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PATENTED FEB. 9, 1904.

W. H. FISHER.

HYDRAULIC PRESS FOR MOLDING ARTIFICIAL STONE OR THE LIKE.

APPLICATION FILED JULY 19, 1902.

NO MODEL.

4 SHEETS—SHEET 1.

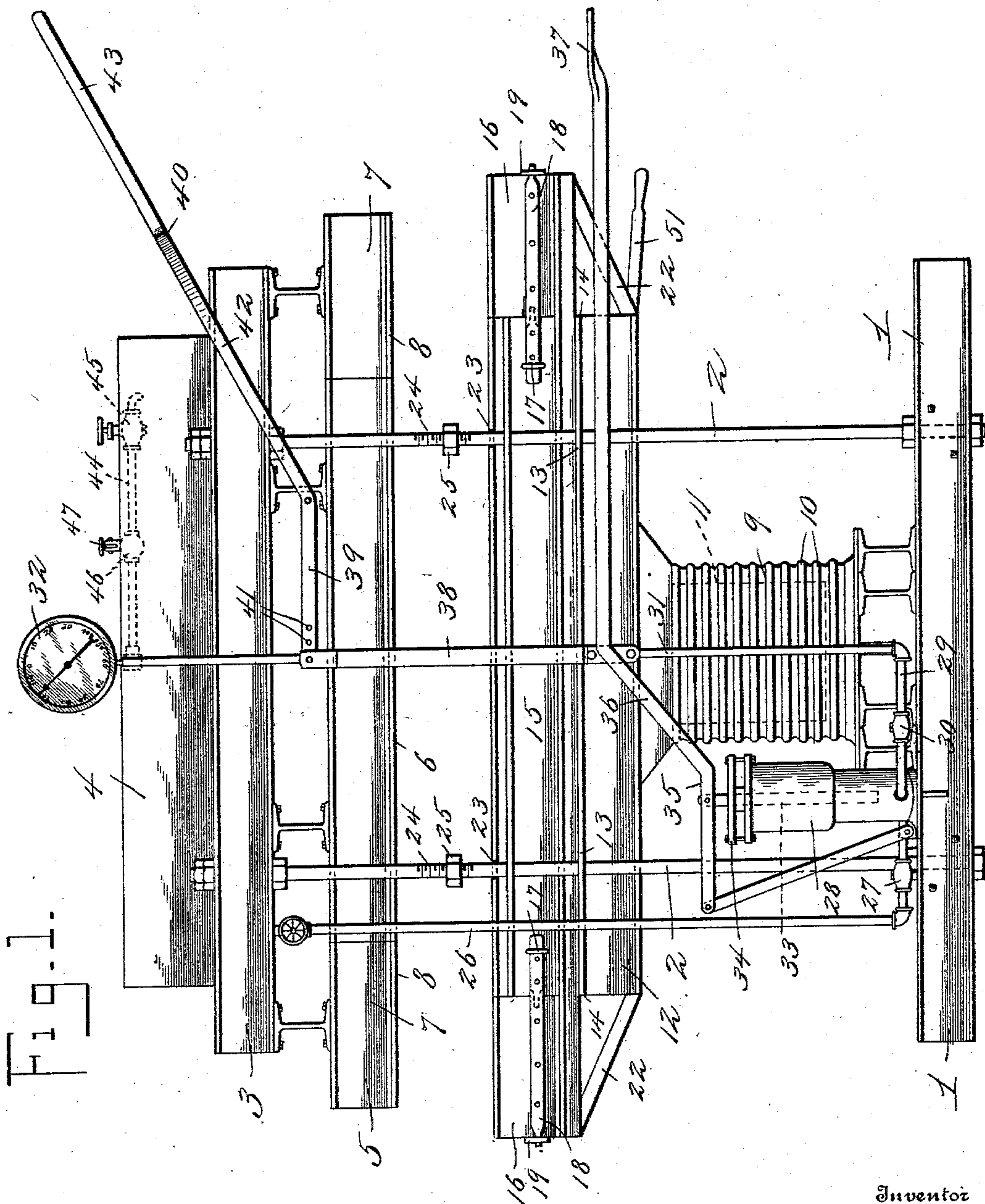


Fig. 1.

Witnesses

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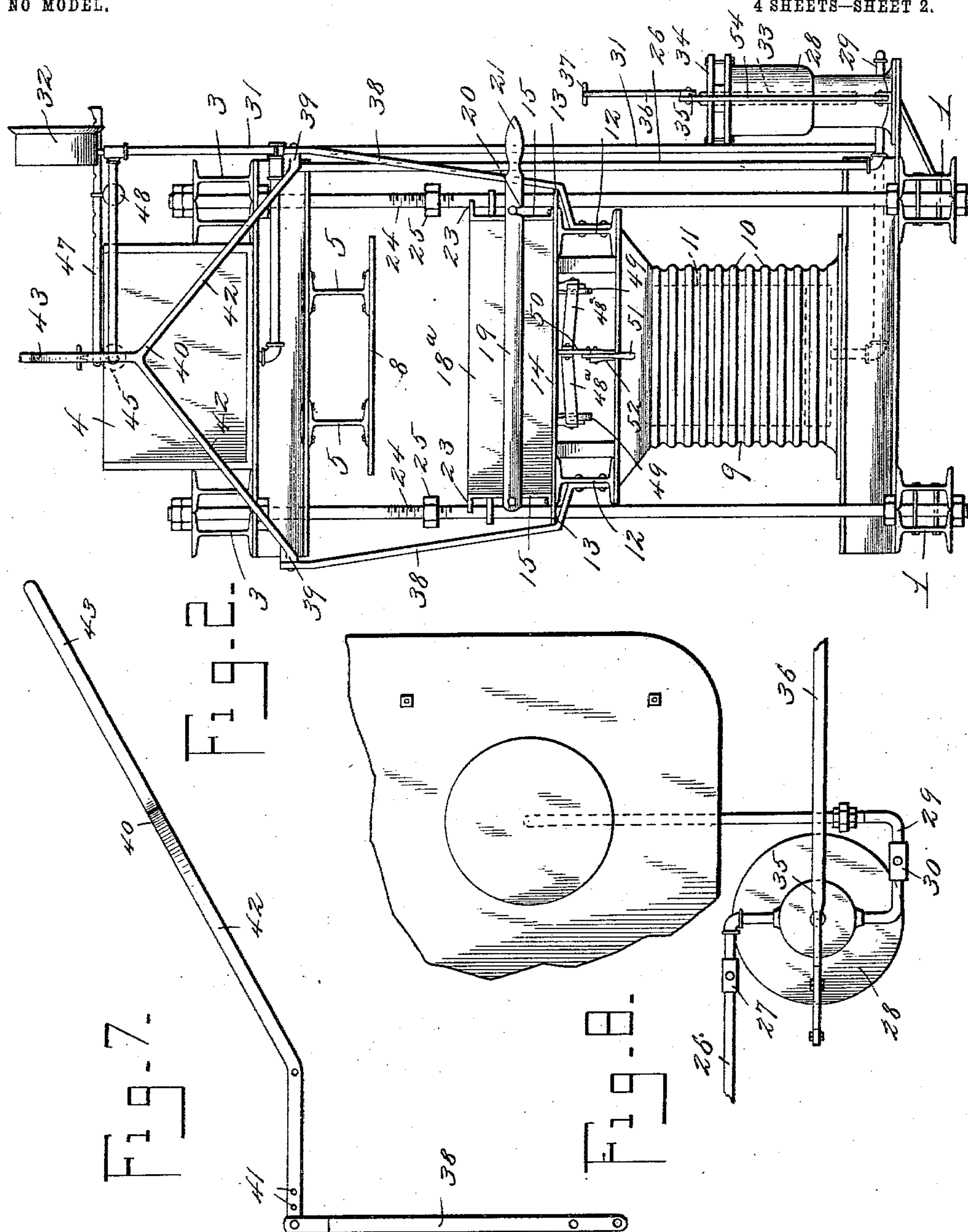
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4 SHEETS—SHEET 3.

Fig. 3.

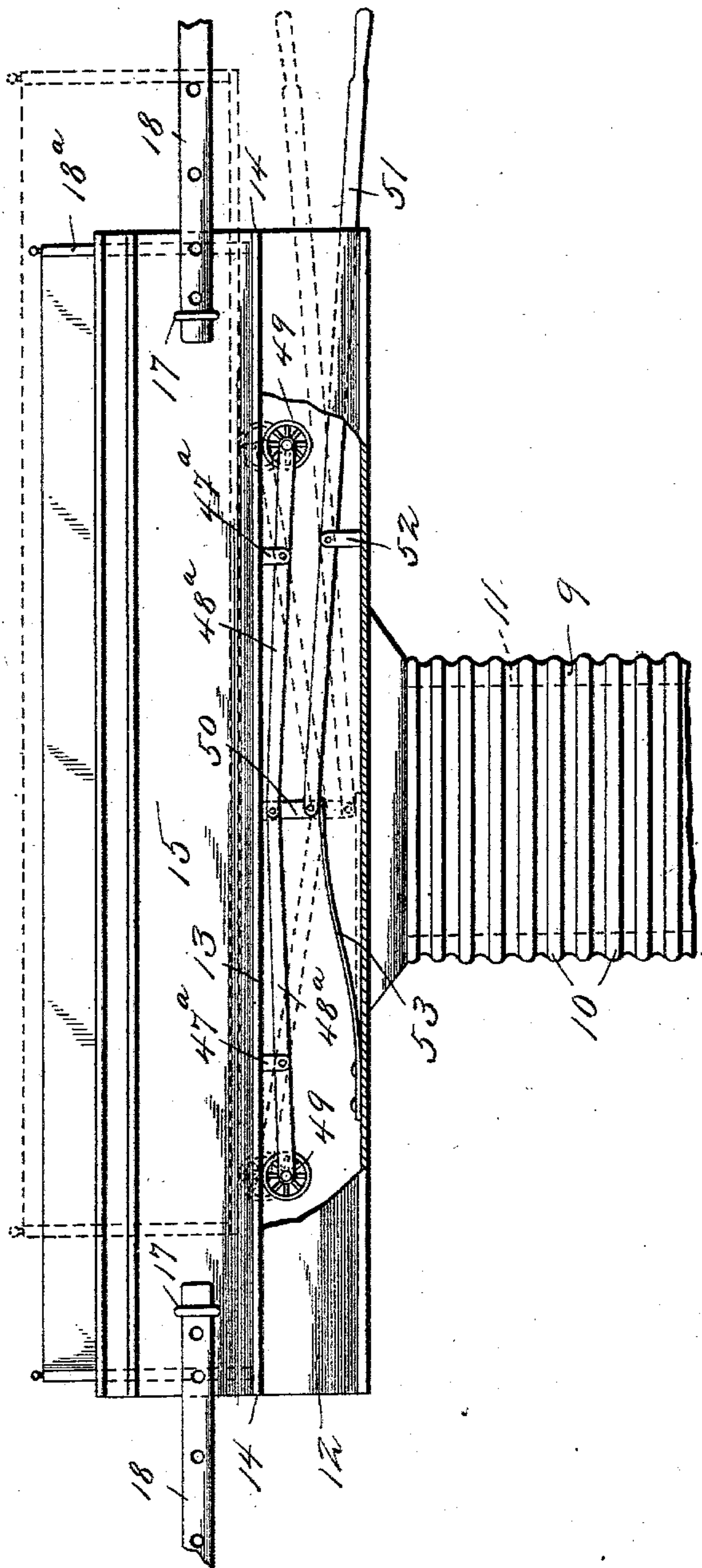
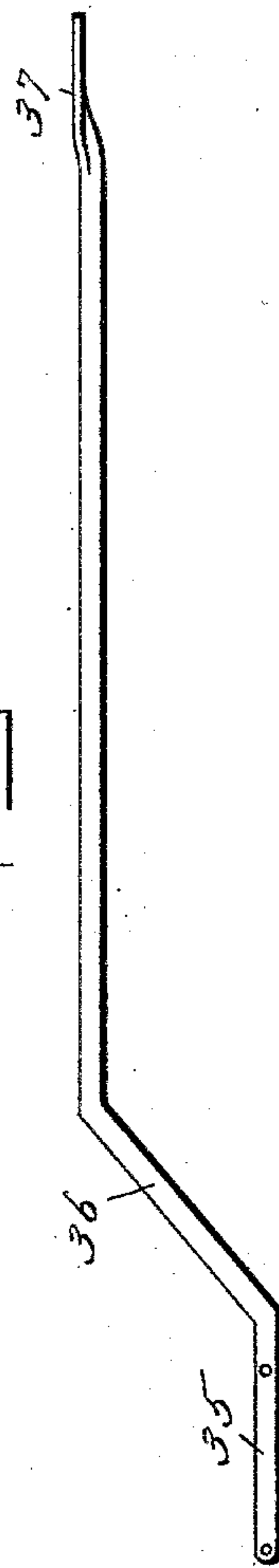


Fig. 6.



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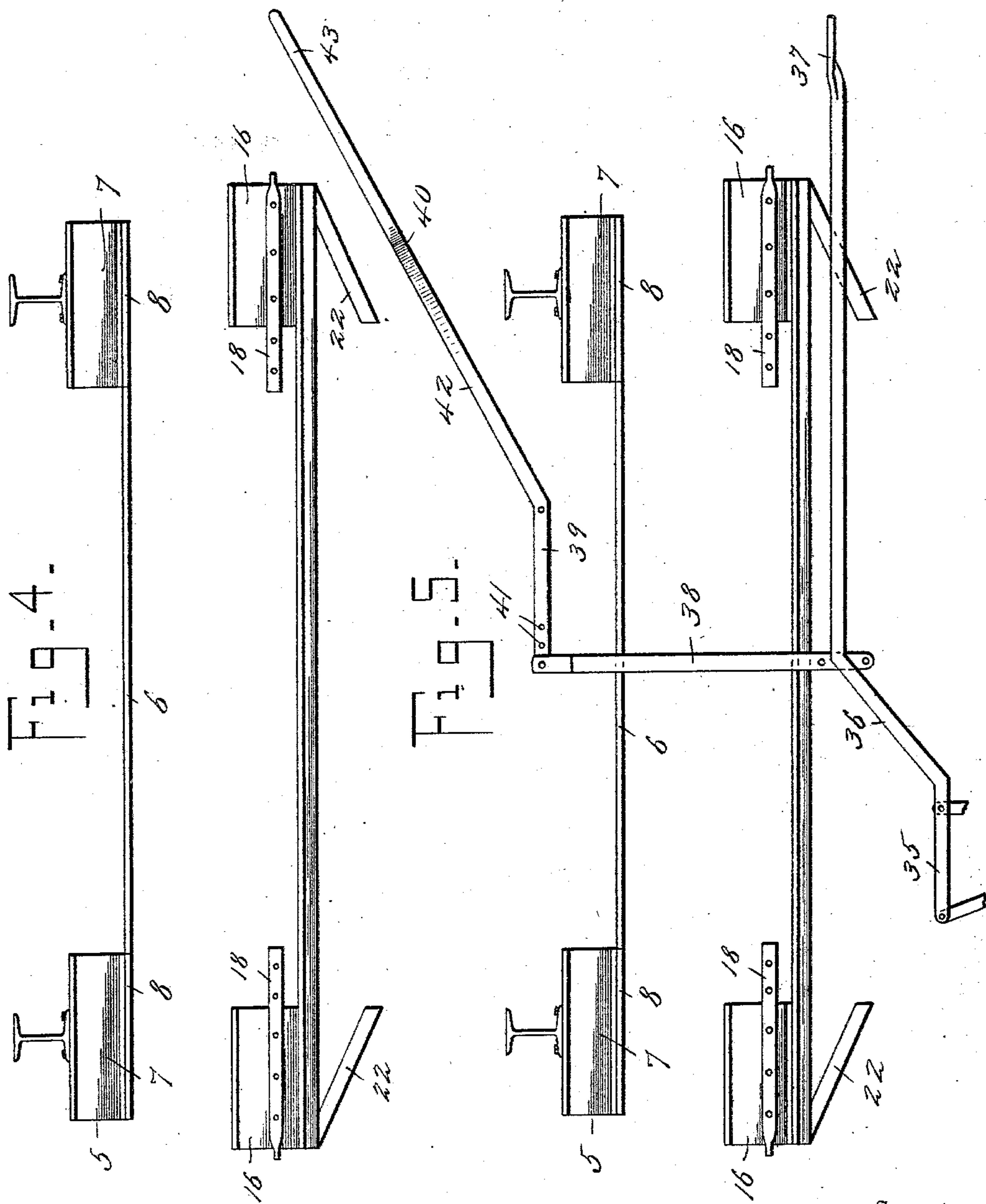
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UNITED STATES PATENT OFFICE.

WILLIS H. FISHER, OF OKLAHOMA, OKLAHOMA TERRITORY.

HYDRAULIC PRESS FOR MOLDING ARTIFICIAL STONE OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 751,904, dated February 9, 1904.

Application filed July 19, 1902. Serial No. 116,256. (No model.)

To all whom it may concern:

Be it known that I, WILLIS H. FISHER, a citizen of the United States, residing at Oklahoma, in the county of Oklahoma, Oklahoma Territory, have invented new and useful Improvements in Hydraulic Presses for Molding Artificial Stone or the Like, of which the following is a specification.

This invention relates to a hydraulic building-stone press adapted for forming artificial stone by compression.

The main purpose of the present construction is to facilitate the operation of forming artificial stone by compressing the same while in a box or mold when in a plastic condition to render it more homogeneous and close-grained and also to have a simple and effective arrangement of parts for elevating and depressing the box or mold containing the stone and for conveniently and easily removing the several boxes or molds, as well as applying the same from and to the press structure.

The invention primarily consists of a press having a cylinder provided with a plunger and means for feeding water thereto and controlling such feed from an elevated tank embodied in the press structure, combined with a vertically-movable bed on which a box or mold for the stone is removably placed, the bed and box or mold being adjustable as to their vertical elevation and cooperating with an upper stationary pressure-plate, the operation of the several parts being sensitively under the control of an attendant through the medium of a convenient arrangement of levers contiguously disposed at one end of the press.

The invention further consists in the details of construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of a press embodying the features of the invention. Fig. 2 is an end elevation of the same. Fig. 3 is a side elevation of the pressure-cylinder, bed, and casting box or mold, showing the bed broken away and illustrating means for conveniently applying and removing the box or mold. Figs. 4 and 5 are side elevations of parts of the structure of the press, showing their particular formation.

Fig. 6 is a side elevation of a treadle-lever for operation by an attendant to control the flow of water into the pressure-cylinder. Fig. 7 is a side elevation of a hand-lever for controlling the flow of water into the pressure-cylinder. Fig. 8 is a top plan view of the controlling-cylinder and parts intimately connected thereto and cooperating therewith and a portion of the bed.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numeral 1 designates a base-support made up of a series of longitudinally-disposed angle-beams intersected by similar beams at right angles thereto, the connection between the said beams being effected as in erecting ordinary iron structures. Rising from the base are uprights 2 in the form of rods which are disposed in parallel pairs and secured at their upper ends to a head-frame 3, also composed of a series of angle-irons disposed at right angles to each other. On the head-frame 3 rests a tank 4, and suspended from said frame by means of angle-irons is a pressure-frame 5, having a lower steel plate 6 firmly secured thereto. The pressure-frame 5 is provided with end extensions 7, which may be applied at will or readily detached to vary the extent of the upper pressure resistance, and said extensions carry lower plate-sections 8, which are adapted to coincide with the main pressure-plate 6. This pressure-frame 5 is shown in detail in part by Fig. 4 to clearly illustrate the extensions 7 and the angle-irons composing the same, the main body of the pressure-plate 6 being illustrated in operative relation to the plate-sections 8, carried by said extensions.

On a central portion of the base 1 a pressure-cylinder 9 is secured and strengthened by external ribs 10, and in the said cylinder a plunger 11 is movably disposed, as clearly shown by dotted lines in Figs. 1, 2, and 3. This plunger 11 is connected to a bed 12, having corner-guides 13 at the upper portion thereof movably embracing the uprights 2, the said bed being made up of a series of angle-irons suitably spaced apart from each other and having a top plate 14, from which the guides 13 extend. On the bed 12 and se-

cured to the plate 14 is a frame 15, adapted to receive a removable mortar box or mold, and it, together with the bed 2, is capable of adjustment to increase the length of the same to receive molds of varying lengths through the medium of auxiliary end extensions 16, removably attached thereto. To hold the extensions 16 in place, vertically-disposed staples 17 are secured to the opposite sides of the frame 15, adjacent to the ends thereof, and therein are inserted retaining-straps 18, removably secured to the said extensions 16 and the sides of the box or mold. As shown by Fig. 2, the ends of the extensions 16 are in the form of gates 18^a, which are removable and are held in place by latch-bars 19, each of which is pivoted at one end to one of the straps 18 and adjacent to the other end has a lower slot 20 to fit over the outwardly-projecting end of the opposite strap 18, each latch having a handle or grip 21 at one end for convenience in operating the same. When the extensions 16 are not used and are detached, the straps 18 are replaced by shorter similar devices, as indicated by dotted lines in Fig. 1, and to these shorter straps the latches 19 are similarly connected and operate therewith to hold the end gates 18^a in place in the ends of the reduced frame 15. Braces 22 are also secured to the ends of a part of the bed 12 and project upwardly to an upper portion of the latter to sustain the weight of the material on the extensions 16 when said additional structural devices are used. The upper portions of the sides of the frame 15 are formed with outwardly-projecting flanges 23, which movably embrace the uprights 2, and to regularly control the elevation of the bed 12 and the box or mold thereon with relation to the pressure-plate 6 and the sections 8, adapted for use therewith, the upper portions of the uprights 2 are provided with screw-threads 24, which are engaged by stop-nuts 25, adapted to be elevated or lowered in accordance with the amount of pressure desired to be imposed upon the plastic material in the box or mold by the plate 6 and the sections 8 of the latter.

Connected to the bottom of the tank 4 is a valved feed-pipe 26, having a lower check-valve 27 and connecting with the lower end of a controlling cylinder or pump 28. A supply-pipe 29 is also attached to the lower portion of the cylinder or pump 28 and to the central part of the bottom of the cylinder 9, the said supply-pipe being in like manner provided with a check-valve 30, and running upwardly from the pipe 29 is a gage-pipe 31, connecting with a pressure-gage 32 in the usual manner for the purpose of informing the operator as to the amount of pressure under which the water is forced into the cylinder 9. It will be understood that the check-valves 27 and 30 overcome back pressure, respectively, in the feed-pipe 26 and the cylinder or pump 28 from

the cylinder 9. Within the said cylinder 28 is a suitable piston 33, working through a top gland 34 and having the upper end thereof movably attached to a treadle-lever 35, which projects along the outer portion of one side of the press and has an angular bend 36 formed therein for convenience in operating the same and so that the outer flattened end 37 will be held at an elevated position to facilitate the depression thereof to force the water from the cylinder or pump 28 into the cylinder 9 and create the necessary pressure in the cylinder 9 to forcefully elevate the bed 12 and the mortar box or mold against the pressure-plate 6 and the sections of the latter when in use. It will be understood that the water flowing into the cylinder or pump 28 will elevate the piston 33 and restore the treadle-lever 35 to normal position when the foot of the attendant or operator is released from the end 37 of said lever, and by successive depressions of the lever 35 the hydraulic force necessary to raise the bed 12 and mortar box or mold will cumulate in the cylinder 9.

To the opposite sides of the center of the bed the lower ends of upwardly-extending arms 38 are firmly secured and are inclined outwardly and attached to the opposite arms 39 of a yoke 40, the said arms being fulcrumed to a part of the beams comprised in the structure of the head-frame 3. The ends of the arms 39 are formed with a series of apertures 41, whereby they may be adjustably connected to the arms 38, so as to correspondingly adjust the depression of the bed 12 and the mortar box or mold supported thereon. The yoke 40 has the arms 39 thereof bent at an upward angle of inclination, as at 42, to render the operation of the yoke more convenient by the attendant, and extending from the said yoke is an operating handle or bar 43, by means of which the said yoke and the arms 38, connected thereto, may be actuated to depress the bed 12 and the mortar box or mold.

Connected to the pressure-gage pipe 31 and extending horizontally through the upper portion of the tank 4 is an outlet-pipe 44, having a terminal outlet-top 45 and an intermediate pressure-regulating or safety valve 46, supplied with the usual beam 47 and weight 48 and coöperating with the pressure-gage 32 in a manner which will be readily understood.

As clearly shown by Fig. 3, one of the essential features of the improved press structure resides in means for facilitating the application and removal of the mortar box or mold. Depending from a part of the beams forming the head-frame are opposite pairs of fulcrum-hangers 47^a, and pivoted thereto are pairs of yokes 48^a, having rollers 49 mounted in the outer ends of the arms thereof, and the inner ends are movably attached to the upper portion of a depending link 50, having the inner end of an operating-lever 51 attached to the lower portion thereof and fulcrumed on a

lower part of the bed 12, as at 52. Engaging the lower end of the link 50 is the upwardly-projecting free end of a spring 53, which tends to automatically elevate the link and depress the rollers 49 into normal position. By drawing upwardly on the outer end of the lever 51 the link 50 is forced downwardly against the resistance of the spring 53, and the rollers 49 and yokes 48^a, carrying the same, are elevated, as shown by dotted lines in Fig. 3, so that the said rollers will be raised above the plane of the top surface of the bed against the bottom of the mortar box or mold and permit the said box or mold to be easily drawn outwardly from or pushed inwardly over the said bed. When the rollers 49 are elevated, they correspondingly elevate the box or mold so as to clear the bed, and thus the said box or mold will be supported exclusively by the roller. When the link is drawn down to the position shown by dotted lines, the yokes will remain depressed and the rollers elevated, because the pivotal point of the yokes will then be below the plane of the normal position of the inner end of the lever 51 or below the central horizontal plane through the bed; but when the box or mold is disposed on the bed to carry out the pressing operation a slight downward pressure on the lever 51 will throw the link 50 up far enough to permit the spring 53 to act and restore the several parts controlled by the lever 51 to normal position.

In the operation of the device the mold is disposed on the bed 12 while the latter is in its lowest position. Water is then permitted to flow through the pipe 26 into the cylinder or pump 28, and the treadle-lever 35 is depressed to cause the water to be forced into the cylinder 9 under the plunger 11. Successive operations of the treadle-lever 35 will cause the water to be forced under pressure into the cylinder 9 and gradually elevate the bed 12 and the box or mold thereon toward the pressure-plate 6 and the sections 8 that may be carried thereby or applied thereto, and ultimately the box or mold and the contents thereof are brought upwardly into close engagement with the said pressure-plate. The hydraulic pressure is permitted to continue to cumulate in the cylinder 9 after the pressure-plate 6 and the sections that may be carried thereby are in contact with the plastic material in the box or mold to compress said material in accordance with the desired or predetermined pressure, which will be indicated by the gage 32, and after the plastic material has become set or sufficiently hard the bed 12 and box or mold with the set material therein will be lowered through the medium of the lever comprising the yoke 42 and handle 43, and at this time the stop-cock 45 will be opened to permit the water that has been forced into the cylinder 9 to flow upwardly through the pipe 31 into the tank, the weight on the plunger 11 being sufficient to

elevate the water through said pipe 31 and which cannot escape or run back into the cylinder or pump 28 in view of the check-valve 30 in the supply-pipe 29. After the bed 12 and box or mold are fully lowered the lever 51 is elevated, as shown by dotted lines in Fig. 3, thereby throwing the rollers 49 above the plane of the said bed to engage and elevate the box or mold, as heretofore explained. The said box or mold is then removed from the bed 12, and at a suitable time the molded stone contained therein is delivered therefrom. It will be understood that a number of boxes or molds may be used to accommodate the formation of stones of different dimensions.

The improved press is adapted to form blocks, slabs, or tiles, and the several mechanisms are so arranged as to relieve the operator of unnecessary strain or avoid bodily bending movements as much as possible. By the use of angle irons or beams in the construction of the several parts of the press strength and durability are obtained as well as convenience in assemblage of the several parts, and, moreover, in view of the use of angle irons or beams as they are found in the market the cost of manufacture is reduced to a minimum and at the same time a superior press is produced.

To assist in the operation of the treadle-lever 35, the end thereof adjacent to the cylinder or pump 28 is movably attached to an upwardly-projecting rocking bar 54, which has its lower end pivotally secured to the base 1 adjacent to the lower end of the said cylinder or pump. It will be seen that the rocking bar 54 will move inwardly toward the pump or cylinder proportionately to the pressure of the lever 35, and it will be also understood that the said lever will be raised to normal condition by the water inflowing into the pump or cylinder.

Changes in the proportions, dimensions, form, and minor details may be resorted to without departing from the principle of the invention.

Having thus fully described the invention, what is claimed as new is—

1. In a press of the class set forth, the combination of a pressure-cylinder having a plunger with a bed disposed thereon, the cylinder and plunger being located under the center of the bed, a pump operatively connected to the lower end of the cylinder, a foot-treadle for operating the piston of the pump, a mold movably mounted on the bed, an upper pressure-plate, a hand-lever connected to the upper part of the press and having portions depending downwardly and secured to the bed for lowering the latter and the mold thereon, and means for supplying the pump with a pressure medium.

2. A press of the class set forth, comprising a bed, a mold movably mounted on the bed, a pressure-plate, means for raising and lower-

ing the bed, and means elevatable through the bed to engage the mold to facilitate the application and removal of the latter.

3. In a press of the class set forth, the combination of a vertically-movable bed having hydraulic operating devices in connection therewith, a pressure-plate disposed at an elevation above the bed, a mold removably mounted on the bed, rollers elevatable through the bed to engage the bottom of the mold to facilitate application and removal of the latter, and means for controlling the operation of the hydraulic devices and for lowering the bed.

4. In a press of the class set forth, the combination of uprights having adjustable stop devices thereon, a vertically-movable bed between said uprights, hydraulic mechanism for elevating said bed, a mold on the bed having the upper edges thereof freely movable between the uprights, means elevatable through the bed to engage the bottom of the mold to facilitate the application and removal of the latter, and means for controlling the raising and lowering movements of the bed.

5. A press of the class set forth, comprising a bed, a mold movably mounted on the bed, a pressure-plate, means for raising and lowering the bed, rollers elevatable through the bed to engage the mold to facilitate the application and removal of the latter.

6. A press of the class set forth, comprising a bed, a mold movably mounted on the bed, a pressure-plate, means for raising and lowering the bed, yokes pivoted to the bed, rollers carried by the yokes, and means for operating the yokes to throw the rollers into engagement with the mold to facilitate the application and removal of the mold.

7. A press of the class set forth, comprising

a bed, a mold movably mounted upon the bed, a pressure-plate, means for raising and lowering the bed, yokes pivoted to the bed, rollers carried by the yokes, means for operating the yokes to throw the rollers into engagement with the mold, and means for automatically throwing the rollers out of engagement with the mold.

8. A press of the class set forth, comprising a bed, a mold movably mounted upon the bed, a pressure-plate, means for raising and lowering the bed, yokes pivoted to the bed, rollers carried by the yokes, a lever for operating the yokes to throw the rollers into engagement with the mold, and a spring for automatically throwing the rollers out of engagement with the mold.

9. A press of the class set forth, comprising an adjustable bed, a mold movably mounted on the bed, an adjustable pressure-plate, means for raising and lowering the bed, and means elevatable through the bed to engage the mold to facilitate the application and removal of the mold.

10. A press of the class set forth, comprising a bed, a mold movably mounted on the bed, a pressure-plate, means for raising and lowering the bed, a yoke fulcrumed upon the frame of the press, arms secured to the press and having their upper ends adjustably connected to the yoke, and means elevatable through the bed to engage the mold to facilitate the application and removal of the mold.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIS H. FISHER.

Witnesses:

GEORGE W. SAMSON,
Z. KEYTON.