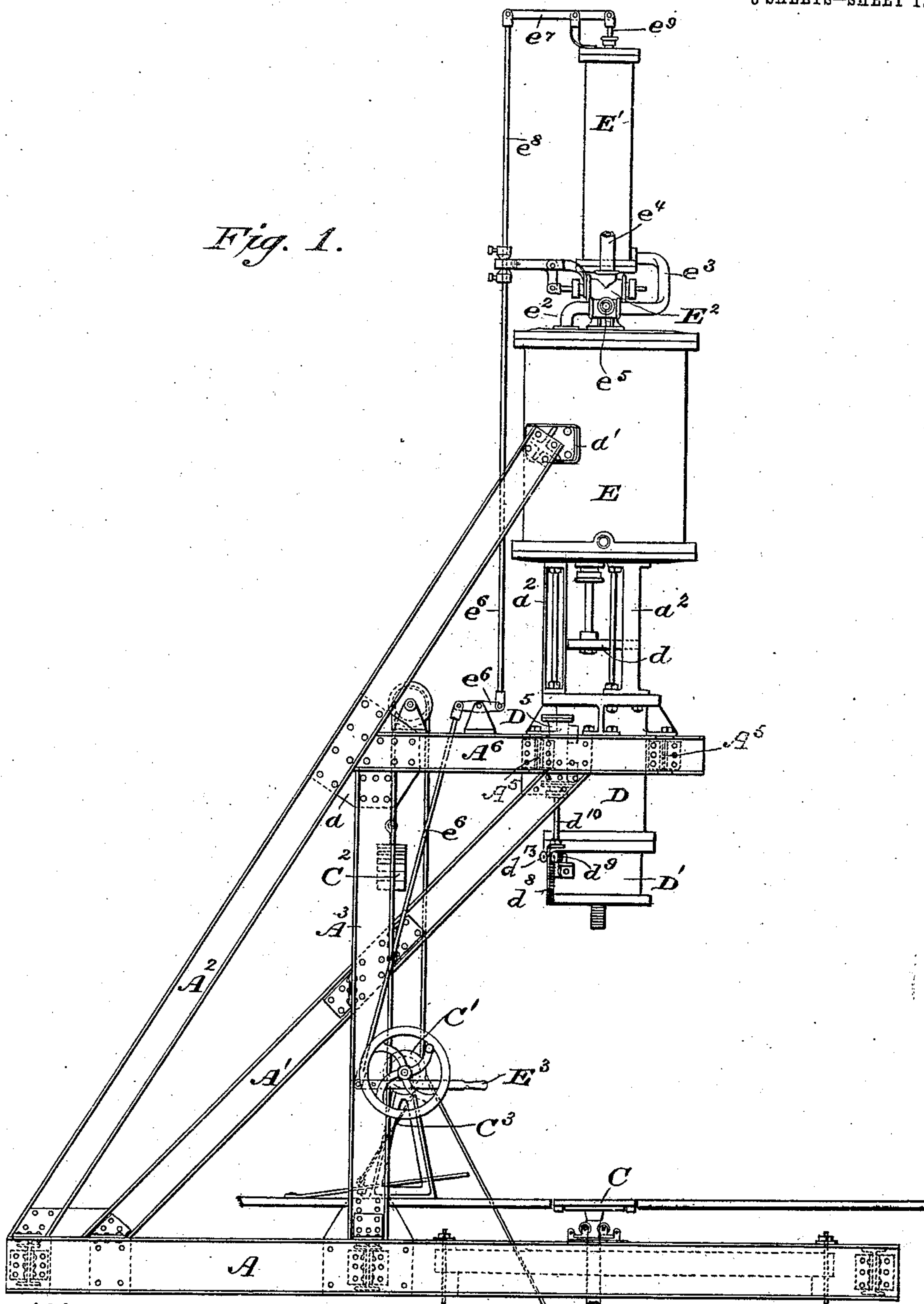


915,640.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

E. H. Saywell
Jno. W. Oberlin

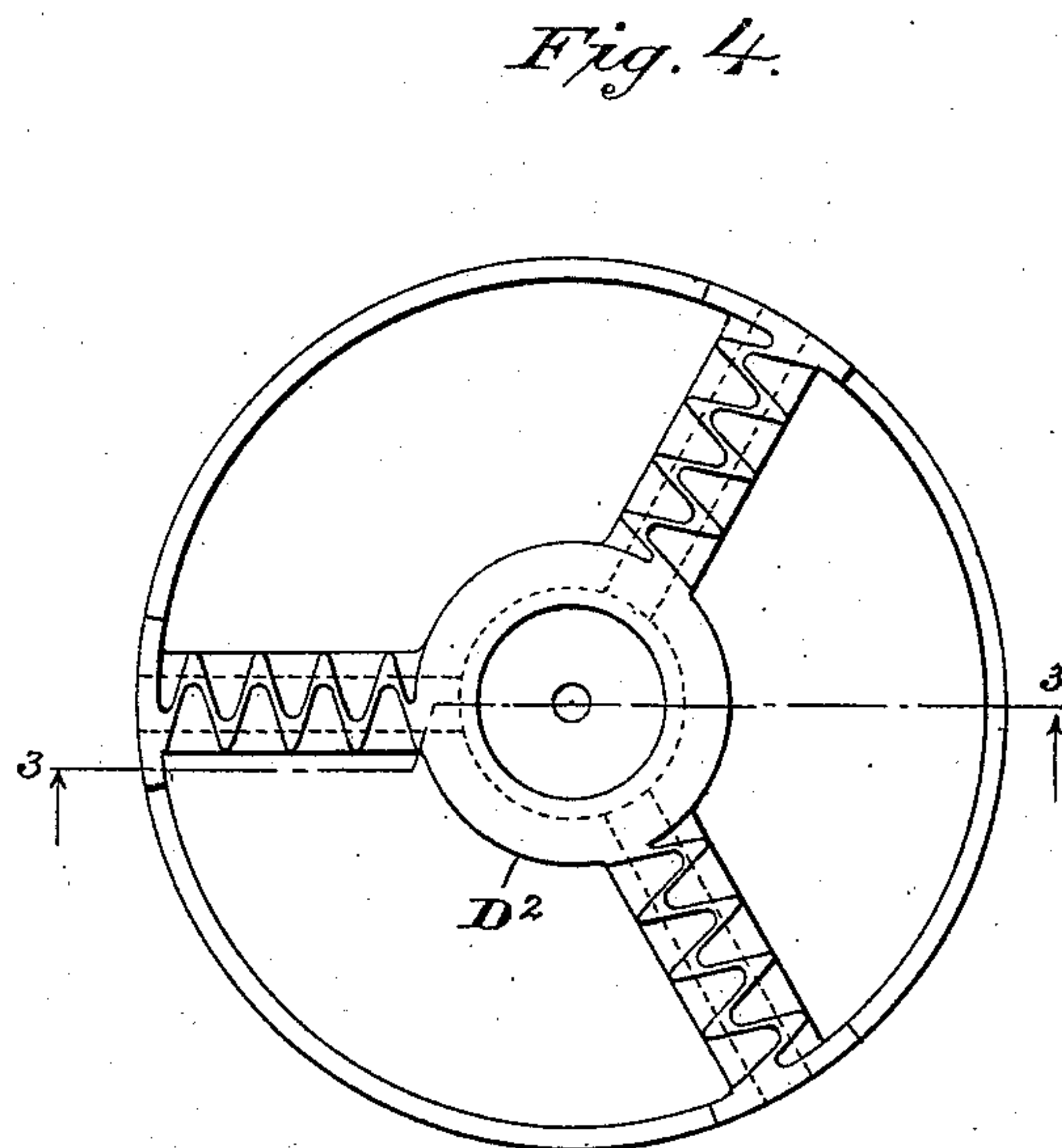
INVENTOR:

Calvin W. Vaughan
by his attorney
J. B. Fay

APPLICATION FILED AUG. 1, 1906.

Patented Mar. 16, 1909.

3 SHEETS—SHEET 2.



B.

G. W. Saywell
Jno. H. Oberlin

Calvin W. Vaughn

by his attorney

J. B. Gay

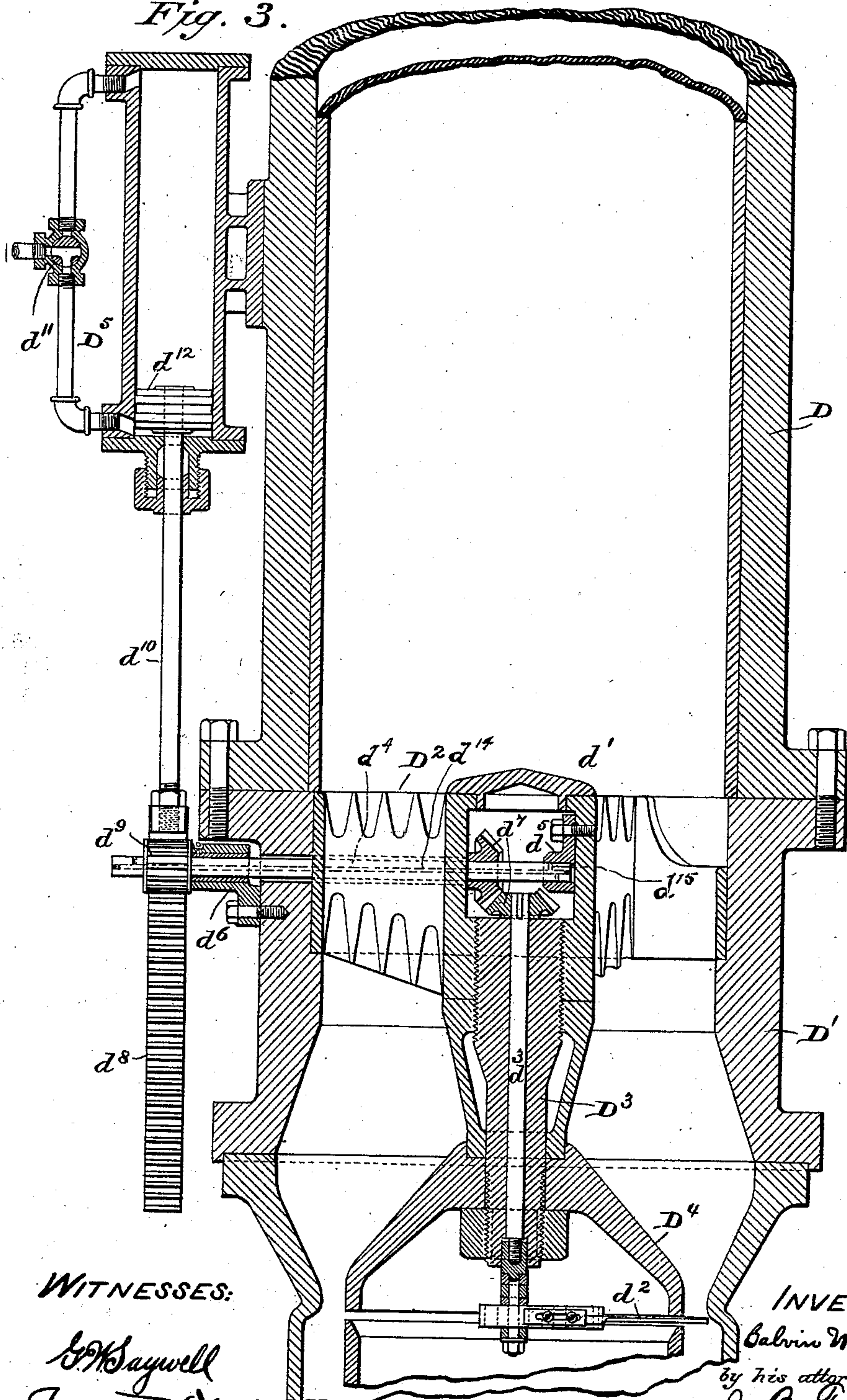
C. W. VAUGHN.
PRESS FOR MAKING SEWER PIPE AND THE LIKE.
APPLICATION FILED AUG. 1, 1906.

915,640.

Patented Mar. 16, 1909.

3 SHEETS—SHEET 3.

Fig. 3.



WITNESSES:

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INVENTOR:

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UNITED STATES PATENT OFFICE.

CALVIN W. VAUGHN, OF CUYAHOGA FALLS, OHIO.

PRESS FOR MAKING SEWER-PIPE AND THE LIKE.

No. 915,640.

Specification of Letters Patent.

Patented March 16, 1909.

Application filed August 1, 1906. Serial No. 328,667.

To all whom it may concern:

Be it known that I, CALVIN W. VAUGHN, a citizen of the United States, resident of Cuyahoga Falls, county of Summit, and State of Ohio, have invented a new and useful Improvement in Presses for Making Sewer-Pipe and the Like, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to clay-working machinery and particularly to presses for the making of sewer pipe, pottery, fire-proofing, terra-cotta lumber, and other clay products. Presses of this kind generally consist of a vertically-disposed clay cylinder from which the clay is expressed into a mold by means of a plunger operated by a steam cylinder and piston directly above such clay cylinder.

My present invention comprehends, in the first place, an improved frame structure for supporting the above-named parts, the object being to provide an open space beneath the clay cylinder and thus facilitate the handling of the molds and of the green product, such as sections of sewer pipe and the like.

Such invention comprehends further a novel steam cylinder construction whereby a marked saving in the amount of power required to run the press is effected; and it also includes power-actuated means for severing successive articles from the mass of clay in the clay cylinder. These several means, as well as others associated therewith, in the structure of my press, are all hereinafter fully described and those constituting my invention are later specifically set forth in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—Figure 1 represents a side elevation of a press embodying my several improvements, such press, although particularly equipped for use in a sewer pipe factory, presenting nevertheless the general features that would characterize one designed for any of the above lines of work; Fig. 2 represents a front elevation of such press; Fig. 3 is a central longitudinal

cross-section of the clay cylinder of the same showing details of the cutter mechanism and the means provided for actuating the same; and Fig. 4 is a plan view of a spider that is utilized to support such cutter mechanism within the clay cylinder.

A brief reference to the state of the art will be essential to a ready understanding of my invention, particular reference being had herein to the manufacture of sewer pipe as serving to illustrate such art as a whole. Apparatus of the sort in hand has heretofore, in its approved form, comprised a vertically arranged clay cylinder supported above the lower floor of the factory at a suitable height to permit therebeneath the approach and adjustment of molds and the removal of the green pipe-sections. Mounted above the clay cylinder has been a steam cylinder and piston of the usual reciprocatory type whereby the plunger or follower used for expressing the clay from the clay cylinder could be actuated as desired. The top of the clay cylinder has generally been on a level with the second floor and the steam cylinder supported on columns or other frame work a suitable distance above such clay cylinder to permit the ready charging of the latter with the prepared clay of which the tile or sewer-pipe is made. In the making of sewer pipe, the mold proper comprises simply a short section adapted together with the die to form the flanged end of the pipe only. At the beginning of the operation this mold is held against the die, that is fastened to the discharge end of the clay cylinder, and in alinement therewith by means of a counterpoised platform or table. Upon the mold proper being filled this platform is slowly lowered and, the clay being forced out of the die at the proper rate, the straight portion of the pipe-section is formed. When the desired length has been thus attained, a suitable cutter in the spider extension, which forms the discharge end of the clay cylinder, is actuated by hand to cut off the pipe-section and the latter may then be removed and the operation be thereupon repeated until the clay cylinder requires to be again charged. When this becomes necessary, the follower is withdrawn, the cylinder filled, and all is again ready for a repetition of the operation.

The frame, whereby the clay cylinder and superposed steam cylinder are supported,

must necessarily be quite strong, and has heretofore been of rectangular form. Obviously the working space beneath the clay cylinder has been consequently much cramped and the use of cranes or similar mechanism for handling the frequently heavy and unwieldy molds and pipe-sections has been correspondingly hampered. Furthermore, a steam cylinder of large cross-section has been required to furnish the power needed for the downward stroke of the follower, the use of which to perform the relatively light task of withdrawing such plunger involves a manifest waste of energy. Lastly, the necessity of operating the cutter manually is not only burdensome upon the operative in charge of the press but frequently distracts his attention from other and more important duties. As has been indicated, it is the object of my invention to eliminate so far as possible these several difficulties.

The frame of my improved press comprises a base A of rectangular outline and preferably of channel bars solidly riveted together in the manner clearly indicated in Figs. 1 and 2. This base A rests upon suitable foundations B, Fig. 2, and over a well B' within which operates the counterpoised table or platform C whereby the mold, not shown, is supported. In the construction of this table no departure is made from that above referred to. Mounted near the rear end of base A is a mast built up of two pairs of forwardly inclined legs, the lower A' of which terminates laterally of the clay cylinder D, the upper A² of which extends up and adjacent to the sides of the superposed steam cylinder E. These legs are preferably formed of channels lighter than, but united in the same way as, those of which base A is made up. The corresponding members of each pair of such legs are supported by a strut A³, one on each side. The upper ends of these struts are secured by gusset plates *a* to legs A² at points approximately on a level with the upper ends of masts A'; and forwardly extending beams A⁴, secured at their rear ends to legs A² by these same gusset plates *a* and resting upon such upper ends of legs A', form an overhanging platform upon cross-beams A⁵, Fig. 2, of which the clay cylinder D is supported. Steam cylinder E, in addition to being supported by upper legs A², to which it is attached by means of brackets *a'*, is supported upon three columns *a*² that rest upon the top head of clay cylinder D.

From the frame construction just described it will be evident that the space beneath the clay cylinder is entirely open on three sides. A crane can hence be swung in and out with the greatest possible freedom and the product removed with facility in any one of three directions. Such construction furthermore is designed to afford ample re-

sistance to any strain apt to be imposed upon it and that, too, with an economical use of material.

Steam cylinder E, of which the manner of support has been already described, is utilized only in actuating a follower or plunger *d* downwardly into clay cylinder D, to express the clay therefrom. This operation, as was earlier stated, requires considerable power, for the clay, although in a plastic condition, must still be stiff enough to stand alone when expressed from the die of cylinder D. On the other hand, to raise or withdraw such plunger requires ordinarily less than one-fifteenth of such power. Accordingly, for withdrawing the plunger, I provide a second steam cylinder E', of correspondingly smaller cross-section, in axial alinement with cylinder E and having its piston-head connected by means of a piston *e'* with the piston-head of the latter cylinder. This last-named piston-head is connected with plunger *d* by means of a plurality of piston-rods *e* because of the greater strain involved.

The mechanism whereby the steam is alternately supplied to first cylinder E, then cylinder E', may, of course, vary from that here shown, which comprises a steam chest E² mounted on the top head of the first cylinder and connected with the upper end of the same and with the lower end of cylinder E' by means of pipes *e*² *e*³, respectively. Steam is supplied through a feed-pipe *e*⁴ and escapes through an exhaust pipe *e*⁵, such supply and exhaust being controlled by means of a piston valve in steam chest E² that is adapted to be operated by a hand lever E³ joined therewith by a suitable system of connecting rods and levers *e*⁶.

As the downward stroke of the plunger has to be regulated in order to express the clay at just the proper speed, lever E³ is placed conveniently within reach of the workman watching the operation. The progress of the upper stroke does not require such care and hence automatic means are provided for cutting off the supply of steam when the piston-head in cylinder E² reaches the upper end of the cylinder. Such means comprise a lever *e*⁷ connected by a rod *e*⁸ with rod *e*⁶ and provided with a short plunger *e*⁹ that extends a short distance within the top head of cylinder E' so as to be forced upwardly by the piston-head as it approaches the limit of its stroke. Accordingly, when it becomes necessary to recharge the clay cylinder, it is merely necessary to swing hand-lever E³ to reverse the supply of steam to the steam cylinders, no further attention being required until it is desired to again start the press.

The lower discharge end of clay cylinder D comprises an extension member D', Figs. 1, 2, and 3, in the upper or neck portion of which is mounted a spider D², Figs. 3 and 4. The arms of this spider, preferably three in

number, have both their upper and under edges scalloped as shown, the object being to prevent the formation of bubbles in the clay as it divides in passing around such spider-arms, with resultant defects in the product. Spider D^2 is formed with a vertical bore that is closed at the top by a cap d' and into which is screw-threaded from below a hollow stem D^3 . Such stem D^3 has secured to its lower end a conical die member D^4 that gages the inner diameter of the pipe section, and just below this member D^4 rotates the cutter d^2 , being mounted upon a shaft d^3 journaled in stem D^3 . Cutter d^2 is of the well-known "jack-knife" construction where- by rotation in one direction is adapted to effect the projection of the cutting blade beyond the edge of member D^4 , whereas rotation in the opposite direction withdraws it within such edge. Rotation of cutter shaft d^3 to thus actuate the cutter d^2 is effected by means of a horizontal shaft d^4 lying in a suitable bore therefor provided in one of the arms of the spider D^2 and having its inner and outer ends respectively journaled in brackets d^5 and d^6 . Bevel gears d^7 connect this shaft with the outer shaft proper and reversible rotation thereof is produced by a rack d^8 that engages a pinion d^9 on the shaft's outer end, and that is itself a prolongation of a piston d^{10} operating in a steam cylinder D^5 . A roller D^{13} assists in keeping such rack in mesh with the pinion. A three-way valve d^{11} , controlled from the same operating station as the valve governing admission of steam to cylinders E and E' , is adapted to admit steam to first one side, then the other, of the piston-head d^{12} with the result of rotating cutter d^2 to render the same in one instance operative and in the other inoperative.

It should be noted that in that type of clay press required for handling certain kinds of clay, in which the use of a spider D^2 or any equivalent means in clay cylinder D has had to be dispensed with, my method of operating the cutter is still applicable. In such case stem D^3 is usually prolonged to extend above the top of the clay cylinder and through the plunger, being supported from a bracket or spider attached to the columns intermediate of such cylinder and steam cylinder E . Obviously, the only change involved in adapting my mechanism to this situation would be a corresponding prolongation of vertical shaft d^3 upon which the cutter d^2 is mounted. The difficulty heretofore encountered in oiling the inner bearing of horizontal shaft d^4 as well as bevel gearing d^7 and the bearings of vertical shaft d^3 I have successfully obviated by providing such first-named shaft with an axial bore d^{14} by means of which and the radial openings d^{15} shown, see Fig. 3, oil or similar lubricant can be easily and regularly supplied where most

needed. This is done without any possibility of such oil becoming mingled with the clay in the cylinder with attendant injurious results to the product.

The mechanism for raising and lowering platform C is shown in part only, but consists chiefly of a windlass C' , Figs. 1 and 2, a counterweight C^2 , and a friction-brake C^3 . There being no direct connection between these parts and the features upon which emphasis is herein sought to be placed, their further description is deemed unnecessary, especially in view of the fact that they are familiar in the art.

The operation of my press is obviously substantially the same as that previously set up in connection with the description of the type of press at present in general use. The variations from such operation entailed by the several departures in construction herein described have been, it is thought, sufficiently described in connection with the description of such improved features. It accordingly only remains, by way of summary, to state that the incorporation of such features, by rendering the press more accessible, by placing every operation under perfect control of the workman in charge, and by economizing in the amount of steam required to operate the press, not only increases the capacity of the plant, but makes it possible to cheapen the cost of production. The use of a different die at the discharge end of the clay cylinder, together with obvious changes in the molds used, is all that is required to adapt the press, above described as a press for making sewer pipe, to the manufacture of any of the various articles suggested at the beginning of the specification.

Having thus described my invention in detail, that which I particularly point out and distinctly claim is:

1. In mechanism of the class described, the combination with superposed vertically arranged clay and steam cylinders, of a frame for supporting the same, such frame comprising a suitable base, a plurality of forwardly-inclined masts mounted on the base near the rear end thereof and connected to said clay and steam cylinder, gusset plates for securing said masts intermediate their ends, a plurality of vertical struts, and a laterally projecting platform secured to the lowermost of said cylinders.

2. In mechanism of the class described, the combination with superposed vertically arranged clay and steam cylinders, of a frame for supporting the same, such frame comprising a suitable base, two pairs of similarly-inclined forwardly projecting legs mounted at the rear end of such base and terminating laterally of and rigidly secured to said clay and steam cylinders, respectively, horizontally-disposed beams resting on the ends of the lower pair of legs and at-

tached at their rear to the upper pair of legs, and struts supporting such upper pair of legs at the juncture of such beams therewith.

3. In mechanism of the class described, 5 the combination with superposed vertically arranged clay and steam cylinders, of a frame for supporting the same, such frame comprising a suitable base, two pairs of similarly-inclined forwardly projecting legs 10 mounted at the rear end of such base and terminating laterally of and rigidly secured to said clay and steam cylinders, respectively, horizontally-disposed beams resting on the ends of the lower pair of legs and at- 15 tached at their rear to the upper pair of legs, and a strut mounted on each side of said base, each strut being attached to the corresponding leg of the lower pair and supporting the corresponding leg of the upper pair at its 20 juncture with one of said beams.

4. In mechanism of the class described, the combination with a clay cylinder and a plunger adapted to operate therein, of a horizontal shaft mounted in said cylinder, a 25 spider mounted in the lower end of said cyl-

inder, a shaft vertically mounted in said spider, a jack-knife cutter attached to the lower end of said shaft and adapted to be rendered operative and inoperative, respectively, when rotated in opposite directions, 30 and means for reversibly rotating said horizontal and vertical shafts, such means comprising a transverse shaft mounted in one of the arms of said spider, gears connecting the same with said vertical shaft, a pinion on the 35 outer end of said transverse shaft, a steam cylinder adjacent to and connected with the clay cylinder, a piston operating within the steam cylinder and provided with a rack engaging said piston, and a valve controlling 40 the admission of steam to said cylinder, said transverse shaft being provided with an axial bore adapted to carry lubricant from its exterior end to the interior of said spider substantially as described. 45

Signed by me, this 27 day of July, 1906.
CALVIN W. VAUGHN.

Attested by—

R. R. PEEBLES,
FRED C. TREAT.