

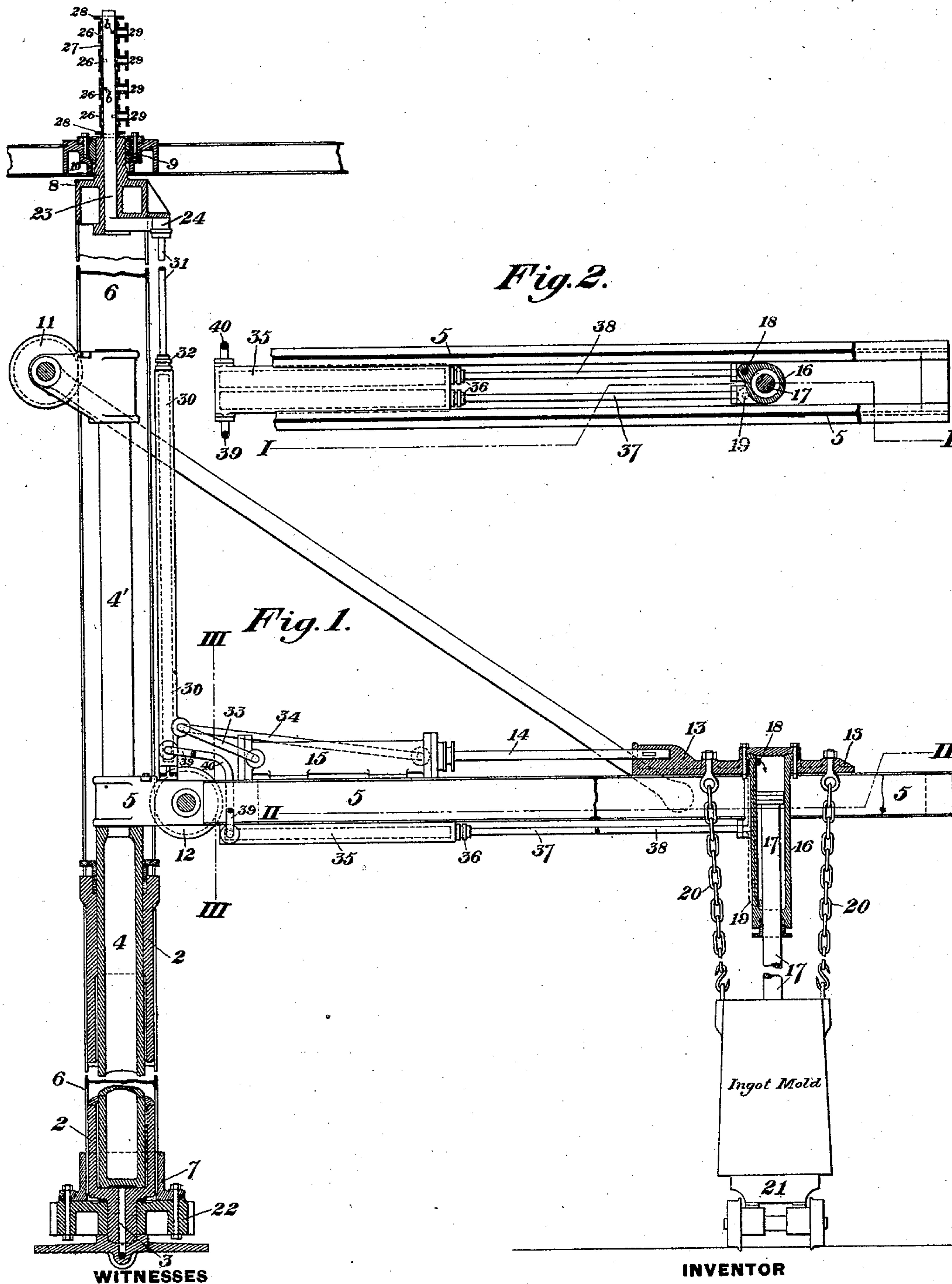
(No Model.)

2 Sheets—Sheet 1.

H. AIKEN.  
CRANE.

No. 455,650.

Patented July 7, 1891.



WITNESSES  
*H. L. Gill*  
*W. B. Conner*

INVENTOR  
*Henry Aiken*

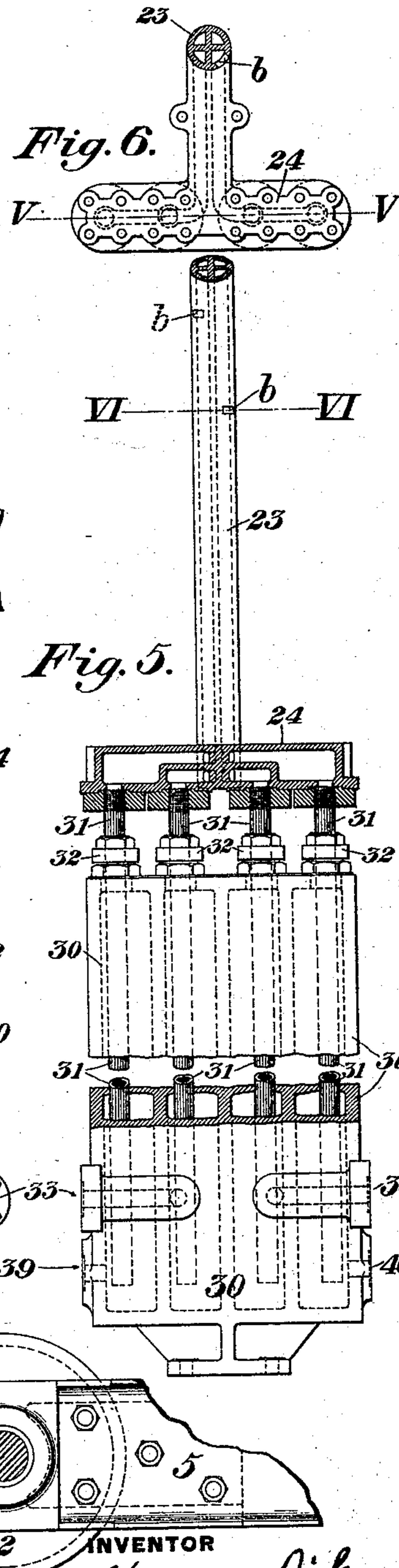
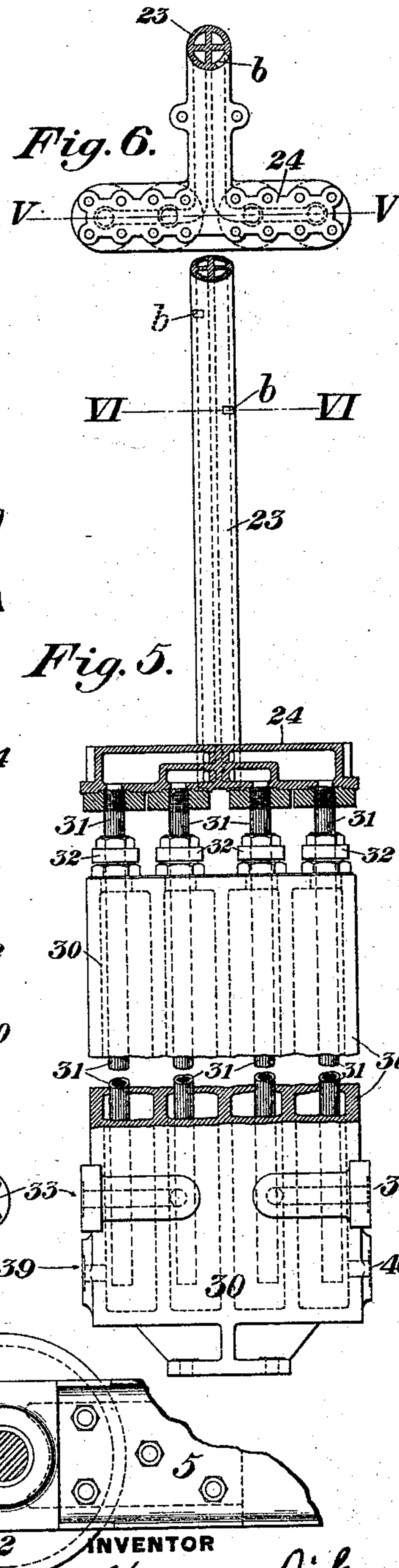
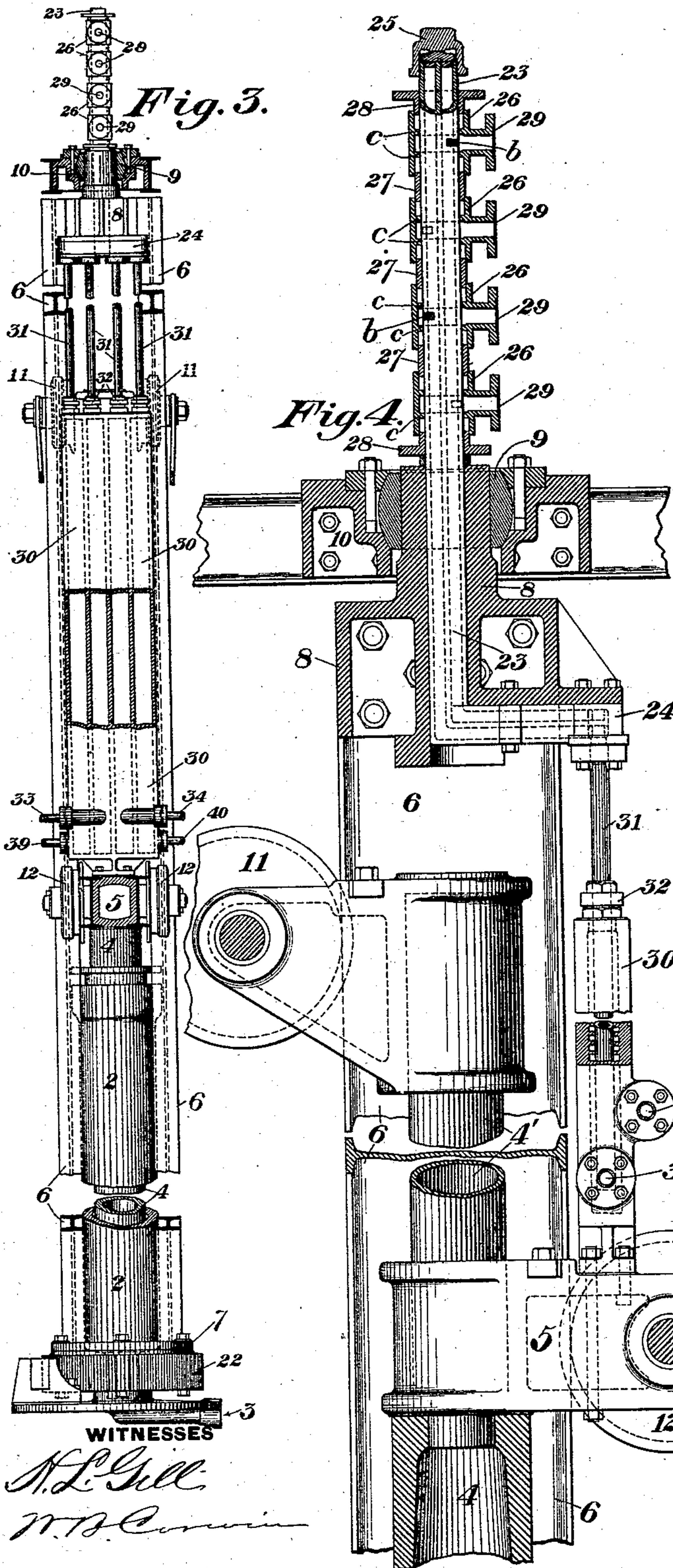
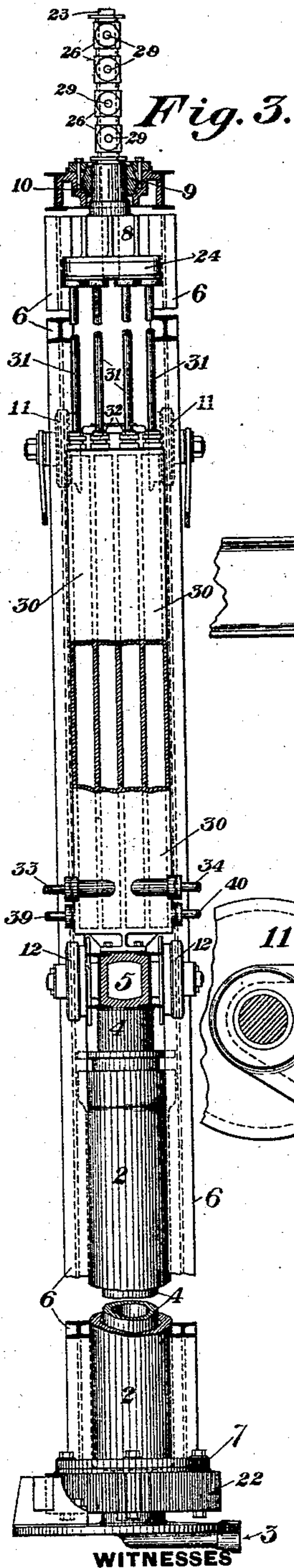
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*Henry Aiken*



# UNITED STATES PATENT OFFICE.

HENRY AIKEN, OF PITTSBURG, PENNSYLVANIA.

## CRANE.

SPECIFICATION forming part of Letters Patent No. 455,650, dated July 7, 1891.

Application filed January 13, 1890. Serial No. 336,789. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY AIKEN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Cranes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation, partly in vertical section, of my improved crane and ingot-extracting device, the latter being shown in section on the line I I of Fig. 2. Fig. 2 is a horizontal section of the jib of the crane on the line II II of Fig. 1. Fig. 3 is an elevation of the mast of the crane, the jib being shown in section on the line III III of Fig. 1. Fig. 4 is an enlarged view of the upper part of the mast, showing in vertical section the top steadiment and the water-connections. Fig. 5 is a front elevation of the water-connections, partly in section, on the line V V of Fig. 6. Fig. 6 is a plan view in section on the line VI VI of Fig. 5.

Like symbols of reference indicate like parts in each.

In the drawings, 2 represents the usual crane-cylinder, which is preferably stationary, and is provided at the base with a suitable water-inlet 3.

4 is a plunger, which is arranged to move vertically and to rotate axially within the cylinder, and which supports and carries a horizontally-projecting jib 5.

The mast of the crane consists of beams 6, arranged vertically on opposite sides of the cylinder and secured at the base to a rotatory block or foot 7, and at the top secured to a top block or casting 8, having a contracted portion or journal fitting within an annular bearing 9 in the top steadiment 10. As shown in Fig. 4, the inner end of the jib extends between the beams of the mast and encircles an upright bar or pipe 4', which projects from the plunger, and has at its upper end wheels 11, which bear against the mast and guide the plunger and jib in their vertical motions. The jib is also provided with guide-wheels 12, which bear against the opposite side of the mast.

The crane as I have described it above is not claimed by me specifically herein, and for the purposes of the invention covered in this specification cranes having parts differently constructed may be employed.

The jib is provided with a sliding carriage 13, which is connected to the plunger 14 of a hydraulic cylinder 15, so that by projecting and retracting the plunger the carriage may be caused to move longitudinally on the jib.

16 is a hydraulic cylinder fixed to the carriage 13 and extending downwardly between the beams of which the jib is composed.

17 is a plunger, which projects from the lower end of the last-named cylinder, and 18 and 19 are the water-inlets, through which water may be admitted to said cylinder to move the plunger vertically in either direction.

20 are suspending-chains, which depend from the carriage 13, and which are provided with hooks or other devices by which they may be attached to an ingot-mold, as shown in Fig. 1.

I shall now describe the operation of this part of the apparatus in extracting ingots from the molds in which they are cast. The mold, with the contained ingot, is placed in an upright position on a buggy 21, and is then carried thereon within the sweep of the jib of the crane; or the mold may be set on the buggy before the ingot is cast within it. The crane is then turned by any suitable means, (it may be by a toothed rack acting upon the spur-wheel 22 at the bottom of the crane-mast,) so as to bring the jib directly above the mold, and the carriage 13 is moved along the jib by means of the cylinder 15, so as to bring the plunger of the cylinder 16 directly above the center of the ingot. The chains 20 are then attached to the usual lugs on the ingot-mold, water is admitted into the upper end of the cylinder 16, so as to force its plunger down upon the ingot, and water is admitted into the crane-cylinder 2, so as to raise the jib. There is thereby exerted a downward pressure upon the ingot and a lifting force on the mold, the effect of which opposing forces is to raise the mold and to strip it from the ingot, leaving the latter standing on the



buggy. When the mold is lifted above the top of the ingot, the plunger 17 is raised, and the buggy carrying the ingot may be drawn away, leaving the mold suspended, to be removed by another buggy or by any other means; or the buggy, with the ingot, may be moved forward a little, and the mold then lowered upon the same buggy at the back of the ingot.

I do not claim herein the ingot-extracting device before described, since I have made it the subject of a separate patent application filed on October 1, 1890, Serial No. 366,717.

I shall now describe the water-connections by which motive fluid is supplied to the cylinder on the jib. There are four of these water connections to be made, and I have shown the parts of the apparatus constructed to suit this number; but it will be understood that when my improved devices are applied to apparatus requiring a greater number of connections it will need modifications, such as will be made apparent by the following description: 23 is a vertical pipe, which extends through and above a hole made for its reception in the top block 8 of the crane-mast, and at its base is provided with a projecting foot or box 24. This pipe is divided vertically into four separate channels, and the foot 24 is also made in four compartments, which communicate respectively with the channels in the pipe. As the pipe passes through the middle of the journal of the crane-mast, it is rotatory axially therewith.

To provide for the admission of water into the channels in the pipe 23, I form in the pipe holes *b*, one for each of the channels, and around the pipe over the holes I place sleeves or boxes 26, having annular channels, which extend around the pipe directly outside the position of the holes and are limited by annular flanges *c*, fitting as closely to the pipes as possible. The sleeves are preferably made separate from each other, and each is or may be formed with an annular portion, which extends longitudinally beyond the flanges *c*, leaving on the outer sides of the flanges annular spaces adapted to perform the function of stuffing-boxes. The glands or followers of these stuffing-boxes are preferably formed as follows: Between the several collars 26 are tubular sections 27, which fit around the pipe 23, and are of such thickness as to be adapted to enter the annular stuffing-boxes at the adjacent ends of the sleeves, between which they are placed. At the outer ends of the upper and lower sleeves of the series are separate glands or followers 28, and by tightening these the intermediate glands 27 may be caused to enter their stuffing-boxes and to close tightly the joints. Each of the sleeves is provided with a water-pipe connection 29, and as these connections communicate with the annular channels in the sleeves, and the latter communicate with their respective holes *b*, each water-pipe is put into direct connection with one of

the channels into the pipe 23. The sleeves 26 are stationary, and the pipe 23 is axially rotatory with the crane-mast within them; but by reason of the annular form of the water-passages in the sleeves the channels in the pipe are continually in communication with their sources of water supply or exhaust. 30 is a box or casting, which is set on the jib, and is provided with four upright passages or channels, as shown in Fig. 5. The compartments of the box 24 are severally provided with downwardly-extending pipes 31, which pass, respectively, through stuffing-boxes 32 into the several channels in the box 30, so that as the jib is moved vertically relatively to the mast the box 30 may move with the jib and may slide telescopically over the pipes 31 without interrupting the free communication between the several channels in the box 30 and the corresponding channels in the box 24. (If desired, the parts may be reversed, the box being secured to the mast and the pipes mounted on the jib.) From two of the channels in the box 30 pipes 33 and 34 pass to the ends of the cylinder 15 on the jib. The other two channels serve as passages for water to supply the cylinder 16; but as said cylinder has a longitudinal travel on the jib its water-connections must be such as to permit such travel without interruption of the supply. To this end I secure to the under side of the jib a hollow box 35, formed with two channels, as shown in Fig. 2, and into each of said channels, through a stuffing-box 36, I extend one of the water-pipes 37 38 of the cylinder 16. The construction in this regard is substantially the same in principle as that shown in Fig. 5 with reference to the box 30 and pipes 31, and the result is that as the cylinder, with its carriage 13, is moved longitudinally on the jib the pipes 37 and 38 will slide telescopically through the stuffing-boxes 36 without interrupting the free communication between said pipes and their respective channels in the box 35. Said channels are connected by pipes 39 and 40 with the proper channels in the box 30, so as to establish communication between the supply-pipes 29 and the ports of the cylinder 16. It will thus be seen that the jib of the crane may be moved vertically and its carriage 13 moved horizontally within the desired limits without interruption of the water-supply, and as the controlling-valves may be placed anywhere on the supply-pipes within easy reach of the operator a most efficient and simple arrangement for the operation and control of the apparatus is provided. The advantage of this part of my improvement is its simplicity and compactness of construction, the small number of joints required to be made, and the capability it affords of dispensing with flexible water-pipes and similar inconvenient appliances.

It will be understood that I do not limit the claims relating to these water-connections to their use with the precise apparatus on the crane-jib which I have shown, since they may



be used for supplying motive fluid to cylinders designed for other purposes, and that the number and relative arrangement of the water-connections may be varied to suit the number of cylinders employed and their relative positions. For example, instead of arranging the pipe 23 to rotate with the mast and the sleeves 26 to remain stationary, this may be reversed, the sleeves being connected with the mast and with the pipes 31 and arranged to rotate therewith, while the pipe 23 is inverted and fixed, the water-supply pipes entering directly the channels in the same.

I claim—

1. The combination, in a crane, of a rotatory mast, a vertically-movable jib, a motor cylinder or cylinders, a series of upright parallel pipes supported by the mast, and a second series of pipes carried in upright position by the jib fitting axially the first-named series and adapted to move telescopically relatively thereto, the first of said series of pipes having connection with a fluid-supply leading to the crane and the second being connected with said motor cylinder or cylinders, whereby connection of said motors with the fluid-supply is maintained in every position of the jib, substantially as and for the purposes described.

2. In a crane having a rotary mast, the combination, with the crane-motors, of a series of water passages or ways situate in the axis of the mast-journal and having ports at different levels, collars having water-channels encircling said ports and preserving constant communication with the respective water-passages, and pipes leading from said water-passages to the crane-motors, substantially as and for the purposes described.

3. The combination, with the rotary mast, of a pipe divided into two or more channels encircling boxes or sleeves, and lateral holes or passages connecting the passages in the sleeves with the respective channels in the pipes, substantially as and for the purposes described.

4. The combination, with the rotary mast, of a pipe divided into two or more channels

encircling boxes or sleeves, and interposed followers or glands by which the joints between the sleeves and the pipe are packed, substantially as and for the purposes described.

5. The combination, with the rotary mast, of a pipe divided into two or more channels encircling boxes or sleeves, interposed followers or glands by which the joints between the sleeves and the pipe are packed, and end followers or glands, substantially as and for the purposes described.

6. The combination, with a rotary mast having a series of longitudinal passages or water-ways through its journal with peripheral ports at different points, of a series of encircling collars having annular water-ways which preserve constant communication with the respective water-ways of the journal, substantially as and for the purposes specified.

7. The combination, with the rotary mast, of a pipe divided into two or more channels encircling boxes or sleeves, holes or passages connecting the passages in the sleeves with the respective channels in the pipes, a jib, and hollow telescopically-sliding channels or pipes connecting the channels in said pipe with a cylinder or cylinders on the jib, substantially as and for the purposes described.

8. The combination, with the rotary mast, of a pipe divided into two or more channels encircling boxes or sleeves, holes or passages connecting the passages in the sleeves with the respective channels in the pipes, a foot 24, connected with said pipe and having compartments communicating with the channels thereof, a jib, and hollow telescopically-sliding channels or pipes connecting the compartments of said foot with a cylinder or cylinders on the jib, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 6th day of January, A. D. 1890.

HENRY AIKEN.

Witnesses:

W. B. CORWIN,  
JNO. K. SMITH.