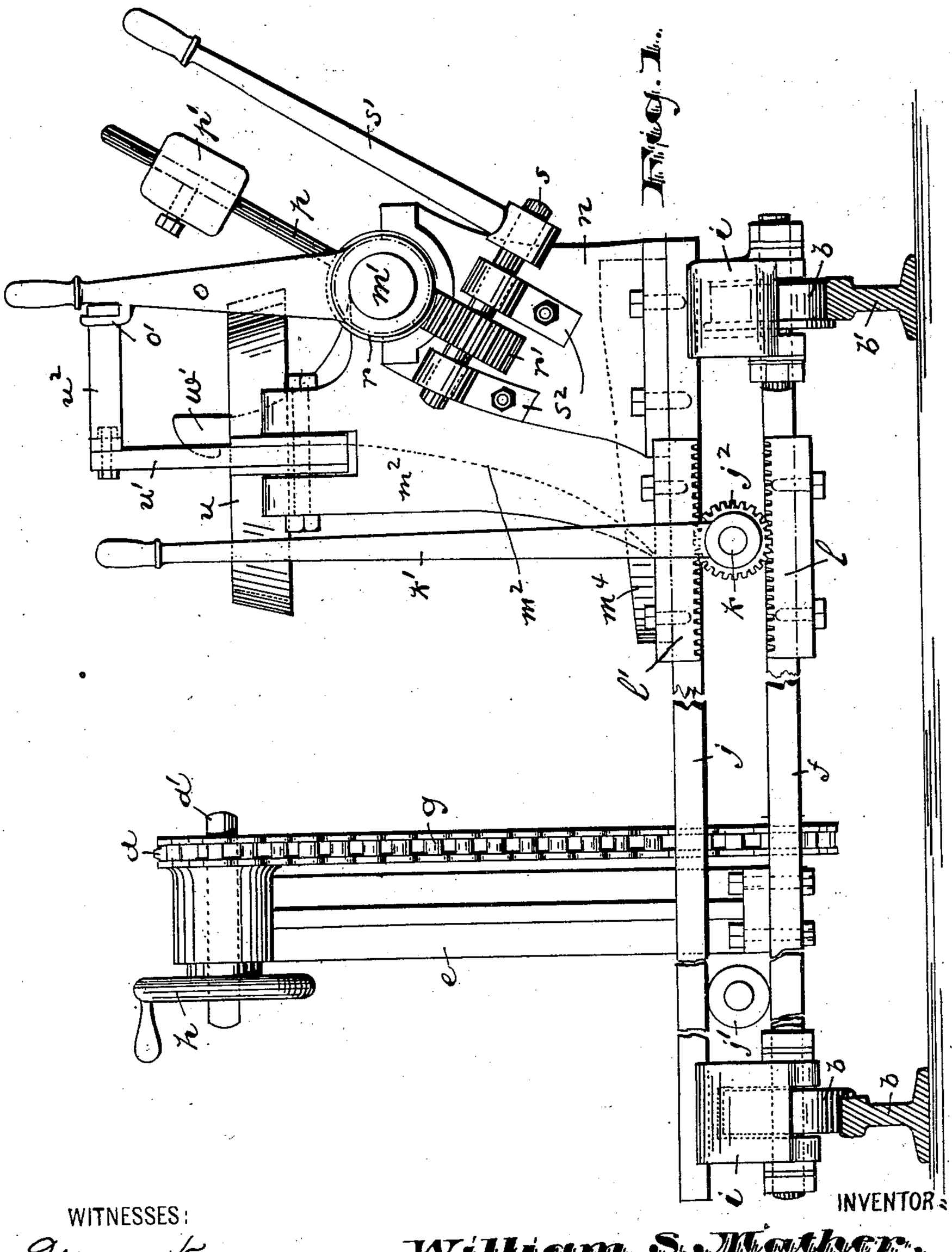
No. 731,062. PATENTED JUNE 16, 1903.

W. S. MATHER.

MACHINE FOR POURING METAL.

APPLICATION FILED SEPT. 21, 1900.

NO MODEL. 6 SHEETS—SHEET 1.



WITNESSES:

Henry King

Russell M. Everett.

INVENTOR:

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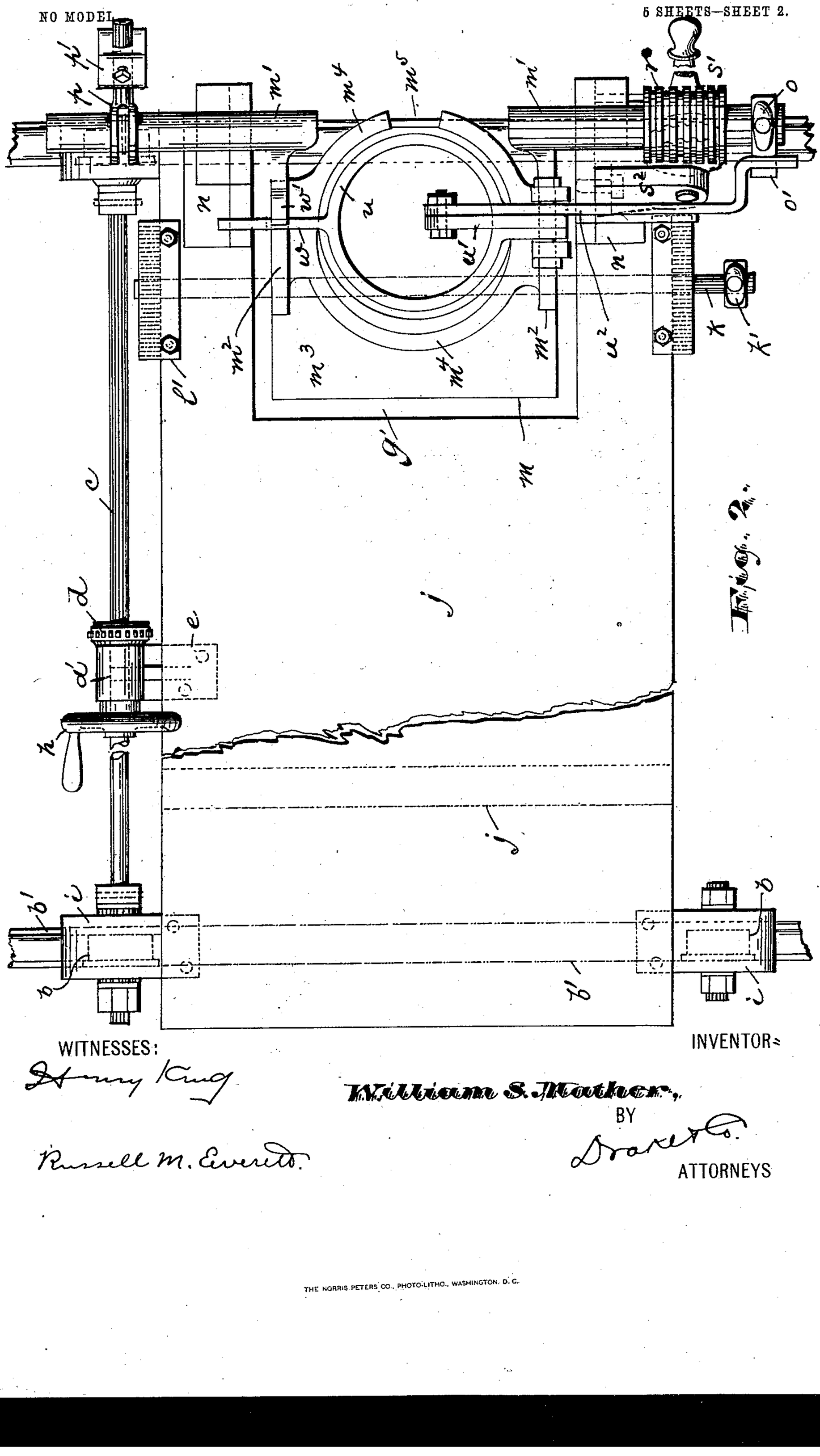

Fig. 2.

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NO MODEL. 5 SHEETS—SHEET 3.

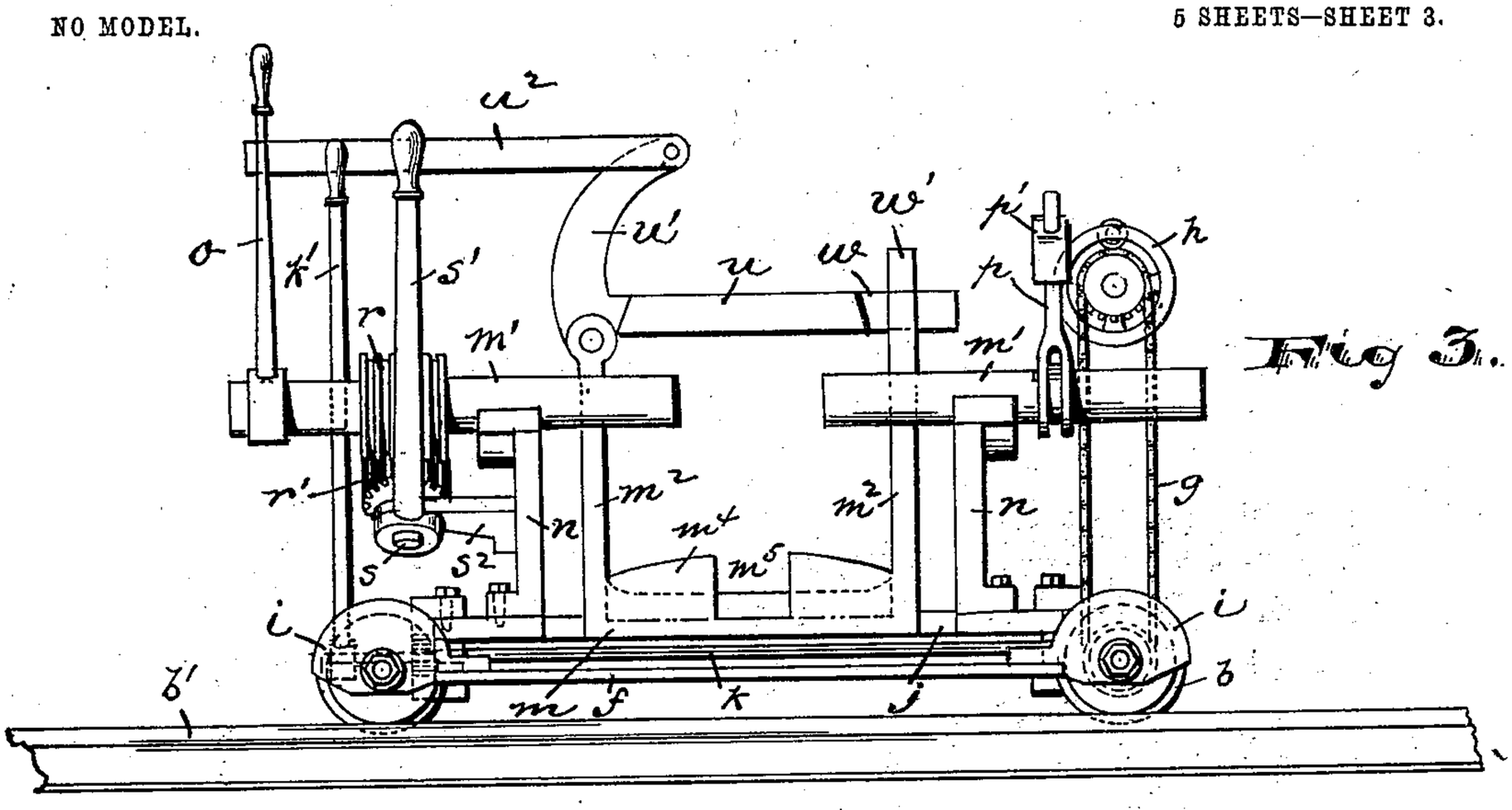

Fig 3.

Fig. 6.

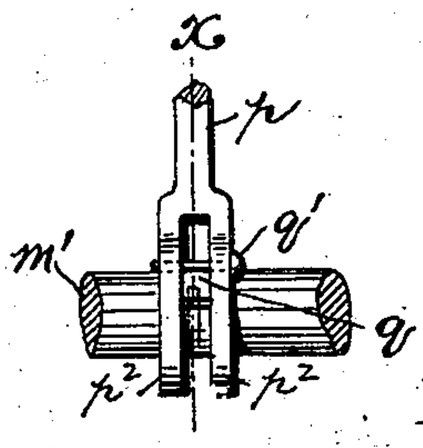

Fig. 5.

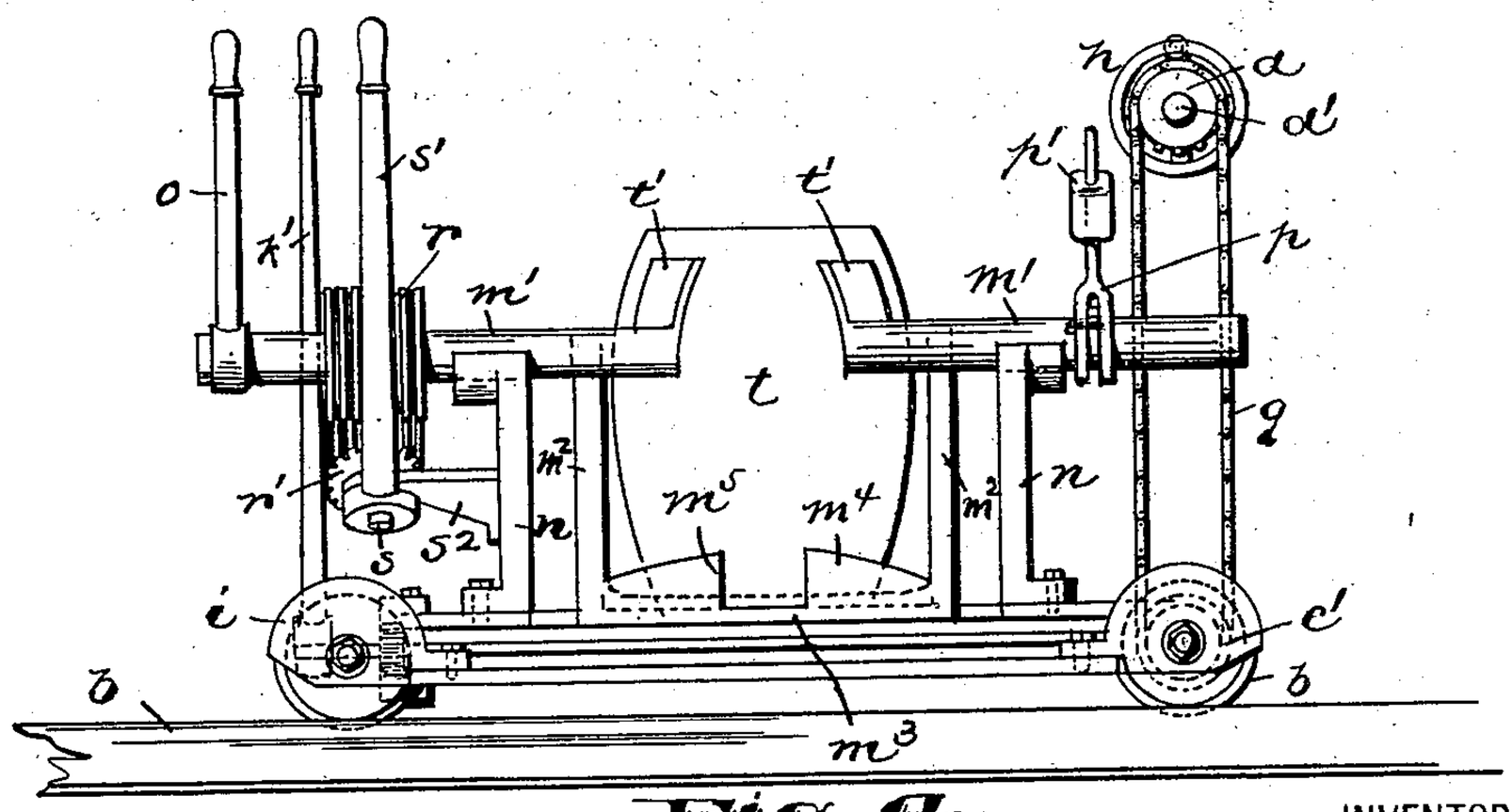

Fig. 4.

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MACHINE FOR POURING METAL.

APPLICATION FILED SEPT. 21, 1900.

NO MODEL. 5 SHEETS—SHEET 4.

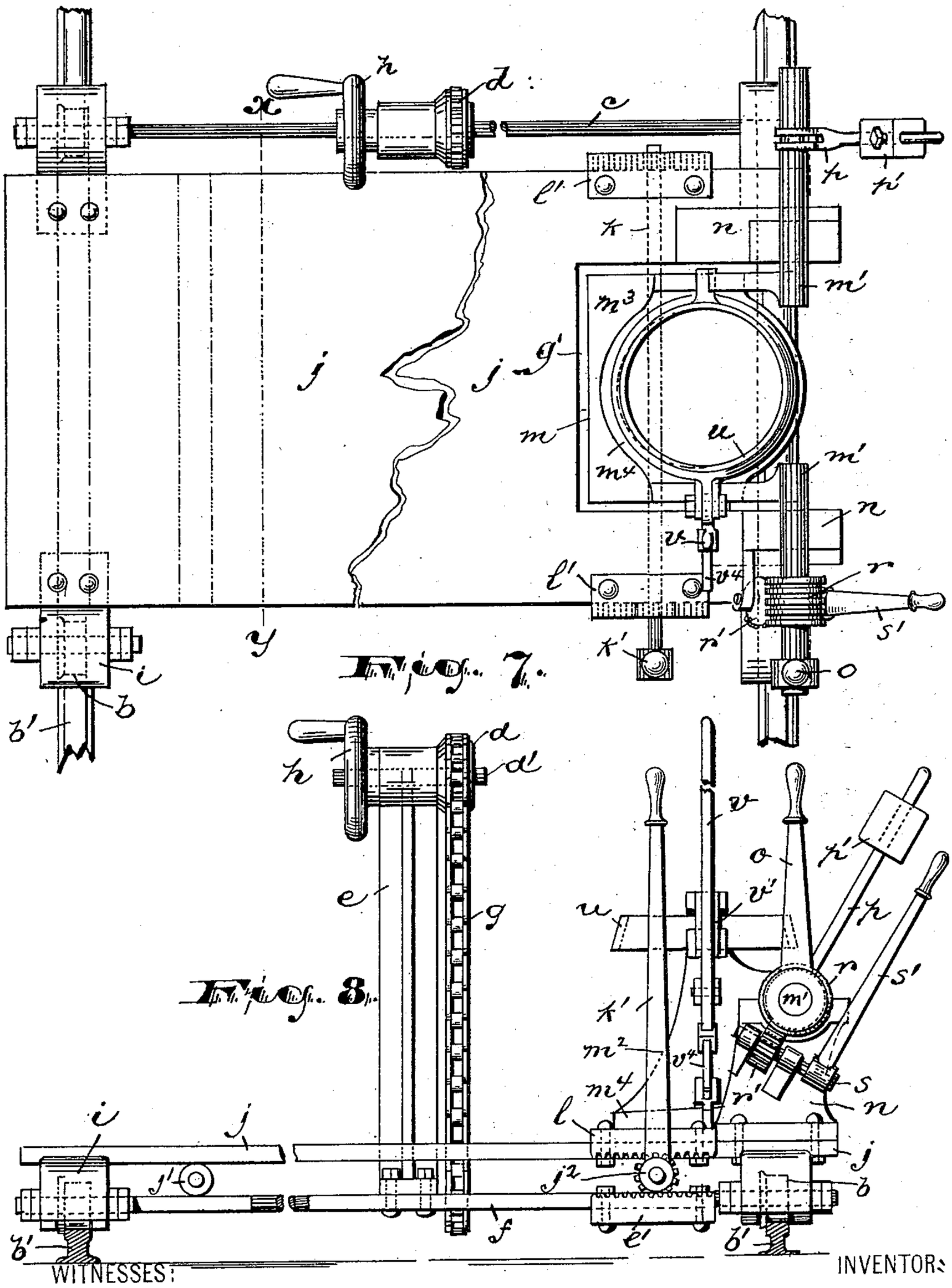

Fig. 7.

Fig. 8.

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No. 731,062. PATENTED JUNE 16, 1903.

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MACHINE FOR POURING METAL.

APPLICATION FILED SEPT. 21, 1900.

NO MODEL. 6 SHEETS—SHEET 6.

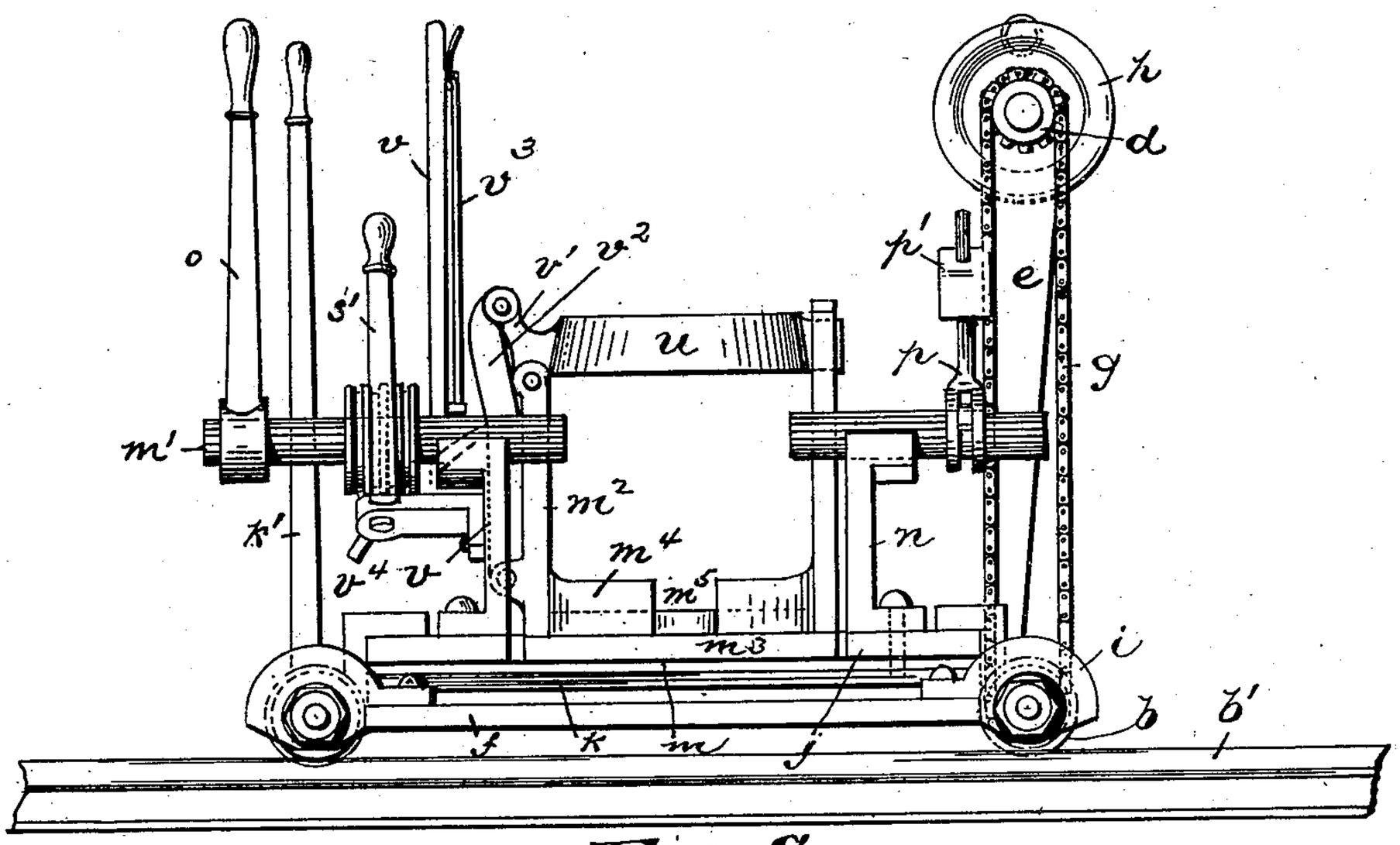

Fig. 9.

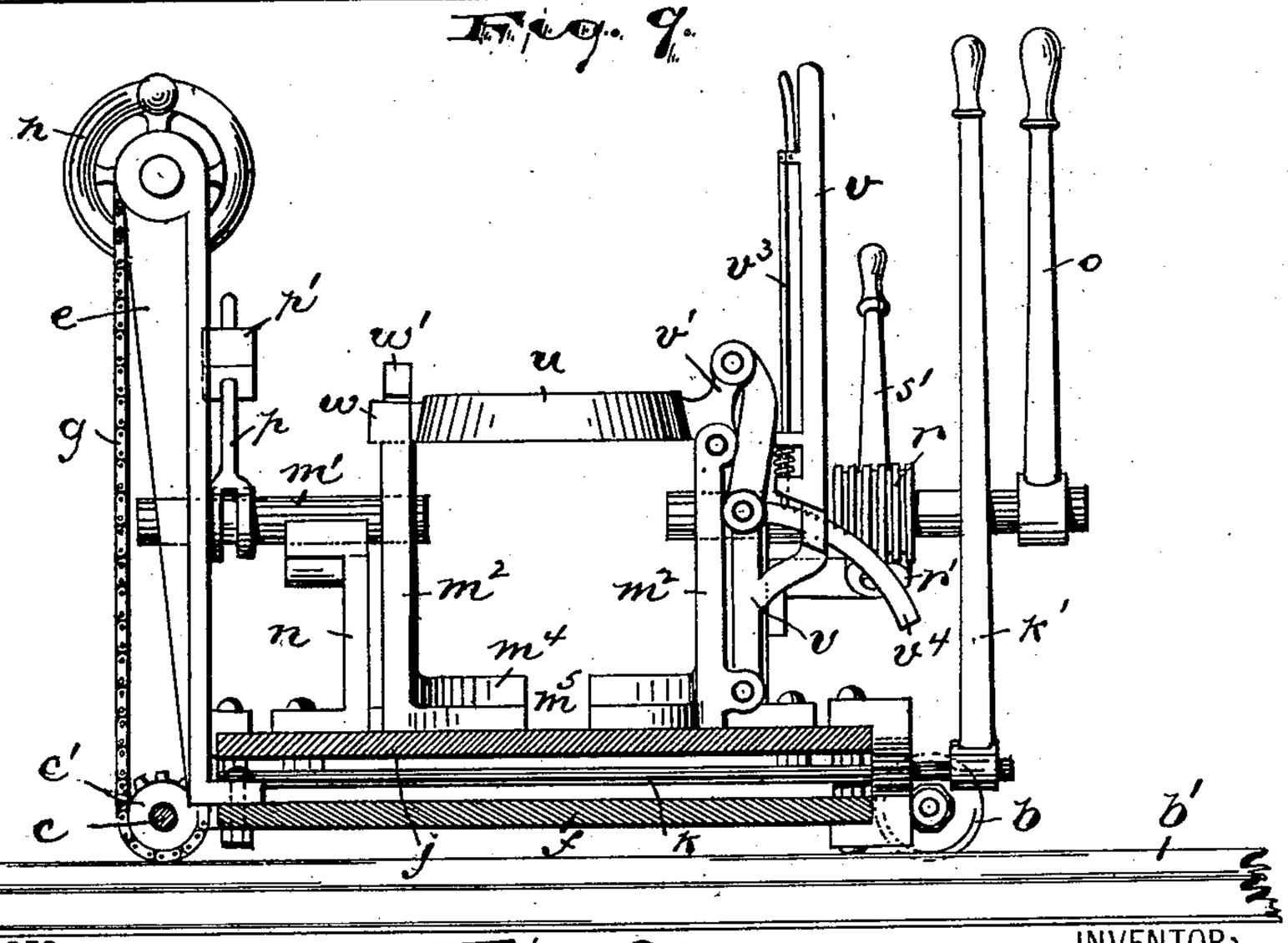

Fig. 10.

WITNESSES:

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No. 731,062. Patented June 16, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM S. MATHER, OF NEWARK, NEW JERSEY.

MACHINE FOR POURING METAL.

SPECIFICATION forming part of Letters Patent No. 731,062, dated June 16, 1903.

Application filed September 21, 1900. Serial No. 30,704. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. MATHER, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Machines for Pouring Metal; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The objects of this invention are to facilitate the operation of pouring molten metal from a crucible or melting-pot either directly into the molds or into a ladle or dipper, to enable the intensely-hot crucible and its contents to be conveniently conveyed from place to place and suitably tipped for pouring, to enable such tipping to be easily and positively controlled, to enable the position of the issuing stream to be located to a nicety with reference to the funnel of the mold, and to secure other advantages and results, some of which may be referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved apparatus for pouring molten metal from crucibles and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures, Figure 1 is a side elevation of my improved pouring-machine. Fig. 2 is a plan of the same, and Fig. 3 is a front elevation. Fig. 4 is a front view of a machine having a preferred construction for supporting the upper part of the crucible. Figs. 5 and 6 are detail views of the connection of a certain weight-arm to its shaft, Fig. 6 being in section on line x, Fig. 5. Figs. 7 and 8 are plan and side views, respectively, of a slightly-modified construction; and Figs. 9 and 10 are front and rear views of the same, Fig. 10 being partly in section on line $x\ y$, Fig. 7.

In said drawings, t indicates a crucible of the type commonly employed in the manufacture of crucible steel and in which the metal is melted in the furnace. (Not shown.)

When the melting is complete, the crucible is removed from the furnace and conveyed in its intensely-hot condition to the ingot-molds and its contents poured into said molds. It is to this operation of carrying and pouring out the contents of the hot and heavy crucible that my invention relates.

My machine in its entirety forms a car or carriage adapted to run by wheels b upon either rails b' or the floor. At least two opposite wheels are fast upon an axle or shaft c, which also has an intermediate sprocket-wheel c' in line with a second sprocket-wheel d upon a shaft d', having bearings at the top of a standard e, extending upward from the main floor or frame f of the car to a convenient height. A power-chain g connects the two sprocket-wheels c' d, and a crank or hand-wheel h upon the shaft d' enables the car to be driven by the operator, as will be understood. $i\ i$ are suitable casings bolted or otherwise secured to the frame f of the car and in which the wheels are pivoted.

Above the main floor or frame f of the machine and parallel thereto is a movable plate or false floor j, supported upon the main floor by rollers j', whose axes lie in the direction of the length of the track and which therefore serve to enable the false floor to be shifted transversely of the track. To this end an opposite pair of the rollers, as j^2, are fixed upon a shaft k, which shaft is turned by means of a lever k', projecting upward convenient to the operator's hand. To secure more positive action of the rollers j^2, their peripheries are toothed and work in opposite racks $l\ l'$ on the main and false floors, respectively.

It will be understood that the track upon which the car or machine is run extends from the furnace alongside the ingot-molds to receive the molten metal, so that the crucible is thus brought into approximate position for pouring. Further discrepancies of distance between the molds and the track are overcome by manipulating the lever k' and parts just described.

The crucible itself is supported on the false floor or plate j at or over one side of the track, which thus determines the front end of the machine, the machine being regarded as traveling sidewise on its track. Said crucible

does not stand directly upon the false floor, but is placed in a cradle m, having opposite trunnions m' m', journaled in suitable bearings formed by standards n on the false floor or plate. The cradle swings between said standards, and the false floor or plate j is apertured, as at g', beneath the said cradle to permit its unimpeded action. Said cradle comprises upright side pieces m^2, extending downward from the trunnions m', and a floor or bottom m^3, all said parts being rigidly connected, preferably cast in one integral piece. The crucible is stood upon said bottom m^3, and I therefore provide at the edge of the bottom a vertical flange m^4 to prevent the crucible slipping off as the cradle tips. Said flange m^4 is made low at the rear of the cradle to facilitate lifting in the crucible and high at the front, which receives the weight of the crucible when pouring takes place. An open gateway m^5 is cut in the flange at any suitable point to permit dirt to be brushed out.

The trunnions m' m' project from the opposite side pieces m^2 m^2 of the cradle at a height which is above the center of gravity of a full crucible and are adapted to turn as a single shaft in their bearings in the standards n by reason of the rigid connection through the cradle m. One of the trunnions has an operating-lever o keyed thereto, by means of which the cradle is tipped, and the opposite trunnion preferably carries a counterbalance comprising a weight p' on a radially-projecting arm p and adapted to counteract the weight of the crucible and its contents in tipping the cradle by means of the lever o. The end of said arm at the trunnion-shaft is perforated to receive said shaft and is furthermore split or forked to straddle a fixed stop q on the trunnion-shaft. The parallel rings p^2 p^2 of the lever have a series of perforations p^3, through any one of which a pin q' may be passed, which pin then lies parallel to the shaft and is adapted to engage the stop q to turn the shaft. By adjusting the pin q' this construction provides that in pouring from a crucible the weight p' shall be released by engagement with the floor, mold, or other suitable stop when tipping has so far progressed that the molten metal in the crucible changing its position becomes more nearly balanced with reference to the trunnions.

In pouring into the molds it is often desirable to secure a more slight movement of the crucible in the direction of the track than can be easily secured by moving the whole car or machine, and therefore I have provided upon the trunnions m', having the tipping-lever and adjacent thereto, a fixed sleeve r, having circumferential grooves adapted to mesh with longitudinal teeth on a wheel r', fixed on a shaft s at right angles to the trunnion-shaft and journaled in suitable brackets s^2 from the standard n. Said shaft s also has a radial hand-lever s' fixed thereon and by means of which the wheel r' can be rotated to slide the cradle in the direction of the length of its trunnions. At the same time independent action of the tipping-lever can be had by reason of the intermeshing wheels r r' described.

For supporting the upper part of the crucible while pouring I preferably prolong the trunnions m' inward from the side pieces m^2 of the cradle and extend them upward into curved plates t', shaped at their inner faces to form a bed for the crucible t to lie against, referring especially to Fig. 4 of the drawings. This construction holds the crucible with security, the natural bulge of the crucible preventing it from sliding out and, furthermore, presents no obstructions at the rear to the insertion and removal of crucibles. Under some conditions, however, a closed ring u may be provided to drop over the top of the crucible, said ring being hinged at one side to an upward extension of a side piece m^2 of the cradle and provided with an upwardly-curved arm u' and lever u^2, pivoted thereto, and to which draft may be applied to raise the ring u from the crucible. Said lever u^2 preferably extends to a point convenient to the lever o and slides in a rest o' thereon. At the side of the ring u, opposite its point of hinging, is a tongue w, adapted to be engaged by a hooked catch w' to hold the ring in place on the crucible.

It will be understood that any suitable levers for raising and lowering the ring u may be used as is most convenient, and in Figs. 7 to 10 I have illustrated another such system differing from the one already described. Here the ring is provided with a short outwardly-curving upward extension v' above its point of hinging, and to the end of this extension is pivoted the upper end of a link v^2, which at its lower end is pivoted to a hand-lever v, fulcrumed on suitable fixed bearing at the base of the cradle. This hand-lever may have a locking-catch v^3, engaging a suitable fixed guide v^4, if desired, by which the parts may be locked with the ring in a given position.

Other modifications of construction within the scope of the claims may be employed, and I do not wish to be limited by the positive descriptive terms used except as the state of the art may require.

Having thus described the invention, what I claim as new is—

1. A machine for pouring molten metal from crucibles, having a wheeled car or carriage movable longitudinally, a false floor on said car and movable transversely of the car, a pivoted cradle on said false floor for receiving the crucible and means independent of the car, for securing an exact adjustment of said cradle in the direction of movement of the car, substantially as set forth.

2. A machine for pouring molten metal from crucibles, having a car movable longitudinally, a false floor on said car movable transversely, a crucible-cradle pivoted on said

false floor, and a rack and pinion for shifting said cradle in the direction of its axis of pivoting, substantially as set forth.

3. A machine for pouring molten metal from crucibles, having a car, a crucible-cradle pivoted on said car, means for tipping said cradle to pour from the crucible and means for moving said cradle in the direction of the length of its pivotal axis independent of the car, substantially as set forth.

4. A machine for pouring molten metal from crucibles, having a car, a cradle pivoted thereupon, and means for moving said cradle along either one of two intersecting lines, independent of the car, substantially as set forth.

5. A machine for pouring molten metal from crucibles, having a horizontally-movable support, a crucible-cradle pivoted by means of horizontal trunnions disposed at right angles to the direction of movement of said support, a rack on said trunnions and a pinion engaging said rack to adjust said cradle into position for pouring.

6. A machine for pouring molten metal from crucibles, having a movable car, standards projecting upward from said car and providing bearings, a cradle between said standards adapted to receive a crucible and support the same from its bottom, said cradle having at opposite sides and above the center of gravity of the combined cradle and a full crucible, trunnions resting in said bearings in the standards, means for shifting said cradle at right angles to the movement of the car, and means for tipping said cradle, substantially as set forth.

7. A machine for pouring molten metal from crucibles, having a car, standards upon said car, a cradle between said standards and adapted to hold a full crucible, said cradle having, at its opposite sides and above the center of gravity of the combined cradle and a full crucible, trunnions journaled in said standards, and a tipping-lever and a counterbalance on said trunnions, respectively, substantially as set forth.

8. In a machine for pouring molten metal from crucibles, the combination with a movable car, of a false floor resting upon rollers or wheels and movable thereon in a transverse direction, one or more of said rollers being peripherally toothed, opposite racks fixed on the upper and lower floors and engaged by said toothed rollers, a lever rotating said rollers, and means upon said false floor for holding a crucible, substantially as set forth.

9. In a machine for pouring molten metal from crucibles the combination of a car, a crucible-cradle pivoted upon said car, a tipping-lever fixed to the pivotal shaft of said cradle a portion of said shaft having parallel annular grooves, a gear-wheel pivoted on an independent shaft at right angles to the first-mentioned shaft and meshing with the grooved portion of said shaft, and means for rotating said gear-wheel, substantially as set forth.

10. In a machine for pouring molten metal from crucibles the combination of a car having upright standards providing journal-bearings, a cradle adapted to receive the crucible and having at opposite sides above its bottom trunnions journaled in said bearings, an annularly-grooved sleeve on one of said trunnions, a gear-wheel pivoted on a shaft having bearings on one of the standards and intermeshing with said sleeve, and controlling means for said gear-wheel, substantially as set forth.

11. In a machine for pouring molten metal from crucibles, the combination with a movable car, having standards providing journal-bearings, of a cradle providing a supporting-seat for the bottom of the crucible and being pivoted upon trunnions oppositely projecting from said cradle above its bottom and lying in said bearings, means for tipping said cradle, a counterbalance-weight and means for holding the top of the crucible in place, substantially as set forth.

12. In a machine for pouring molten metal from crucibles, the combination with a movable car, of a cradle providing a seat for the base of a crucible and being open at its rear side to admit a crucible, trunnions on opposite sides of said cradle, and bearings therefor on the car, said trunnions being continued inward beyond the sides of the cradle and having forwardly-extending curved plates thereon adapted to lie against the front side of the crucible, said plates terminating below the top of the crucible, substantially as set forth.

13. In a machine for pouring molten metal from crucibles the combination with a car, and a crucible-cradle pivoted on said car by trunnions oppositely projecting from said cradle above its middle, of a counterbalance-weight, a lever carrying said weight and having its end forked and transversely perforated to receive a trunnion, a stud on said trunnions and lying between the perforated prongs of said lever, and a stop on said lever for engaging said stud, substantially as set forth.

14. In a crucible pouring-machine, the combination of a supporting-car, a crucible-cradle pivoted by opposite trunnions upon said car, means for tipping said cradle, and a counterbalance comprising a weight, a lever carrying said weight and having its end forked and transversely perforated to receive the trunnion-shaft, a stud on said shaft and straddled by the forked portion of the lever, the side portions of the lever having series of holes or sockets, and a pin adapted to be thrust through said holes or sockets, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 31st day of July, 1900.

WILLIAM S. MATHER.

Witnesses:
CHARLES H. PELL,
C. B. PITNEY.