

No. 719,401.

PATENTED JAN. 27, 1903.

A. R. WILFLEY.
ORE CONCENTRATOR.

APPLICATION FILED AUG. 14, 1901.

NO MODEL.

2 SHEETS—SHEET 1.

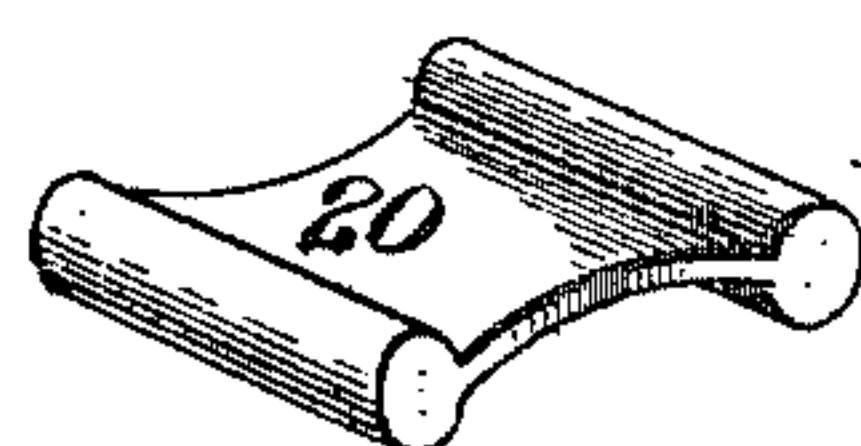
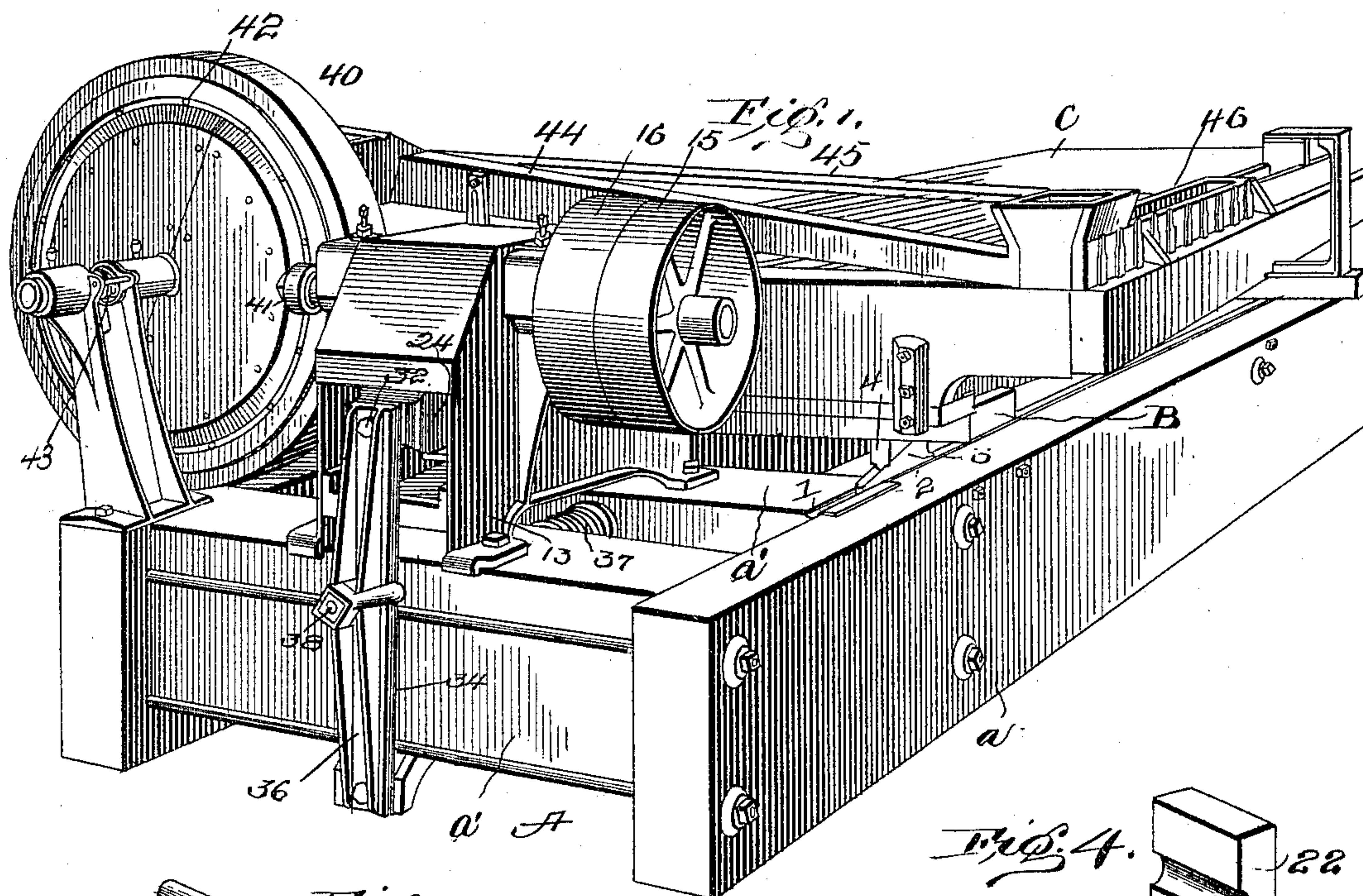


Fig. 3.

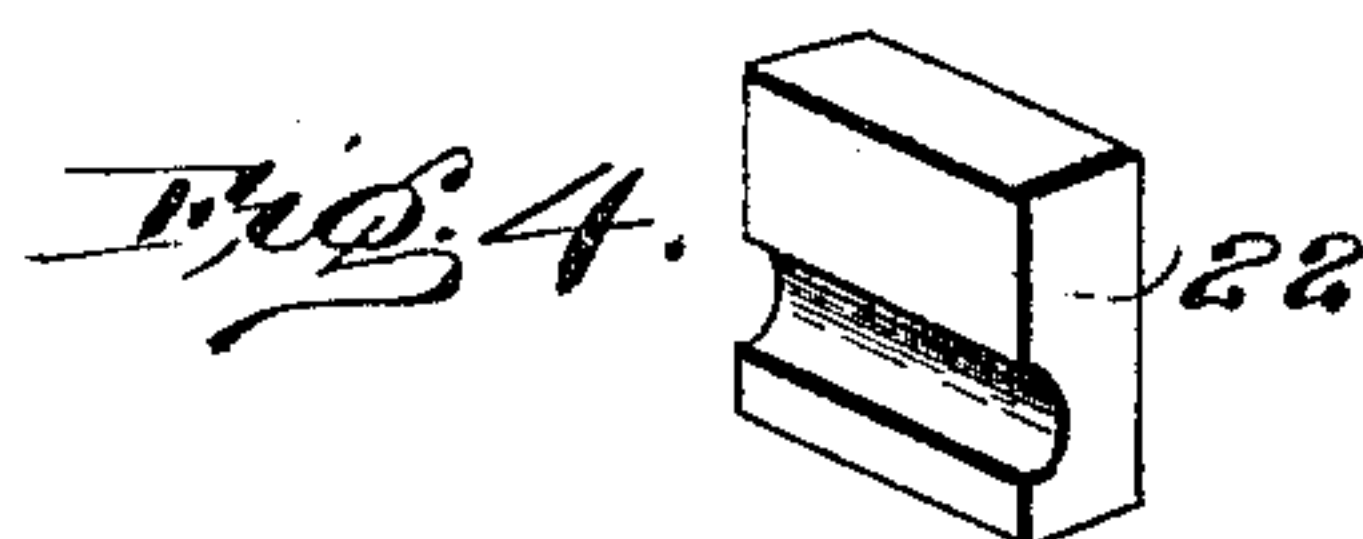


Fig. 4.

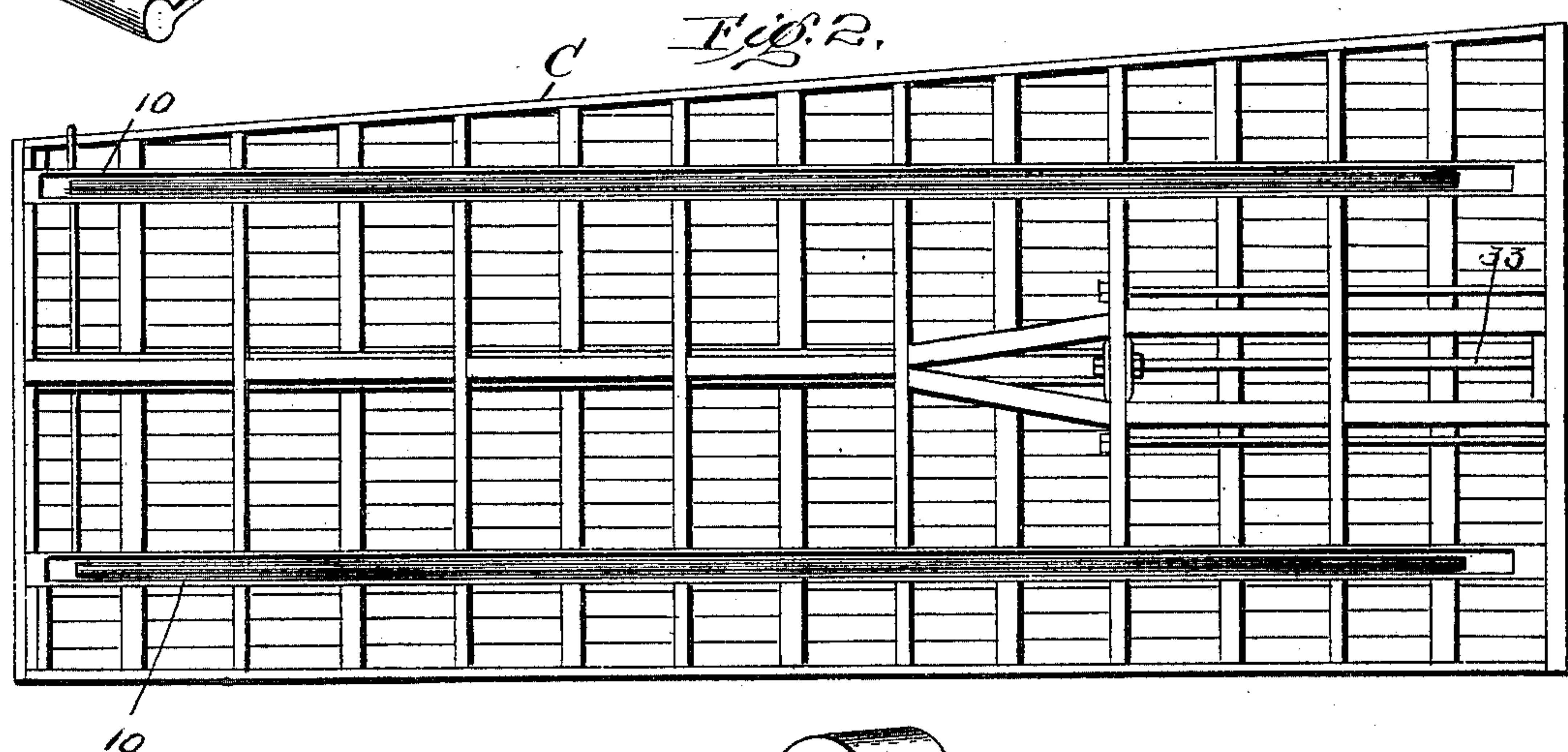
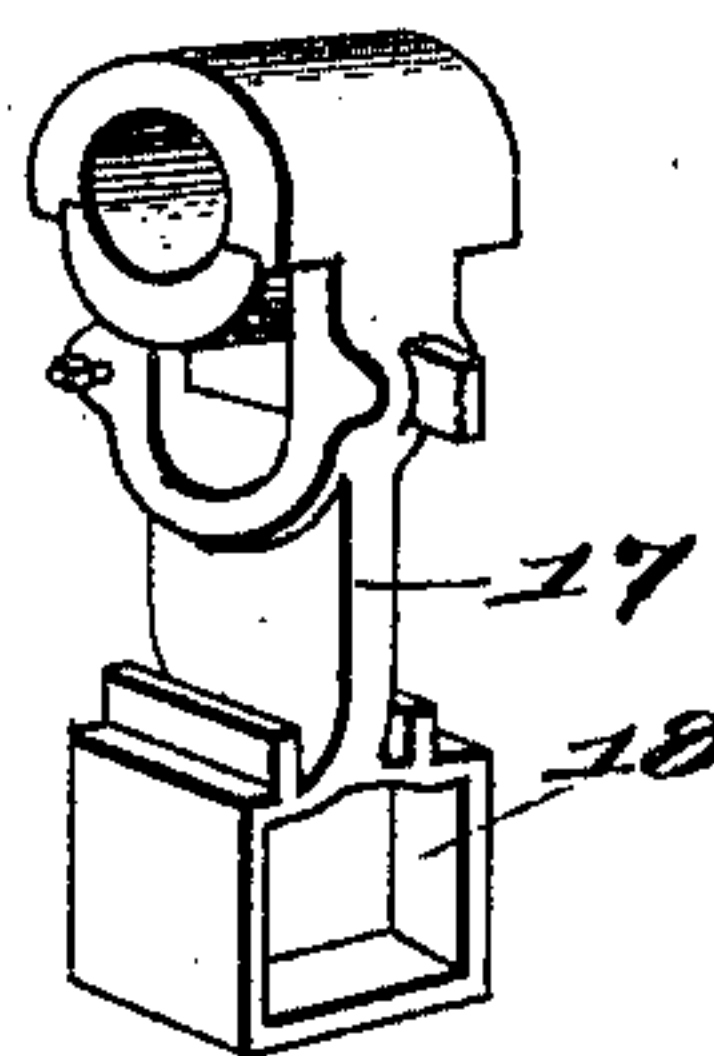


Fig. 2.

Fig. 5.



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Ralph Swarfield

Inventor:
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by Vernon C. Hodges
his Atty.

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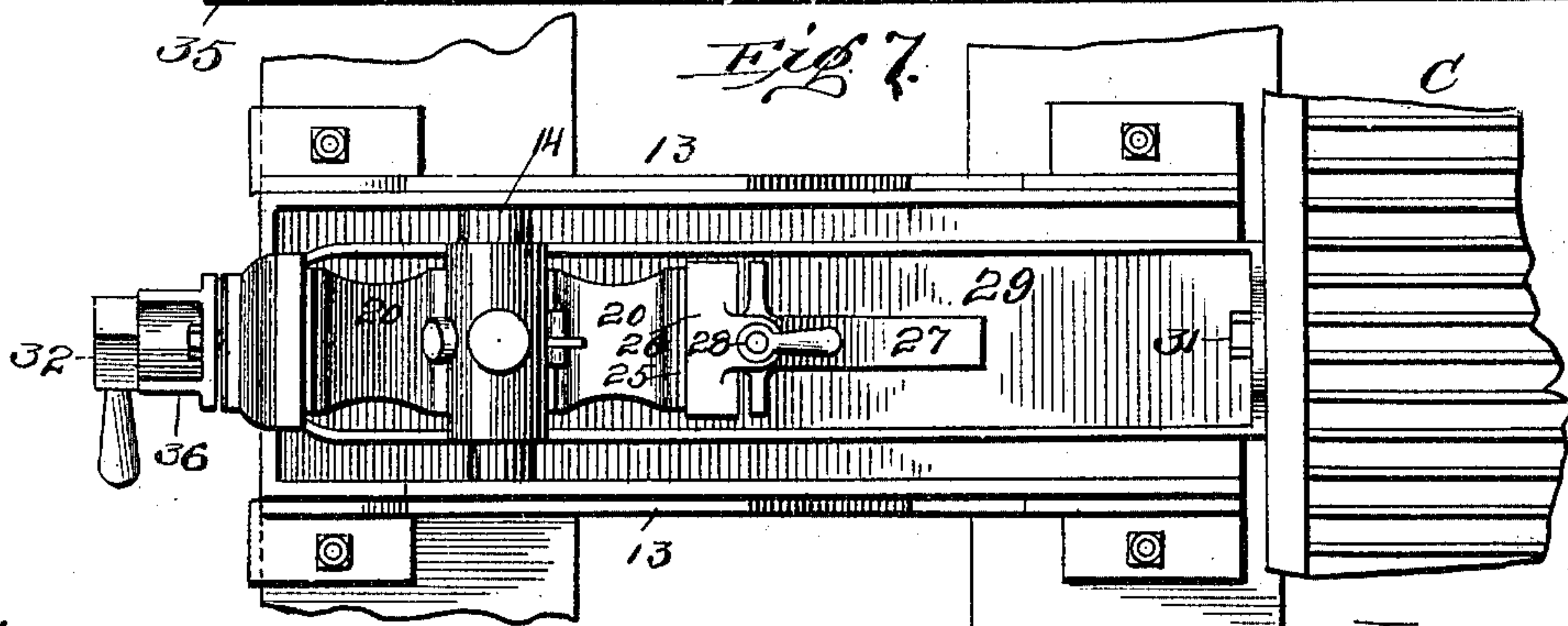
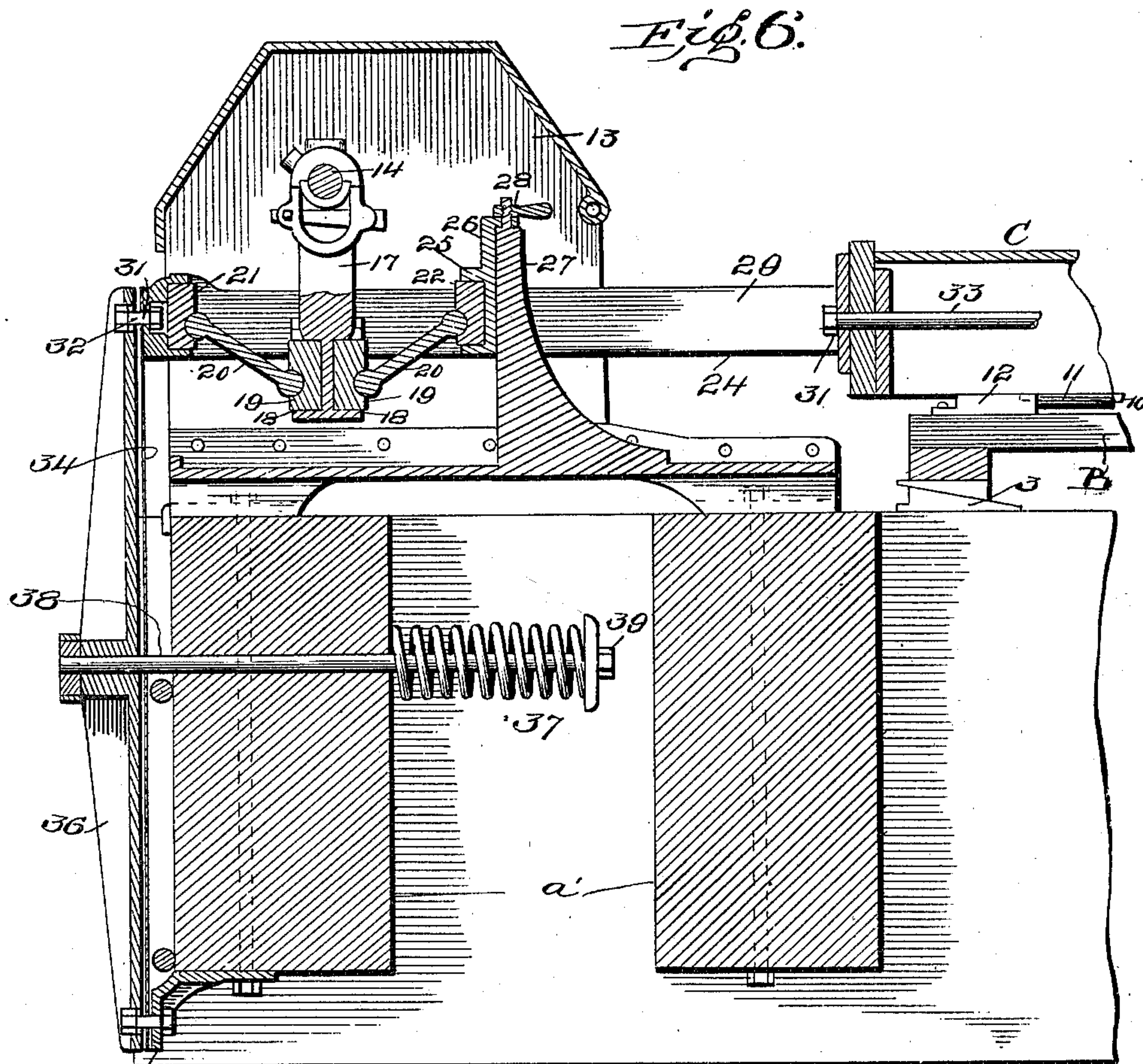
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2 SHEETS—SHEET 2.



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Walter T. Estabrook.

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UNITED STATES PATENT OFFICE.

ARTHUR R. WILFLEY, OF DENVER, COLORADO.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 719,401, dated January 27, 1903.

Application filed August 14, 1901. Serial No. 72,063. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR R. WILFLEY, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented a new and useful Improvement in Ore-Concentrators, of which the following is a specification.

My invention relates to an improvement in ore-concentrators, and it is an object to perfect the ore separation by the adoption of simplified and efficient mechanism; and to this end my invention consists in certain novel features of construction and combinations of parts, which will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective of my improved concentrator. Fig. 2 is a bottom plan view of the table or deck. Fig. 3 is a view in perspective of one of the toggle-arms. Fig. 4 is a similar view of one of the boxes 22. Fig. 5 is a detached view in perspective of the pitman 17 and socket 18. Fig. 6 is an enlarged vertical longitudinal section through the center of the operating mechanism, and Fig. 7 is a plan view of this portion of the machine.

A represents the bed or base frame. This is made up of longitudinal beams *a a* and cross-timbers *a' a'*, securely bolted together, as shown, to form a rigid framework of sufficient strength, size, and weights to withstand the strain and shocks to which a machine of this character is constantly subjected. Of course this bed or base frame affords a support or foundation for all the other parts of the concentrator, and these various parts will now be described.

An intermediate frame B is located immediately above the bed or base frame. Like frame A, it comprises longitudinal sills *b b* and cross-beams *b' b'*, securely bolted together and adapted to rest upon the bed or base frame when in a horizontal position.

C indicates the table or deck, which is superimposed upon the two frames and constitutes a roof or cover over and for the protection of the parts beneath. The deck or table is provided with a smooth and relatively rough or rifled upper surface for the separation of the concentrates, the riffles when employed extending longitudinally of the table or deck and the outer terminals of the riffles

extending more or less in advance one of another from the upper to the lower surface of the table or deck. On the lower surface the table is suitably braced by a framework for that purpose, and this table or deck has sliding connection with the intermediate frame B, upon which it rests. A pair of track-rods 10 10, of steel or other material, are secured to the lower surface of the deck or table parallel with each other and at suitable distances apart, as shown in the bottom plan view of the table or deck, Fig. 2. At corresponding positions on the upper surface of the intermediate frame B the guides 11 11 are secured to receive these tracks and in which the latter slide back and forth. Castings 12 12 are riveted or otherwise secured to the ends of these guides to close their ends and constitute oil-cups and perform the still further and important function of preventing their turning over sidewise. This makes a thoroughly lubricated slide connection for the deck or table as it reciprocates in the process of ore washing and concentration, and, as previously stated, the table or deck above affords a cover or protection to exclude water or other extraneous matter from the slide-bearing, which is always well filled with oil.

Passing now to the so-called "motion," which reciprocates the deck or table and its accessories, numerals 13 13 are a pair of standards securely bolted to the forward cross-timber of the bed or base frame. A crank-shaft 14 is revolvably supported in suitable bearings in these standards, the crank-shaft having loose and fixed pulleys 15 and 16 on one end for the usual purpose. From the crank on this shaft a pitman 17 extends downward, and on its lower end it is provided with sockets 18 18, one on each side, in which are carried boxes 19 19. Toggle-arms 20 20 extend in opposite directions from these boxes to corresponding boxes 21 and 22 for their opposite ends. One of these boxes is carried by the draw or thrust bar 24, whereas the other is supported in a socket 25 in the hanger 26, and hanger 26 is adjustably supported on the post 27 by means of nut 28 on the upper threaded end of the post.

To return to the construction of the draw or thrust bar, it will be observed that it is of skeleton form, having an open center 29,

through which the pitman, toggle-arms, and post extend. Holes 30 and 31 are made in the ends to receive the bolts 32 and 33, respectively. Bolt 32 extends some distance 5 through the framework at the longitudinal center of the deck or table, and by means of it a swivel connection is formed between the deck and table and the draw or thrust bar, this swivel being the axis of oscillation of the 10 table or deck as its lateral inclination is adjusted. The opposite end of the draw or thrust bar is supported by a thin piece of steel 34, placed upright, the upper end being bolted fast to the end of the draw or thrust 15 bar, while the lower end of this steel plate 34 is bolted fast to a cast bracket 35, in turn bolted fast to the cross-timber a' of the base or bed frame. Outside of this steel plate 34 is placed a heavy bridge-piece 36. Through 20 this bridge-piece, cross-timber a' , and spiral spring 37 a rod 38 passes, and a nut 39 on this rod gives tension to the spring, so that the bridge-piece 36 serves as an adjustable buffer to impart the desired motion to the table or 25 deck with each complete revolution of the crank-shaft. This motion imparted to the deck or table is the one found most effectual in ore concentration, which is at first slow as the table is forced outward and gradually ac- 30 celerated and backward in a reverse order, at first quick and then gradually retarded, thus giving a progressive forward movement to the heavy concentrates. Water is supplied in any approved manner.

35 As the operation has been referred to at intervals in the course of the description, it will only be necessary to outline it very briefly at this point. The ore is placed in the trough 46, as usual, and the belt shifted to the fixed pul- 40 ley on the crank-shaft 14, the inclination of the table having been or being adjusted as desired to get the best results. The rapid rotation of the crank-shaft causes the table to reciprocate, as previously explained, and wa- 45 ter being discharged into the trough 46 it flows upon the surface of the table with the ore in the trough. The action of the table may be regulated by the adjustment of the tension-spring without stopping the machinery as re- 50 quired.

From the foregoing it will be seen that the parts of the mechanism are few, strong, and compactly disposed and all parts containing lubricant are housed and protected from ex- 55 traneous material, so that all moving parts of the mechanism operate freely and friction is reduced to a minimum. It is needless to say that the separation of the ore from the waste material, which is the main thing, is complete 60 and effectual, and the capacity of the concentrator is greatly in excess of that of other types of machines.

It is evident that slight changes might be resorted to in the form and arrangement of 65 the several parts described without departing from the spirit and scope of my invention,

and hence I do not wish to limit myself to the exact construction herein set forth; but,

Having thus fully described my invention, what I claim as new, and desire to secure by 70 Letters Patent, is—

1. The combination with a base or bed frame and a concentrator-table having sliding connection therewith, of a draw or thrust bar connected with the table at one end, flexible 75 means for supporting it at the other end, means for positively moving the draw or thrust bar in one direction and tension mechanism against which the bar abuts as it is moved in one direction and which gives pres- 80 sure to it in its opposite movement.

2. The combination with a base or bed frame and a concentrator deck or table constructed and adapted to move with respect thereto, of a post or abutment secured upon the frame, a 85 spring-actuated movable abutment or bridge-piece connected with the frame, a draw or thrust bar extending between the table to which it is attached and the bridge-piece or movable abutment against which it abuts, 90 mechanism interposed between the draw or thrust bar and the post or abutment, a crank-shaft and means extending therefrom to the mechanism for operating the latter.

3. The combination with a base or bed frame 95 and a concentrator deck or table constructed and adapted to move with respect thereto, of a fixed post or abutment secured upon the frame, a spring-actuated movable abutment or bridge-piece connected with the frame, a 100 draw or thrust bar extending between the table to which it is attached and the bridge-piece or movable abutment against which it abuts, toggle mechanism interposed between the draw or thrust bar and the fixed post or 105 abutment, a crank-shaft and a pitman extending from the latter to the toggle-joint.

4. The combination with a base or bed frame and a concentrator deck or table constructed and adapted to move with respect thereto, of 110 a fixed post or abutment secured upon the frame, a spring-actuated movable abutment or bridge-piece connected with the frame, a draw or thrust bar extending between the table to which it is attached and the bridge- 115 piece or movable abutment against which it abuts, toggle mechanism interposed between the draw or thrust bar and the fixed post or abutment, a crank-shaft, a pitman extending from the latter to the toggle-joint, and means 120 for adjusting one end of the toggle-joint with respect to the fixed post or abutment.

5. The combination with a base or bed frame and a concentrator deck or table constructed and adapted to move with respect thereto, of 125 a fixed post or abutment secured upon the frame, a spring-actuated movable abutment or bridge-piece connected with the frame, a draw or thrust bar of skeleton form having a hol- 130 low interior, said draw or thrust bar extending between the table to which it is attached and the bridge-piece or movable abutment

against which it abuts, toggle mechanism interposed between the draw or thrust bar and the fixed post or abutment, a crank-shaft, a pitman extending from the latter to the toggle-joint, the toggle, pitman and fixed post extending through the hollow interior of the draw or thrust bar.

6. The combination with a base or bed frame having a fixed post or abutment thereon, and a concentrator table or deck having sliding connection with the bed or base frame, of a movable bridge-piece or abutment, means for regulating the tension thereof, a crank-shaft, a pitman having oppositely-extending sockets therein, bearing-boxes held in said sockets, toggle-arms extending in opposite directions from these bearing-blocks, a draw or thrust bar connected with the table and adapted to abut against the movable abutment or bridge-piece, a box carried by one end of the draw or thrust bar for the reception of one of the toggle-arms, a hanger adjustably connected with the post on the bed or base frame, and a bearing-box carried thereby for the reception of one end of the other toggle-arm.

7. The combination with a bed or base frame and a concentrator deck or table having sliding connection with respect thereto, of a draw

or thrust bar connected at one end with one end of the table, a steel spring-support for the opposite end, a movable bridge-piece or abutment connected with the base or bed frame at its lower end, a tension device for holding the abutment or bridge-piece inward, its upper end located in the path of the draw or thrust bar, and means for throwing the latter toward the bridge-piece with a positive motion.

8. The combination with a bed or base frame and a concentrator deck or table having sliding connection with respect thereto, of a draw or thrust bar connected at one end with one end of the table, a steel spring-support for the opposite end, a movable bridge-piece or abutment connected with the base or bed frame at its lower end, and a tension device for holding the abutment or bridge-piece inward, its upper end located in the path of the draw or thrust bar.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ARTHUR R. WILFLEY.

Witnesses:

E. B. BADGER,

L. H. PETERSON.