No. 734,492. PATENTED JULY 21, 1903.

W. C. DAVIS.

RABBLE MECHANISM.

APPLICATION FILED MAR. 26, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

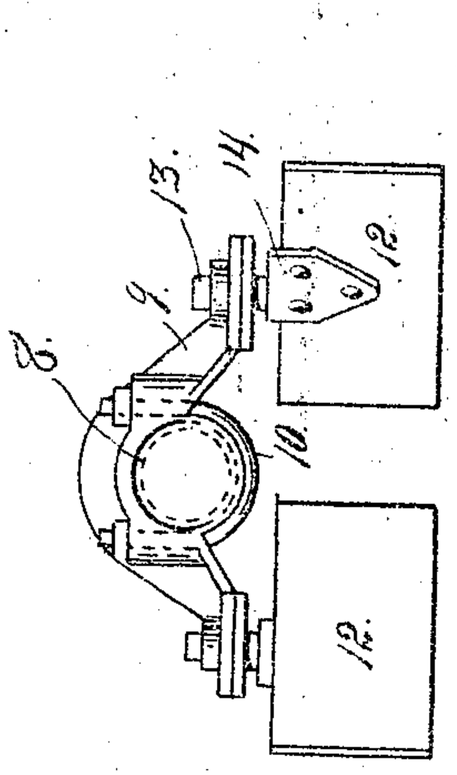


Fig. 6.

Fig. 1.

Witnesses
Otto E. Hoddick.
Dena Nelson.

Inventor
W. C. Davis.
By A. B. Dyer
Attorney

No. 734,492

PATENTED JULY 21, 1903.

W. C. DAVIS.

RABBLE MECHANISM.

APPLICATION FILED MAR. 26, 1903.

NO MODEL.

4 SHEETS—SHEET 2

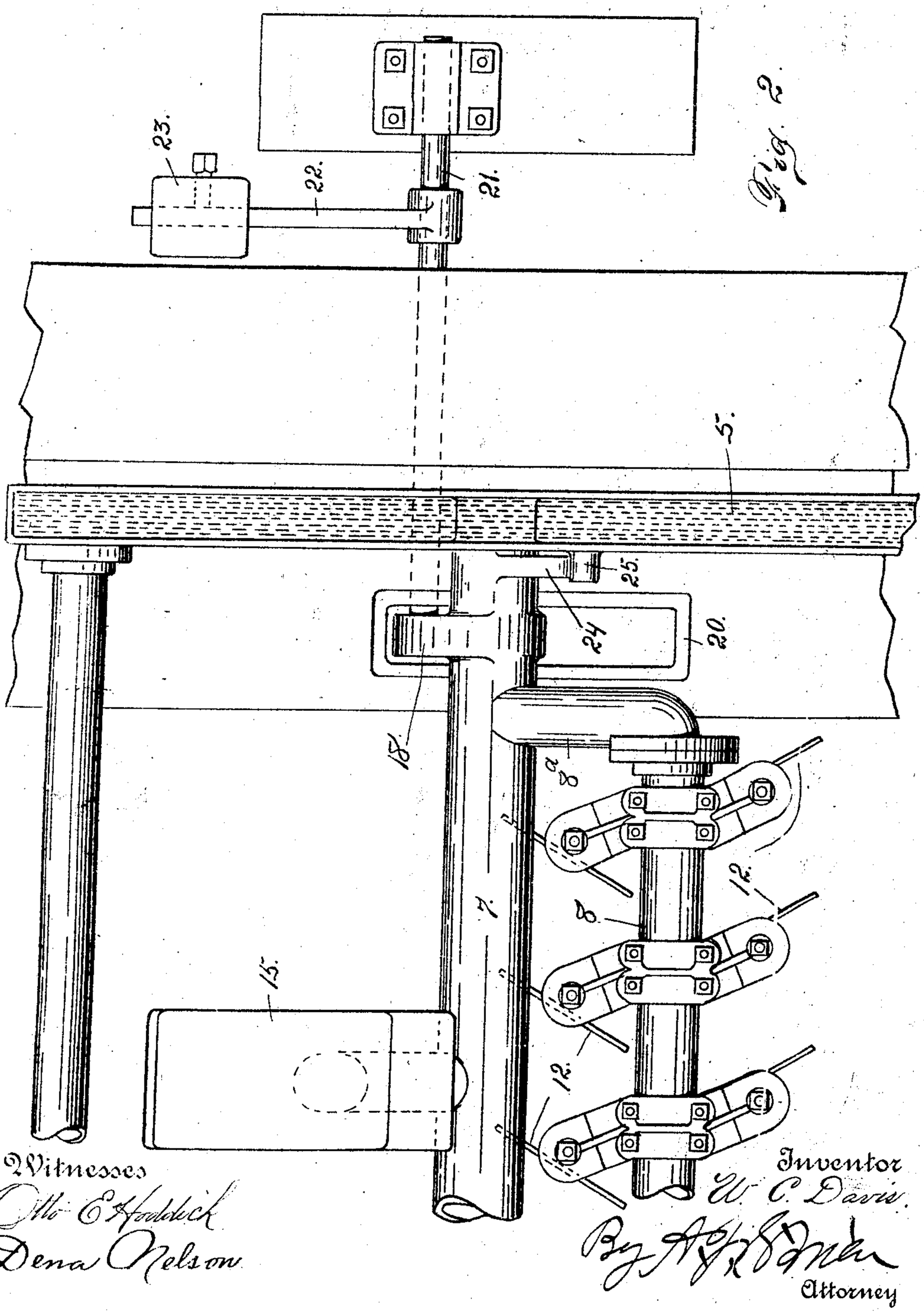


Fig. 2.

Witnesses
Otto E. Hoddick
Dena Nelson

Inventor
W. C. Davis.
By Atty
Attorney

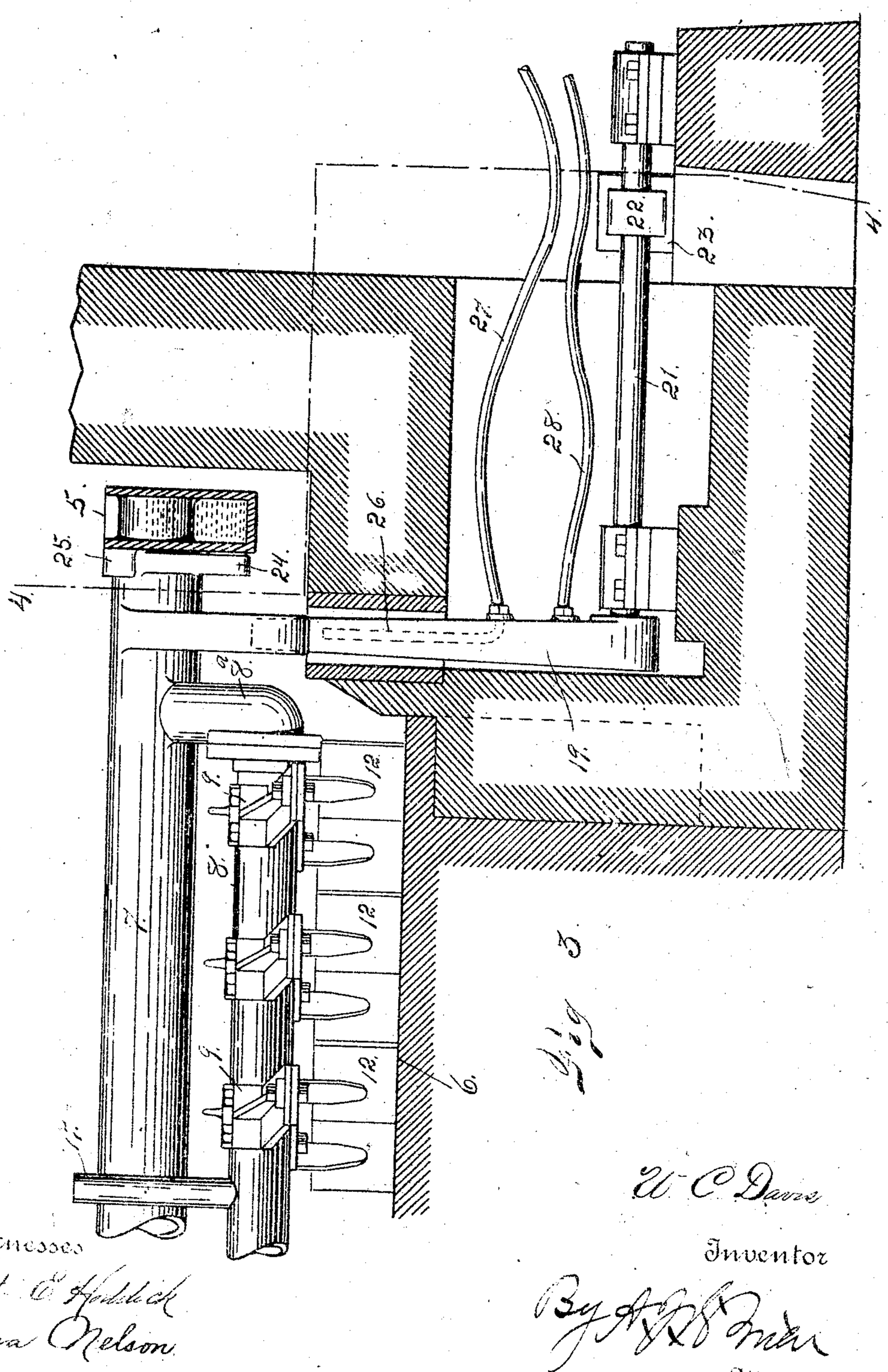
No. 734,492. PATENTED JULY 21, 1903.

W. C. DAVIS.

RABBLE MECHANISM.

APPLICATION FILED MAR. 26, 1903.

NO MODEL. 4 SHEETS—SHEET 3.



Witnesses
H. C. Goodwin
Dena Nelson

W. C. Davis
Inventor
By A. G. Dyer & Son
Attorney

No. 734,492. PATENTED JULY 21, 1903.

W. C. DAVIS.

RABBLE MECHANISM.

APPLICATION FILED MAR. 26, 1903.

NO MODEL. 4 SHEETS—SHEET 4.

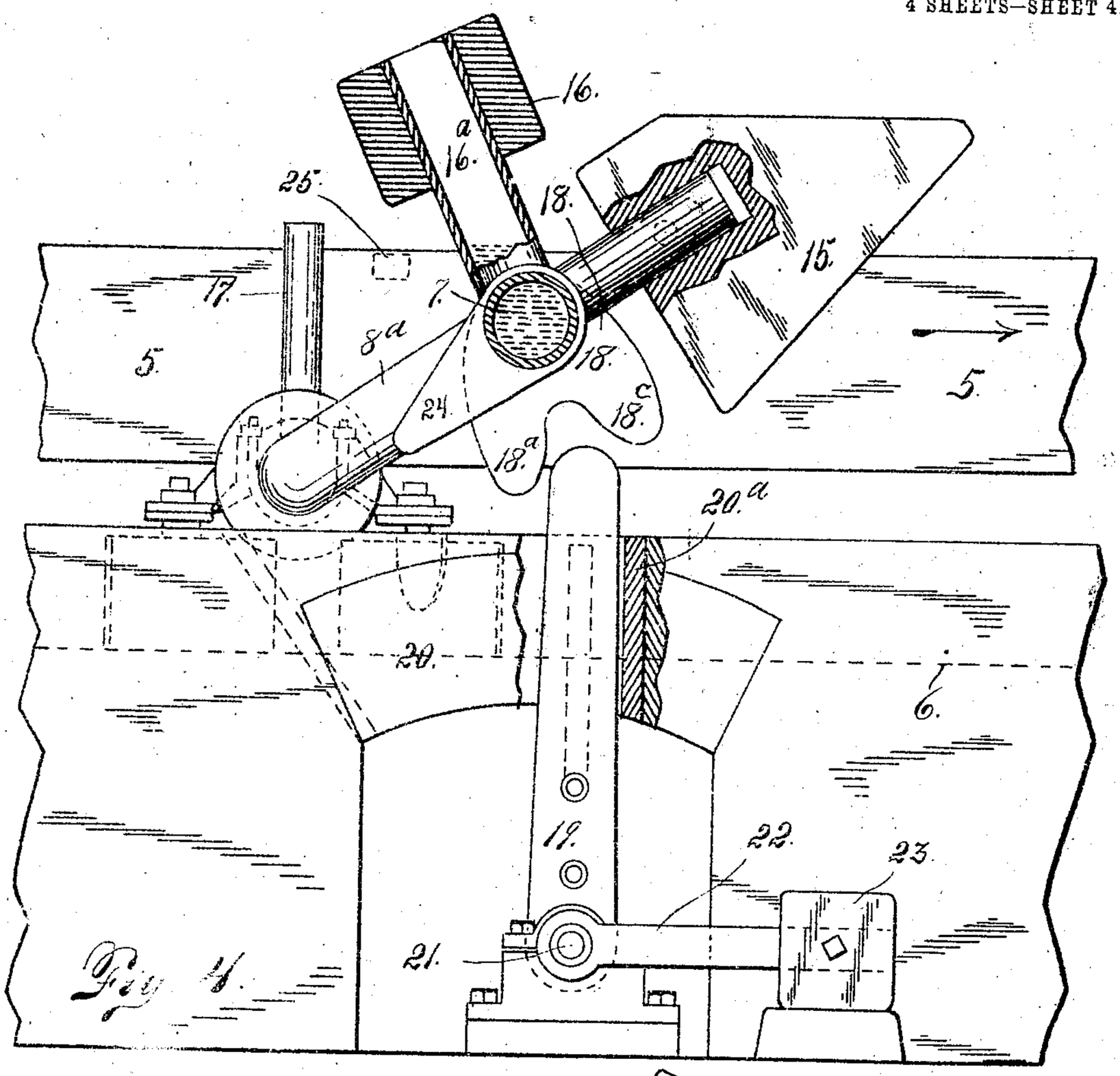


Fig. 4.

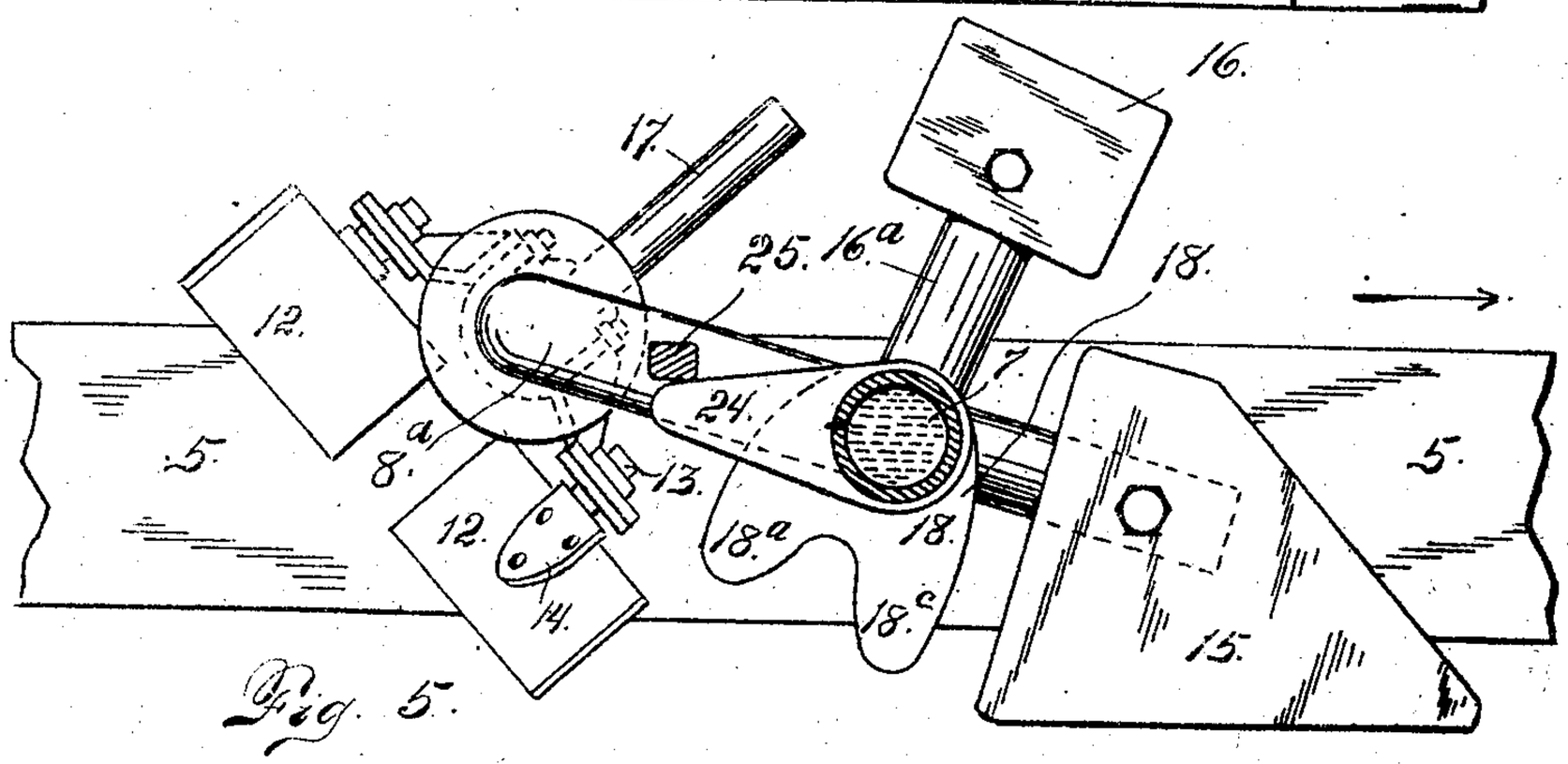


Fig. 5.

Witnesses
Otto E. Hodelick.
Dena Nelson.

Inventor
W. C. Davis.
By Atty

No. 734,492. Patented July 21, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM C. DAVIS, OF DENVER, COLORADO.

RABBLE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 734,492, dated July 21, 1903.

Application filed March 26, 1903. Serial No. 149,752. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. DAVIS, a citizen of the United States of America, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Rabble Mechanism; and I do 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 the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in rabble mechanism for furnaces in which ore is roasted for the purpose of removing its impurities, which retard the separation of the metallic values from the gangue. In my improved construction provision is made for holding the rabble-blades in contact with the pulverized ore upon the hearth while traveling in one direction—namely, toward the rear or discharge end of the furnace. When, however, the rabble-carriage begins the reverse movement, a rock-shaft, with which the rabble-shaft is rigidly connected, is automatically turned sufficiently to raise the rabble-blades above the ore, in which position these blades or plows are held during the reverse movement of the rabble-carriage until the front or feed end of the furnace is reached, when the rock-shaft is again actuated automatically prior to beginning the rearward movement to throw the blades downwardly into the ore, whereby as the rabble-carriage travels rearwardly the ore upon the hearth is simultaneously stirred and gradually moved toward the discharge end of the furnace. The carriage rock-shaft is hollow and filled with water. The rabble-shaft is also hollow and connected with the rock-shaft to allow the water in the latter to circulate freely in the rabble-shaft for cooling purposes. This application is limited to the construction of the rabble mechanism and the means for manipulating it for the purpose of throwing the rabble-blades into the operative or inoperative position, as heretofore explained. The rabble mechanism includes the rock-shaft, the rabble-shaft, the brackets mounted on the rabble-shaft, the blades carried by the brackets, weights for holding the parts in either position of adjustment, and side troughs in which the extremities of the rock-shaft are journaled. The manner of propelling the rabble mechanism will not be described in this application, as it forms no part of my present invention.

Having briefly outlined my improved construction, I will proceed to describe the same in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figures 1 and 2 taken together form a top view of my improved rabble mechanism. Fig. 3 may be called a "front" or a "rear" view of the rabble mechanism looking from one end of the hearth. Fig. 4 shows the rabble mechanism viewed from the side of the hearth, showing the rabble-blades in the operative position and illustrating the automatic trip for actuating the rock-shaft, whereby the rabble-blades are raised and lowered, as heretofore explained. Fig. 5 is a detail view showing the rabble mechanism in position when the blades are raised above the hearth. Fig. 6 is a detail view of one of the brackets with which the rabble-blades are connected. In this view the position of the rabble-shaft is indicated by dotted lines.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the troughs which form the support for the rabble mechanism at the sides of the hearth 6. These troughs are filled with water and are open at the top. They may be supported and propelled in any suitable manner. In suitable bearings attached to a pair of these troughs, one on each side, are journaled the extremities of a hollow rock-shaft 7. The rabble-shaft 8 is also hollow, extends parallel with the rock-shaft, and is connected therewith by hollow branch arms 8^a, whereby the water supplied to the rock-shaft for cooling purposes circulates freely between the two shafts. The rock-shaft may be supplied with water through a hollow arm 16^a, open at the top and carrying one of the weights connected with the rock-shaft, as hereinafter explained. Mounted on the rabble-shaft are saddle-brackets 9, secured in place by U-shaped bolts 10, which engage the shaft below and are

fastened by nuts above. As shown in the drawings, there are two of these bolts for each bracket. These brackets project on opposite sides of the rabble-shaft, and the rabble-blades 12 are secured to their opposite extremities by bolts 13, passed through the upper members of angle-pieces 14, whose lower members are secured to the rabble-blades. The extremities of the brackets are slightly turned in opposite directions to form oblique angles with the rabble-shaft, and the blades or plows 12 are set at angles to the direction of travel, the two blades forming angles with each other, whereby the two blades of each bracket throw the ore in opposite directions and advance it toward the discharge extremity of the furnace as they travel over the hearth.

Connected with the rock-shaft and projecting therefrom in the direction opposite the branch arms 8^a of the rabble-shaft are two weights 15, whose gravity is regulated to exactly balance the rabble-shaft and the parts connected therewith. Connected with the rock-shaft and projecting upward therefrom and forming angles with the direction of the arms 8^a and the weights 15 is an auxiliary weight 16, adapted to maintain the rabble-shaft and blades in either position of adjustment—that is to say, with its blades in the ore when traveling toward the discharge extremity of the shaft or with the blades raised out of the ore, as when traveling in the reverse direction. These two positions of the rabble mechanism are respectively indicated in Figs. 4 and 5, and the said mechanism is held in the one or the other position, according as the weight 16 occupies a position on the one side or the other of a vertical line passed through the rock-shaft. If the weight 16 leans from the perpendicular line toward the weight 15, the rabble-blades are raised from the hearth, as shown in Fig. 5, while if the weight 16 is tilted from the vertical toward the rabble-shaft the blades of the latter are held in the operative position, as shown in Fig. 4. The weight 16 is connected with the rock-shaft by a hollow arm 16^a, whose opening communicates with the shaft-opening and forms an escape for the steam generated by the heat of the furnace. Through this hollow arm 16^a water may be introduced for the purpose of supplying the rock-shaft and rabble-shaft, as heretofore intimated. The rabble-shaft is provided with one or more outlet pipes or tubes 17 for the escape of steam or vapor.

At one extremity the rock-shaft is provided with a depending yoke or device 18, having two arms 18^a and 18^c. Located in the path of this yoke at each end of the furnace is a trip-arm 19, passing upwardly through a bracket 20, forming a guide for the said arm. The lower extremity of this arm 19 is made fast to a rock-shaft 21, projecting outside of the furnace, and whose outer extremity is provided with an arm 22, extending at right angles to the shaft and having a weight 23 at its outer extremity which acts as a counterbalance for the trip-arm 19 and normally holds the said arm at one extremity of the guide-bracket 20 or in the position shown in Fig. 4, when the upper extremity of the arm projects into the path of one arm or horn of the yoke 18. After the rabble-carriage has reached the discharge extremity of the furnace and begins its rearward movement the arm 18^a of the yoke (see Fig. 4) engages the upper extremity of the trip-arm 19, which throws the rabble mechanism to the position shown in Fig. 5, raising the rabble-blades above the hearth and out of the ore thereon, whereby the blades are idle during the return movement. When this occurs, it is assumed that the rabble mechanism is moving in the direction of the arrows in Figs. 4 and 5. In this event the arm 19 is prevented from moving in the direction of the carriage or toward the right by a stop 20^a of the guide-bracket. Hence the trip acts on the rabble mechanism in the manner described. In order to prevent the rock-shaft from moving farther than is necessary under the conditions stated, the said shaft is provided with an arm 24, which when the rabble-blades are raised a sufficient distance above the hearth engages a stop 25 on one of the side troughs 5 and holds the rabble mechanism in the adjusted position. As soon as the rabble mechanism reaches the feed end of the furnace and begins the movement toward the discharge end the yoke-arm 18^c engages a trip 19, which throws the rabble mechanism again to the position shown in Fig. 4. The trip-arms 19 are free to move in one direction. The one located at the discharge extremity of the furnace is free to move toward the left, referring to Figs. 4 and 5, while the one located at the feed end of the furnace is free to move toward the right. Hence as the rabble-carriage approaches the discharge end of the furnace the arm 18^a of the yoke engages the trip-arm 19, which being free to move toward the left travels in its guide-bracket until the arc described by its upper extremity leaves the path of the said yoke-arm, when the weight 23 returns the trip-arm to its normal or vertical position, being that shown in Fig. 4. When the rabble mechanism approaches the feed end of the furnace, the same operation takes place—that is to say, the yoke-arm 18^c engages the trip-arm, which moves sufficiently to release the yoke-arm, after which the trip is returned to its normal position by its counterbalance-weight. From this it will be understood that as soon as the rabble mechanism reaches either end of the furnace and begins the movement in the opposite direction the yoke will engage a trip-arm and reverse the position of the rabble mechanism. If this mechanism is starting toward the discharge end of the furnace, it will be actuated to cause its blades to engage the ore on the hearth, while if said mechanism is starting toward

the feed end of the furnace it will be actuated to raise the rabble-blades sufficiently above the hearth to disengage them from the ore thereon.

The trip-arm is hollow and is provided with an upwardly-projecting inlet-pipe 26, connected with a water-supply conduit 27, whereby the water introduced is carried upwardly and discharged into the hollow arm at its upper extremity. Near the lower extremity of this arm is formed an outlet-opening, from which leads a drain pipe or conduit 28. This water-supply keeps the trip-arm sufficiently cool to prevent injury from the heat.

Having thus described my invention, what I claim is—

1. The combination with traveling side supports, of a rock-shaft journaled in said supports, and a rabble-shaft rigidly connected with the rock-shaft whereby as the rock-shaft is actuated, the rabble-shaft is moved away from or toward the hearth.

2. In rabble mechanism, the combination with traveling side supports, of a rock-shaft journaled in said supports, a rabble-shaft extending parallel with the rock-shaft and rigidly connected therewith whereby as the rock-shaft is actuated, the rabble-shaft is raised or lowered, means for actuating the rock-shaft, and means for automatically maintaining the rabble-shaft in either position of adjustment.

3. In rabble mechanism, the combination with traveling supports, of a rock-shaft whose extremities are journaled in said supports, a rabble-shaft connected therewith by suitable arms, means for actuating the rock-shaft to throw the rabble-shaft up or down as desired, and a weight connected with the rock-shaft for holding the rabble-shaft in either position of adjustment.

4. The combination with traveling supports, of a rock-shaft whose extremities are journaled in said supports, a rabble-shaft rigidly connected with the rock-shaft and occupying a position parallel therewith, rabbles carried by the rabble-shaft, the rock-shaft being weighted on the side opposite the rabble-shaft to balance the latter and its attachments, and another weight connected with the rock-shaft to destroy its equilibrium whereby the rabble-shaft is held in either position of adjustment.

5. In rabble mechanism, the combination with supports located at the opposite sides of the hearth, a rock-shaft whose extremities are journaled in said supports, a rabble-shaft rigidly connected with the rock-shaft and extending parallel therewith, a weight connected with the rock-shaft and arranged on the side opposite the rabble-shaft to balance the latter, another weight connected with the rock-shaft to destroy its equilibrium and hold the rabble-shaft in any desired position of adjustment, means for actuating the rock-shaft to raise or lower the rabble-shaft, and means for limiting the movement of the rock-shaft as the rabble-shaft is lifted from the hearth.

6. In rabble mechanism for roasting-furnaces, the combination with traveling supports occupying positions at opposite sides of the hearth, a rock-shaft connected with said supports, a rabble-shaft connected with the rock-shaft, a counterbalance-weight connected with the rock-shaft opposite the rabble-shaft, another weight connected with the rock-shaft for holding the rabble-shaft in the adjusted position, a depending device connected with the rock-shaft, and a trip-arm arranged in the path of said device for actuating the rock-shaft.

7. In rabble mechanism, the combination of a rock-shaft, rabbles connected with the rock-shaft on one side, a counterbalance connected with the rock-shaft on the opposite side, a controller-weight for destroying the equilibrium of the rock-shaft whereby the rabble-shaft is held in any desired position of adjustment, a depending device connected with the rock-shaft, and a trip-arm arranged at each end of the furnace and lying in the path of the depending device of the rock-shaft, the said trip-arm being free to move in one direction but prevented from moving in the opposite direction.

8. In rabble mechanism, the combination of a rock-shaft, a rabble-shaft rigidly connected with the rock-shaft and extending parallel therewith, means connected with the rock-shaft opposite the rabble-shaft for balancing the rock-shaft, means for destroying the equilibrium of the rock-shaft whereby the rabble-shaft may be held in either position of adjustment, a depending, bifurcated yoke mounted on the rock-shaft, a trip-arm projecting into the path of said yoke and arranged to engage one arm of the latter according to the direction of travel, the said trip-arm being weighted to hold it in the normal position or in the path of the bifurcated yoke, and a guide through which the trip-arm passes, the arrangement being such that the trip-arm is free to move in one direction but locked against movement in the opposite direction.

9. In rabble mechanism, the combination with traveling supports located at the sides of the hearth, a rock-shaft journaled in said supports, a rabble-shaft connected with the rock-shaft, a rabble-shaft counterbalance connected with the rock-shaft, a controller-weight also connected with the rock-shaft, an arm connected with the rock-shaft, a stop which said arm engages to limit the movement of the rock-shaft in one direction, a depending, bifurcated part connected with the rock-shaft, and a trip-arm engaged by said part for changing the position of the rabble-shafts at predetermined intervals.

10. The combination with a traveling support, of a rock-shaft journaled therein, a second shaft rigidly connected with the rock-

shaft and lying parallel therewith, whereby the second shaft moves in an arc of a circle when the rock-shaft is actuated, brackets mounted on the second shaft, and rabble blades or plows connected with the said brackets.

11. The combination with traveling supports located at the sides of the hearth, a rock-shaft connected with said supports, a rabble-shaft rigidly connected with the rock-shaft, saddle-brackets connected with the rock-shafts, and rabble blades or plows connected with the brackets and occupying positions on opposite sides of the rabble-shaft.

12. In rabble mechanism, the combination with suitable traveling supports located at the opposite sides of the hearth, a rock-shaft mounted on said parts, a rabble-shaft connected with the rock-shaft, the rock-shaft being hollow and adapted to hold water, the rabble-shaft being also hollow and in communication with the rock-shaft to allow the water to circulate for cooling purposes.

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

WILLIAM C. DAVIS.

Witnesses:
DENA NELSON,
OTTO E. HODDICK.