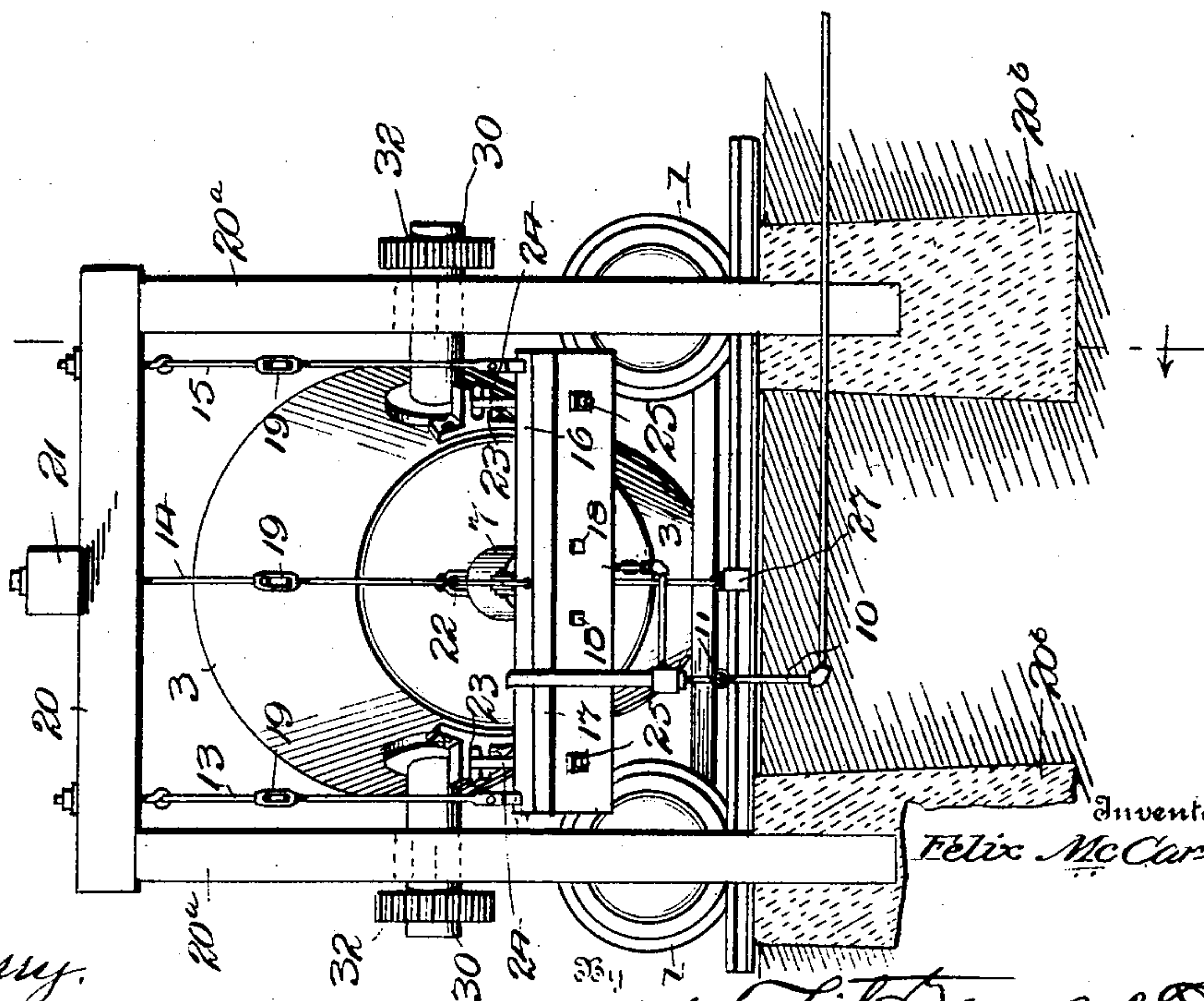


Fig. 1.



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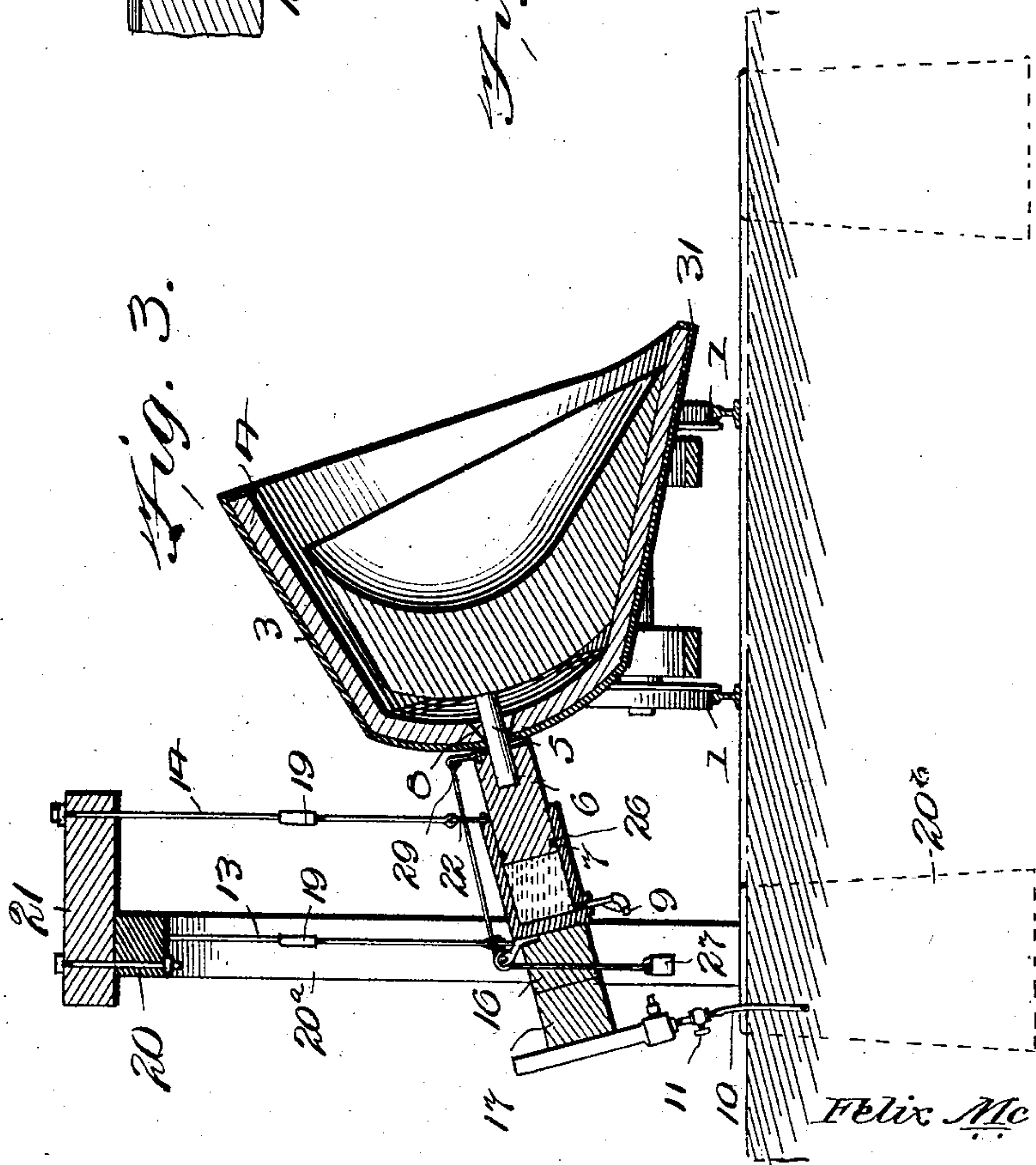
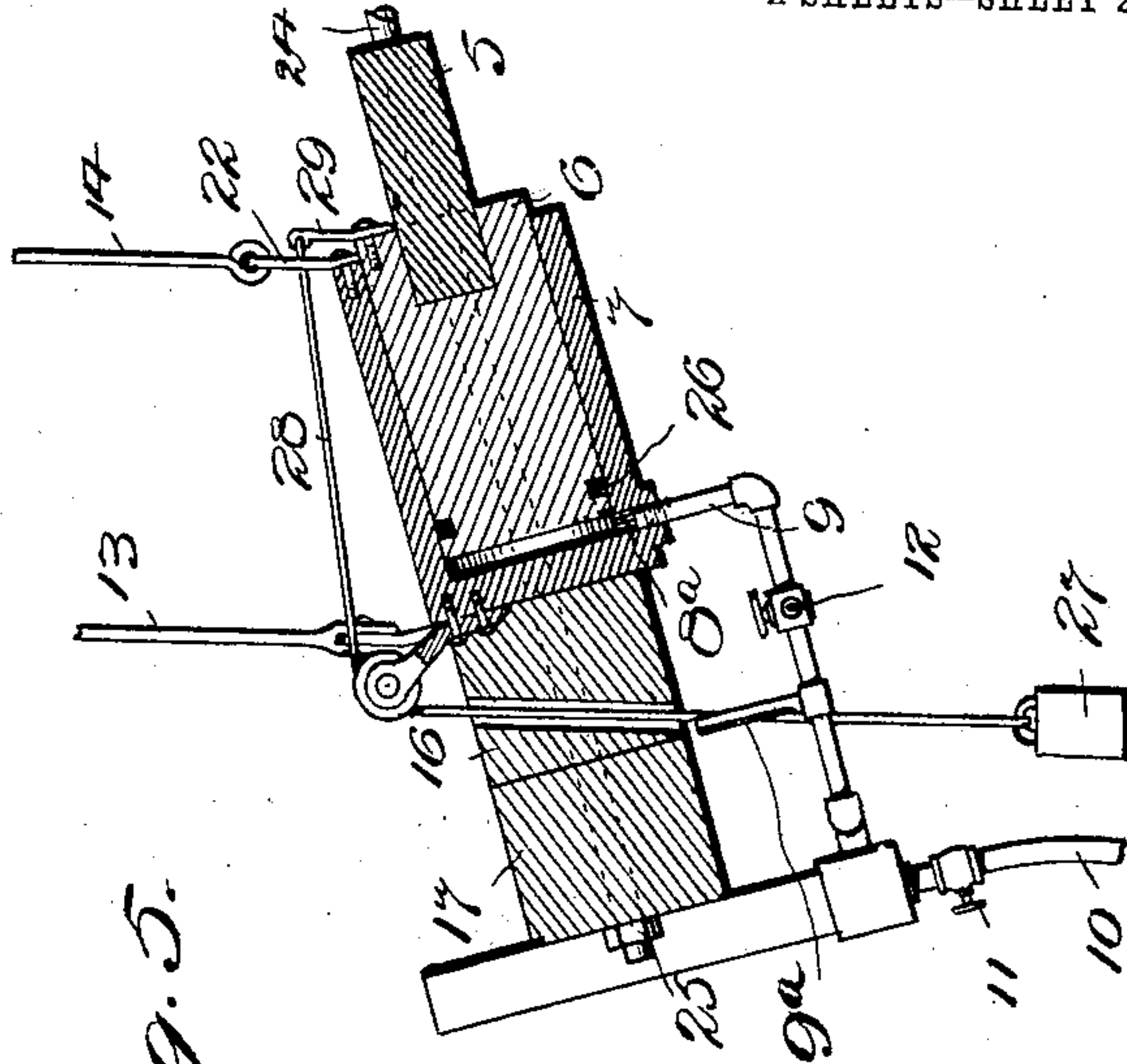
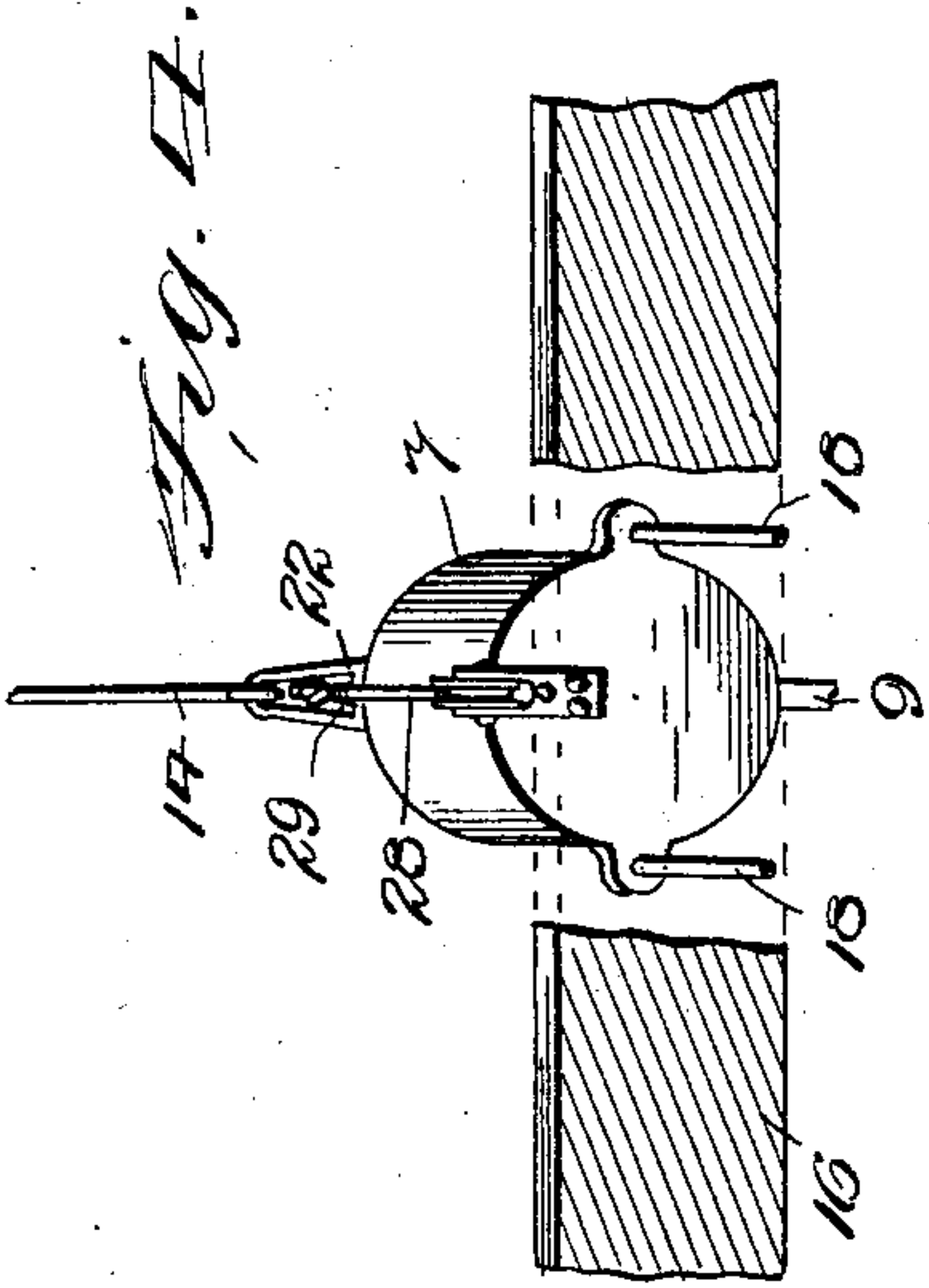
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

FELIX McCARTHY, OF POTTSTOWN, PENNSYLVANIA.

SKULLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 771,487, dated October 4, 1904.

Application filed March 7, 1904. Serial No. 196,911. (No model.)

To all whom it may concern:

Be it known that I, FELIX McCARTHY, a citizen of the United States, residing at Pottstown, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Skulling-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to what is commonly designated a "skulling" apparatus; and it consists of novel construction and combination of parts, the preferred materialization whereof will be hereinafter clearly set forth, and pointed out in the claims.

The main object of my invention, among others, is to provide reliably - efficient and easily-operated means for disengaging the cooled metal which has been left adhering to the walls of the ladle.

A further object of my invention is to provide means for forcing a separation between the cooled metal or residuary matter adhering to the walls of the ladle, no matter how securely said parts are joined together incident to the use of the ladle.

Other objects will be fully brought out in the following specification, which shall be considered in connection with the accompanying drawings made a part thereof, and in which—

Figure 1 shows a side elevation of my invention disposed in coöperation with a ladle. Fig. 2 shows an end view of the ladle and its carrying-truck and also shows the relative position of my skull-discharging machine. Fig. 3 is a similar view to that presented in Fig. 2, the parts being illustrated in section. Fig. 4 is an end view in perspective of the cylinder containing the hydraulic or steam-operated plunger. Fig. 5 shows my hydraulic or steam-actuated plunger and coöperating parts in section.

As is well understood, the molten metal is run into ladles at the furnace, the ladles being commonly mounted upon suitable trucks and trackway, whereby it may be readily moved to the discharging-point where the molten metal is poured into molds adapted to the for-

mation of pigs. More or less of the molten metal is cooled or chilled by the walls of the ladles, and the cooled portion is left adhering to the bottom and sides of the ladle, and the quantity of cooled metal is thus gradually increased with each use of the ladle until the capacity of the ladle is greatly reduced, and it therefore becomes very desirable and important to provide some cheap and efficient means for forcing the adhering metal or skull from the ladle without injury to the walls thereof, and it is for the accomplishment of this result that I have originated my present invention.

For convenience of description I will designate the details and coöperating parts of my invention by numerals, each numeral being applied to a corresponding part in the different views of the drawings.

It is common to provide a suitable truck, the wheels of which are designated by the numeral 1, suitable standards 2 also being provided upon said trucks, and upon the standards thus or otherwise fashioned I mount the ladle 3, which, as is common with ladles of this character, consists of an exterior wall or casing of metal constituting the ladle proper, the inner surface of such wall being lined in any preferred way, as with a covering of fire brick or clay 4. In the bottom of the ladle-body 3 I form an aperture of proper size to receive the tooth or bolt 5, mounted in the end of the plunger 6, which latter is designed to snugly fit within the cylinder 7, whereby it may be forced inward and outward as a piston is moved within its cylinder and as will be hereinafter particularly set forth. I also provide a tapered hole or opening 8 in the bottom of the lining 4, said opening being designed to receive a conical stopper or closure, whereby when it is desired to remove the skull within the ladle said stopper may be cut away, as with a chisel, reaching through the aperture formed in the bottom of the ladle-body 3, thereby providing direct access to a contiguous part of the bottom of the skull and insuring that the rod or tooth 5 may be extended directly in engagement with the material left adhering to the walls of the ladle.

Referring to Fig. 3 and other views, it will

be observed that the cylinder 7 is opened at one end to receive the plunger 6, while the closed end thereof is provided with a suitable port 8^a to receive steam, hydraulic, or other pressure through the conveyer-pipe 9, said pipe 9 being placed in communication with the source of supply, as indicated by the numeral 10, suitable valves 11 and 12 being also provided to facilitate a ready control of the fluid-pressure. Attached to the conveyer-pipe 9 in any suitable way and extending upwardly therefrom is a suitable pressure-gage 9^a, by which means the pressure upon the cylinder may be noted. The cylinder 7 is adjustably supported in position by the rods 13, 14, and 15, the rods 13 and 15 extending into engagement with the ends of the beams 16 and 17, which are secured together in any preferred way and sustained in such position that the closed end of the cylinder 7 will bear directly against the inner edge of the beam 16, said cylinder being secured to the beam 16 in any preferred way, as by the bolts 18.

A proper adjustment of the length of the rods 13 and 14 and 15 may be readily attained, as by the turnbuckles 19 or equivalent device. The rods 13 and 15, it will be observed, are supported by the cross-beam 20, while the rod 14 is sustained by the bracket or arm 21, bolted to the beam 20 and extending at a proper distance to enable the rod 14 to cooperate with the open end of the cylinder, said rod 14 being secured to the cylinder in any preferred manner, as by the link 22. It will be understood that the beam 20 is reliably sustained in a horizontal position by the uprights or standards 20^a, said standards being securely held in an upright position, as by being disposed in the concrete bedding 20^b.

Since great force must be applied to remove the adhering metal from the walls of the ladle, it becomes desirable and important to hold the ladle from moving away from the plunger 6 and its tooth or blade 5, and with this object in view I provide suitable brackets 23, attached to opposite sides of the ladle, said brackets being connected with the rods 24, the opposite ends of which extend through the beams 16 and 17 and secured in place, as by the nuts 25.

It is of course obvious that the brackets 23 may be connected to a suitable part of the ladle 3, my object being, as before stated, to hold the ladle from moving away from the plunger. To prevent the escape of steam, air, or water between the walls of the casing 7 and the plunger 6, I provide an annular groove in the plunger, adapted to be filled with suitable packing 26, as clearly shown in Figs. 3 and 5. The plunger 6 is restored to its initial position within the casing 7 by the weight 27 and the cable 28, which latter is attached to the outer end of the plunger, as by the bracket 29 or equivalent device. As is common with ladles of this character, it is supported upon

suitable trunnions 30, resting in bearings provided in the standards 2, and it is obvious that when the ladle is to be discharged of its contents it is simply tilted to one side, whereby the nozzle or discharging-lip 31 will be in proper position to deliver said contents. The actuation of the ladle necessary in tilting it into a discharging-point and restoring it to its horizontal position may be accomplished in a variety of ways, as by a suitable controlling rack-bar or gear-wheels (not shown) placed in communication with the gear-wheels 32, keyed to the trunnions 30.

It will thus be seen that an adjustable support for the plunger relied upon to force the skull from the ladle has been provided by me and that the entire discharging appliance may be located to one side of the trackway, and therefore wholly out of the way of the ladle and its carrying-truck until required for use, when by simply connecting the anchoring-rods 24 and adjustably securing the nuts 25 in position, whereby the ladle will be held at the desired point, the tooth will register with the opening in the ladle and be in position to perform its office.

It will be understood that after tilting the ladle either manually or by machinery provided especially for this purpose the conical plug in the opening 8 may be cut away, thus providing direct access to the metal adhering to the walls and bottom of the ladle. After the conical plug has been removed, as by cutting it away with the chisel, the tooth 5 is entered in the opening, and water, steam, or air is introduced into the cylinder 7 through the mediation of the pipe 9 and pipes connected therewith, which results in forcing the plunger 6 outward, and thereby bringing great force to bear upon the metal adhering to the ladle and causing a separation of such metal from the walls 4, when it will drop out or may be otherwise removed.

It will thus be seen that I have provided very simple though reliably efficient means for the accomplishment of the result which it is desirable to attain, and believing that the advantages and manner of using my invention have thus been made clearly apparent further description is deemed unnecessary.

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

1. The herein-described machine for removing adhering metal from the walls of a ladle comprising the combination with the ladle and suitable carrying-trunks therefor, of a fluid-pressure-actuated plunger having an extension or tooth adapted to extend through an aperture in the bottom of said ladle; suitable means to support the cylinder and the plunger controlled thereby, comprising uprights 20^a, beam 20, bracket 21, beams 16 and 17 and adjustable rods 13, 14 and 15, brackets 23 secured to the ladle, rods 24 carried by the beams 16 and

17 adapted to engage said brackets, and lock the cylinder and ladle in engagement with each other whereby they will not have a relative movement to each other and conveying means 5 for the fluid-pressure medium designed to cooperate with the cylinder, all substantially as specified and for the purpose set forth.

2. In an appliance of the character specified, a cylinder having a fluid-pressure-controlled 10 plunger mounted therein; means to force said plunger outward and additional means to restore it to its normally inward position comprising a cable 28 secured to the outer end of said plunger by means of a clevis 29, a weight 15 27 secured to the opposite end of said cable,

in combination with an adjustable support for said cylinder and devices for locking the cylinder in engagement with the ladle whereby when the plunger is forced out of the cylinder its force may be directed against the metal 20 adhering to the walls of the ladle as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FELIX McCARTHY.

Witnesses:

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