

(No Model.)

J. J. FITZGERRELL.

2 Sheets—Sheet 1.

COMBINED ORE SEPARATOR AND AMALGAMATOR.

No. 501,879.

Patented July 18, 1893.

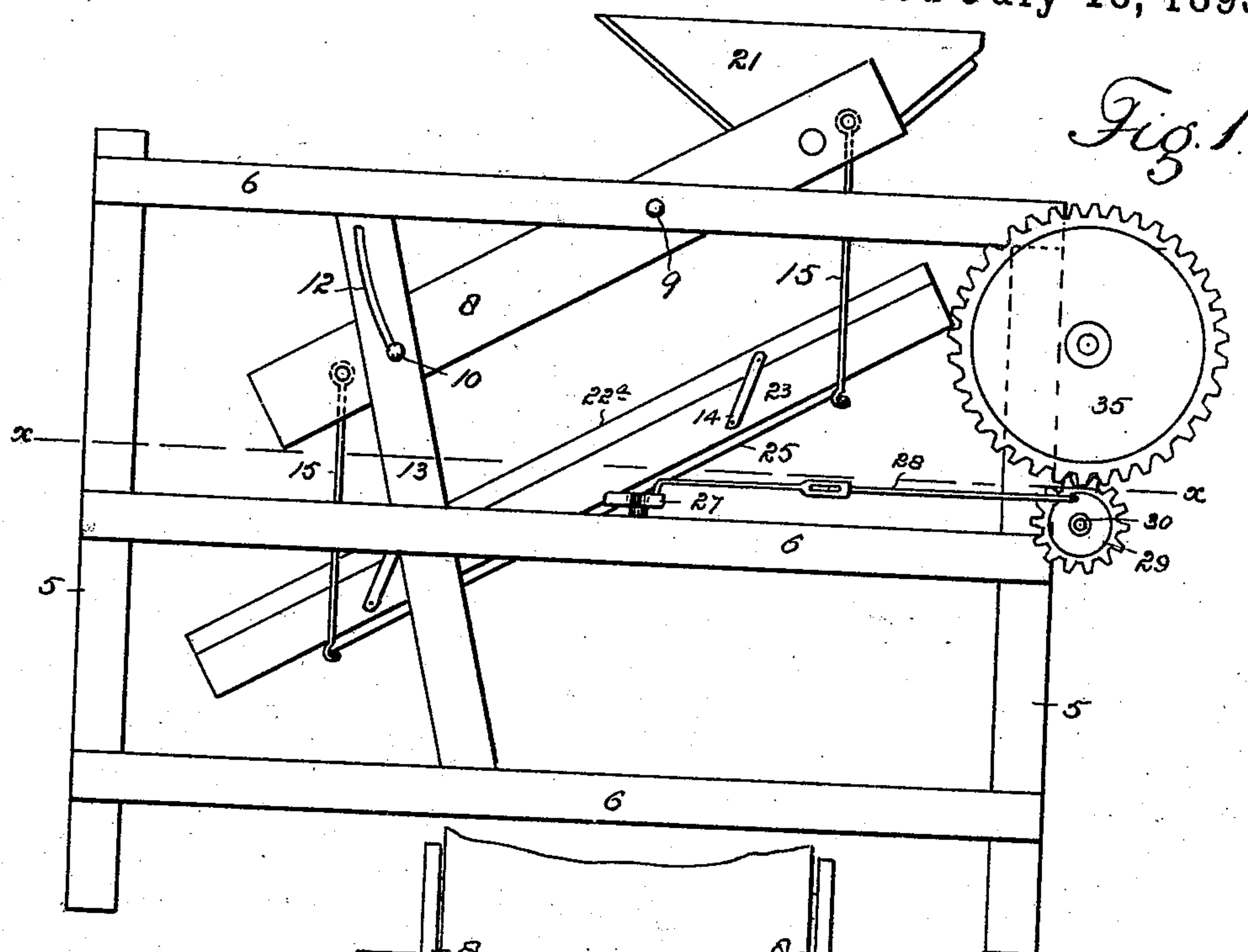


Fig. 1

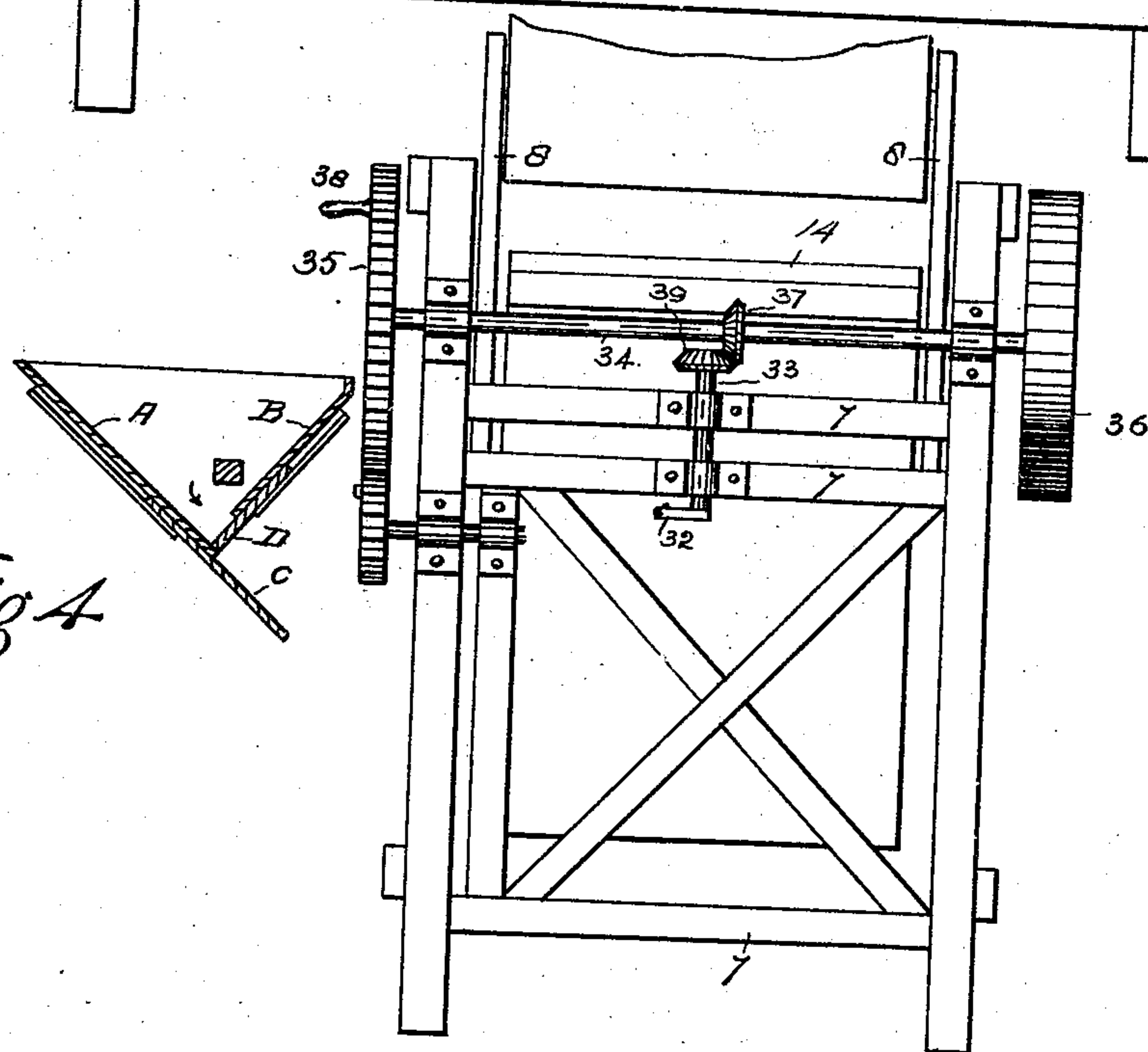


Fig. 2

Fig. 4

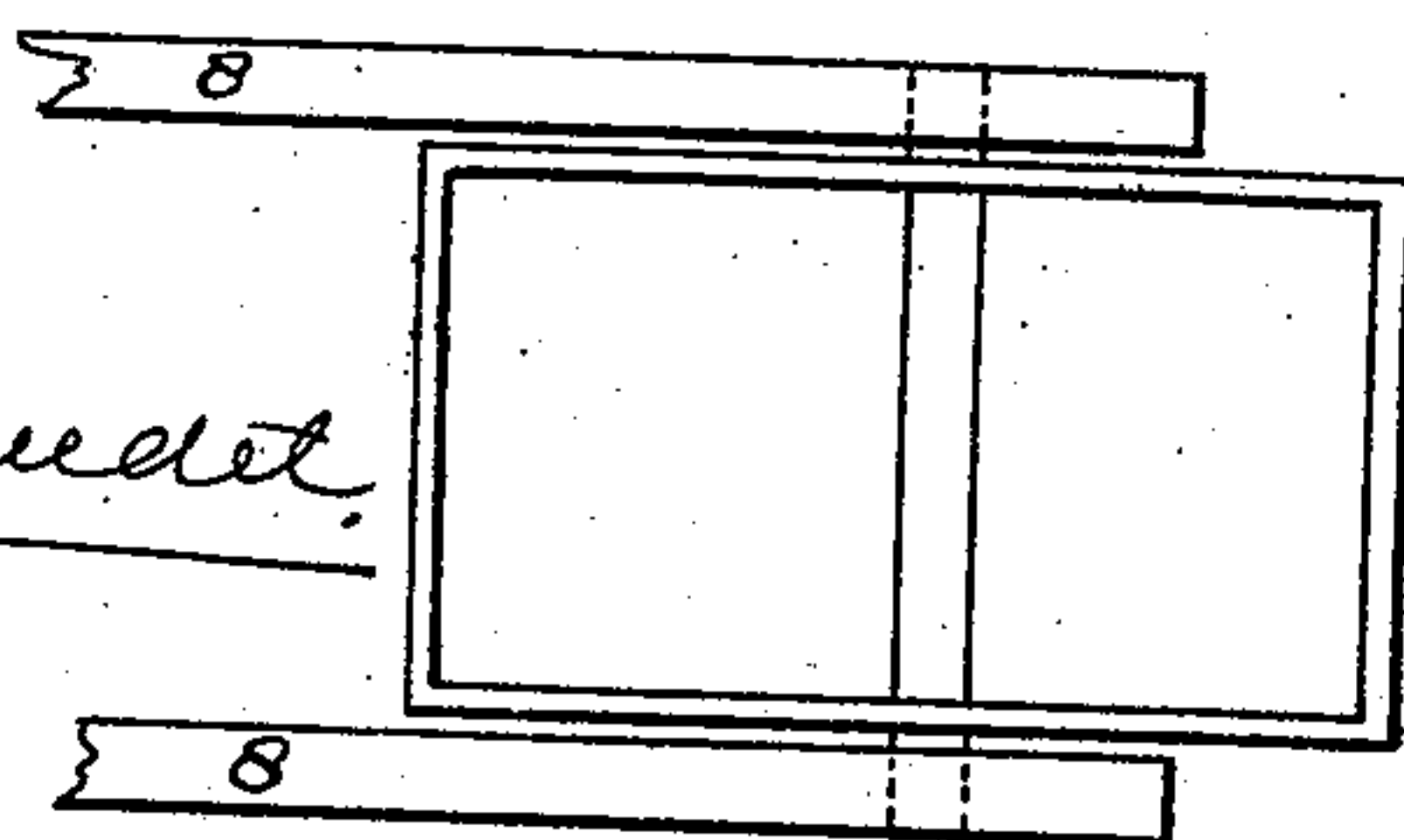
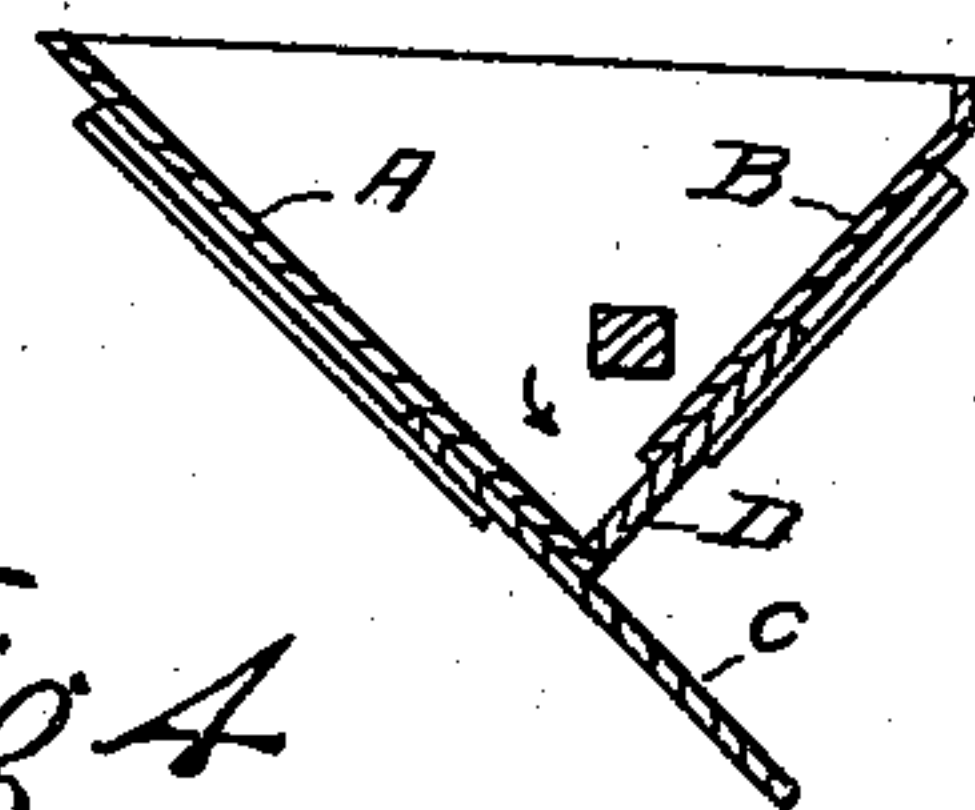


Fig. 3

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2 Sheets—Sheet 2.

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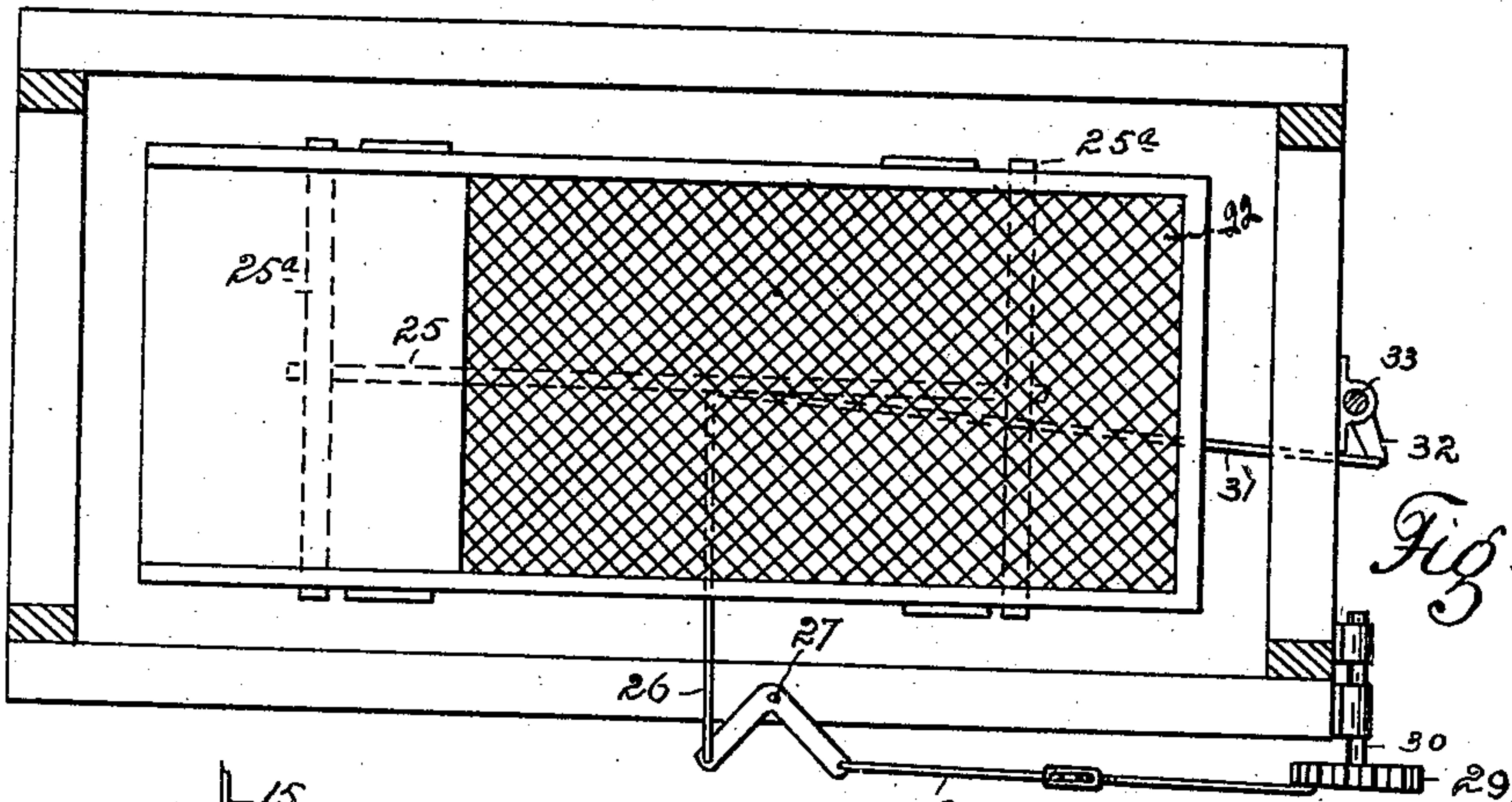


Fig. 5.

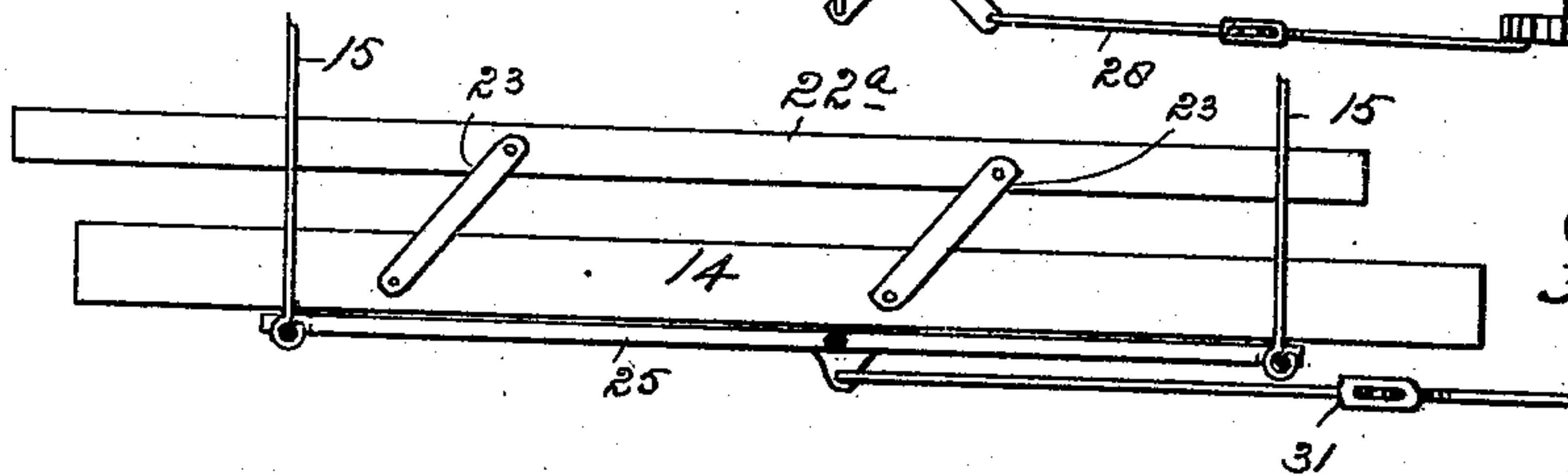


Fig. 6.

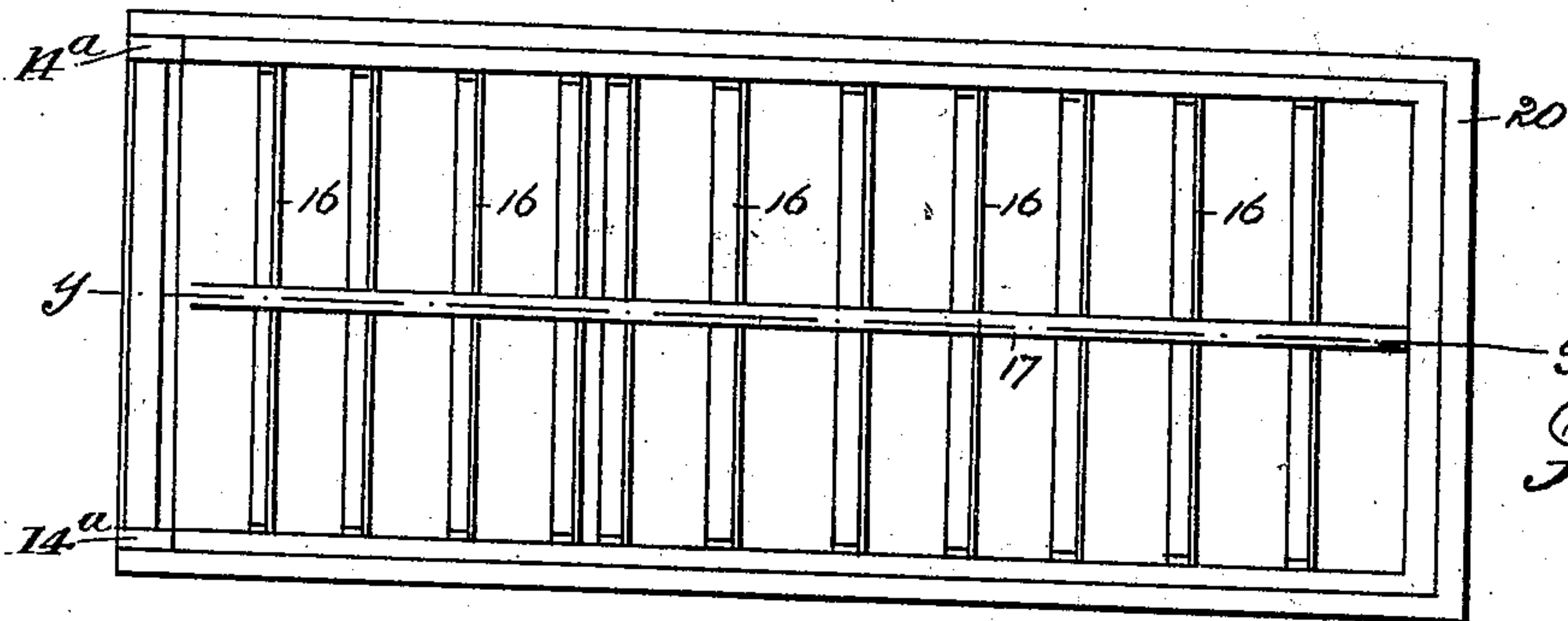


Fig. 7.

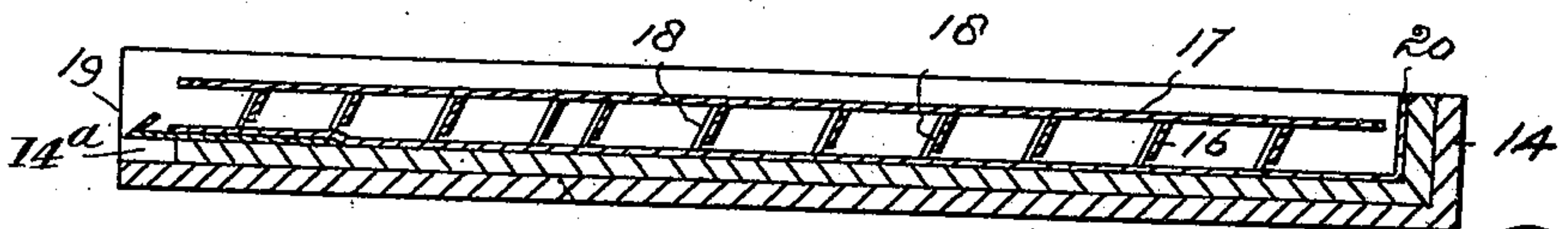


Fig. 8.

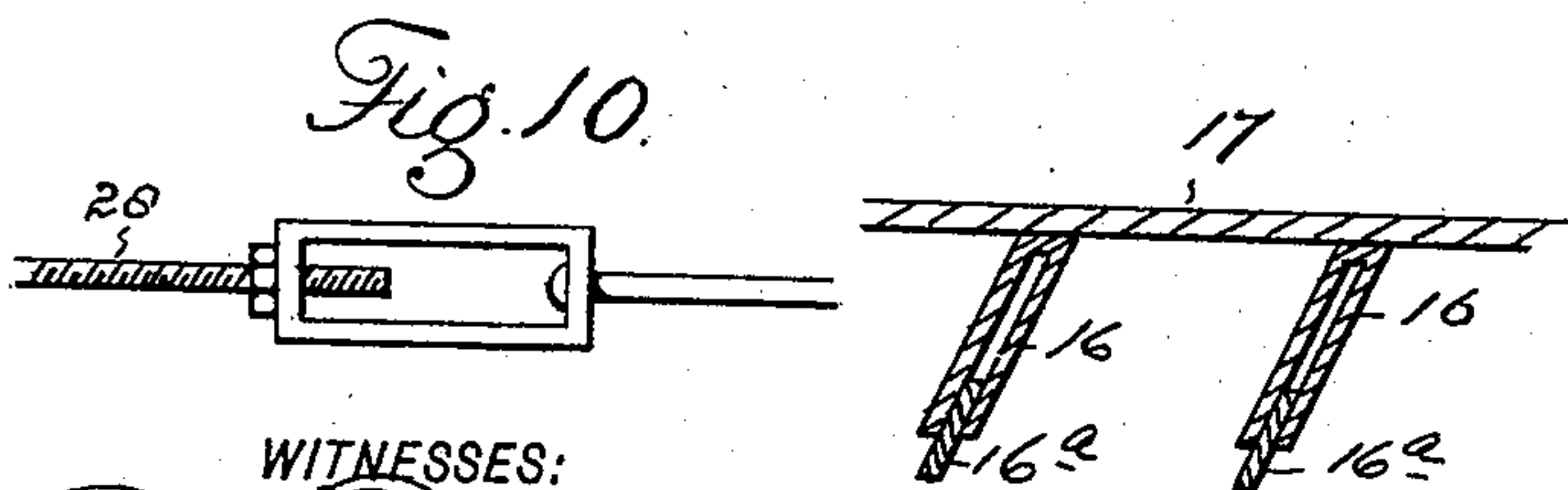


Fig. 9.

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UNITED STATES PATENT OFFICE.

JAMES J. FITZGERRELL, OF DENVER, COLORADO.

COMBINED ORE-SEPARATOR AND AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 501,879, dated July 18, 1893.

Application filed December 31, 1892. Serial No. 456,965. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. FITZGERRELL, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in a Combined Ore-Separator and Amalgamator; 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 letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in machines for separating free mineral, particularly gold, from the gangue with which it is naturally found mingled. In other words my improved machine is designed for use in placer mining and may be employed either with or without water. It is simple in construction, economical in cost, reliable, durable and efficient in use, and consists of the features, arrangements and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of the machine. Fig. 2 is a front end elevation thereof. Fig. 3 is a top or plan view of the hopper. Fig. 4 is a vertical section there-through. Fig. 5 is a plan view of the amalgamating pan and operating parts. In this view the frame is shown in section. Fig. 6 is a side elevation of the pan or box showing the screen frame partly raised. Fig. 7 is a top plan view of the box or pan with the screen removed. Fig. 8 is a longitudinal section taken there-through on the line *y-y*. Fig. 9 is a fragmentary section, the riffles being shown on a large scale. Fig. 10 is a detail view of the adjustable pitman.

Similar reference characters indicating corresponding parts or elements of the mechanism in the several views let the numeral 5 designate the vertical bars, 6 the longitudinal connecting bars, and 7 the transverse connecting bars of a suitable stationary frame.

Between the two longitudinal top bars 6 is pivoted a frame 8 as shown at 9. This frame

carries bolts 10 which enter curved slots 12 formed in bars 13 attached to the frame, which may be adjusted to any desired inclination, and held in position by tightening the nuts on these bolts.

From the adjustable frame 8 is suspended the box 14 by means of rods 15 which are so connected with the frame and with the box that the latter is permitted a free movement both longitudinally and laterally. This outer box receives an amalgamated copper pan 20 which carries a removable set of transverse riffles 16 connected by one or more suitable longitudinal strips 17. These riffles are fixed upon the strips 17, and are held in place by suitable stops 18 attached to the sides of the amalgamating pan. The riffles 16 carry yielding lips 16^a preferably composed of rubber and projecting a short distance below the extremities of the riffles proper.

The amalgamating pan always occupies a position of more or less inclination. Hence its extremity farther to the left in the drawings may be called its lower extremity which is closed by a removable slide 19 adapted to catch whatever of valuable material escapes from the riffles and the amalgamated copper plates of the pan. Slide 19 consists of a flanged plate received in an opening between the lining and body of the pan at its lower extremity. The flange is upwardly turned and forms a stop to the passage of material which passes under the riffles as before stated. The amalgamating pan 20 is readily detachable from the outer box 14 which is provided with suitable stops 14^a to support the pan in place.

The material to be treated is fed from a suitable hopper 21 to a screen 22 of any suitable mesh supported above the amalgamating and separating pan. The frame 22^a of this screen is connected with the outer box 14 by means of arms 23 pivoted at both extremities. These arms are of sufficient length to permit the raising of the screen far enough above the box to allow the removal, adjustment or regulation of either the riffle frame or the amalgamating pan. The hopper 21 is supported upon a cross bar carried by the frame 8. It has two inclined stationary sides A and B and two adjustable slides C and D. The function of slide D is to regulate

the quantity of material discharged through the feed passage between the inclined sides, while the use of slide C is to so regulate the point of feed upon the screen that it shall always fall upon the desired part of the screen regardless of the adjustment of the inclined frame and the amalgamating box.

To transverse strips 25^a made fast to the bottom of box 14 are secured the extremities of a longitudinal spring steel bar 25 to which is attached a rod 26 connected with one arm of a bell-crank lever 27, while an adjustable pitman 28 is attached to the other arm of said lever at one extremity and to a crank pinion 29 at the opposite extremity. This pinion is supported upon a spindle 30 journaled in the frame. Another adjustable pitman 31 is connected with bar 25 at one extremity and with a crank 32 carried by a vertical shaft or spindle 33 journaled in the transverse end bars of the frame. The function of the adjustable pitmen is to regulate the position of the box 14 with reference to the location of the hopper 21 and the adjustable frame 8, whereby the material passing from the hopper to the box may be made to fall farther to the front or to the rear as may be desired. The adjustment is effected by means of turn buckles, one of which is illustrated in Fig. 10. The box 14 is actuated through the medium of this mechanism from a shaft 34 journaled in the frame, carrying a gear wheel 35 at one extremity, a pulley 36 at the opposite extremity, and a bevel pinion 37 intermediately located. Motion is imparted to shaft 34 from a suitable crank connected with the shaft, or its equivalent, a handle 38 secured to the gear wheel 35 to one side of its center, or from any suitable motor by connecting the same with pulley 36 in any suitable manner. As the shaft 34 rotates the gear wheel 35 meshes with pinion 29 and imparts to box 14 a lateral movement through the medium of the pitman 28, bell crank lever 27, and connecting rod 26, while the bevel pinion 37 meshing with another suitable pinion 39 made fast to the upper extremity of the vertical shaft 33 transmits a longitudinal movement to the box through the medium of the crank 32 and the pitman 31. Hence these two motions, namely, the longitudinal and lateral simultaneously imparted to the box 14 subject the material in the amalgamating pan to that peculiar combination of movements employed in hand panning.

In practice I so construct the mechanism that the side or lateral movements are much quicker than the longitudinal movements, in the proportion of three to one. For instance, for each forward and reverse movement longitudinally or endwise there are three corresponding lateral or side movements, as the mechanism is now geared. Hence it may be said that for each rotation of the crank arm 32, the material in the pan is subjected to six gyrations or gyratory movements resembling in fact and in result the hand panning motions.

In the use of the machine, the material, if it is to be worked dry, is fed through the hopper to the screen after adjusting the frame 8 so as to give the amalgamating box the proper inclination. If water is to be used the pulp is fed from a sluice directly to the screen, which rejects the coarse worthless portion of the gangue, while the finer material, containing all the valuable portion passes through the screen into the amalgamating and separating box, where under the influence of the movements heretofore described the gold unites with and is caught by the mercury upon the plates, forming the lining of the pan, while the coarser portion either works under the yielding lips of the riffles or is caught thereby. In the latter case, the riffles are raised at intervals sufficient to allow the concentrates to fall to the lower extremity of the box where they are caught by the flanged plate 19 which may be removed and emptied into some suitable receptacle as often as desirable or necessary.

Having thus described my invention, what I claim is—

1. The combination with a suitable frame, of a movable box suspended thereon and lined with amalgamated copper plates and carrying a movable series of transverse riffles suitably connected, the box being provided with a screen through which the material is fed thereto, and which may be raised to permit the removal of the riffles, and means for imparting to the box, a suitable movement, substantially as described.

2. The combination with a suitable frame, of an amalgamated copper pan movably suspended thereon at a suitable inclination, a movable series of transverse riffles suitably connected together, and located in the pan, the riffles being provided with yielding lips slightly raised from the bottom of the pan, and mechanism for imparting to the pan the desired movement, substantially as described.

3. In a separator and amalgamator, the combination of a copper pan movably suspended on a suitable frame, and provided with a screen through which the material is fed thereto, and which may be raised to permit the removal of the riffles, a series of longitudinally connected transverse riffles located in said pan, and movable therein and removable therefrom, the lower extremity of the pan being provided with a removable flanged plate adapted to catch the gold and concentrates at the bottom, substantially as described.

4. The combination of a stationary frame, a pivoted frame supported thereon and adjustable by means of bolts passing through curved slots formed in the stationary frame, and an amalgamating pan movably suspended from the movable frame, carrying a movable series of connected transverse riffles and provided with a screen through which the material is fed to the pan, and which may be raised to permit the removal of the riffles, and

suitable means for simultaneously imparting to the pan, both lateral and longitudinal movements, substantially as described.

5 The combination of a stationary frame, a pivoted frame mounted thereon and adjustable by means of bolts in one part engaging slots formed in the other part, a box suspended from the pivoted frame, and an amalgamating pan located in said box, a series of
10 removable transverse riffles, carried by the pan, the box being provided with a screen which may be raised to permit the removal of the riffles, and means for imparting to the box, a suitable movement, substantially as
15 described.

6. The combination with the stationary frame, of an amalgamating pan movably suspended thereon and carrying a movable connected series of transverse riffles, the pan being
20 provided with a screen through which the material is fed thereto, and which may be raised to permit the removal of the riffles, and means for simultaneously imparting to the pan, both longitudinal and lateral movement,

said means consisting of two adjustable pitmen, each connected with the pan at one extremity and with suitable actuating mechanism at the opposite extremity, substantially as described.

7. The combination of a stationary frame, a pivoted frame supported thereon, a box movably suspended from the pivoted frame and adapted to receive a separating pan, said box being provided with a longitudinal bar composed of spring steel, said bar being attached at its extremities to transverse strips
35 but intermediately detached, and means connected with the steel bar for simultaneously imparting to the box both lateral and longitudinal movements, substantially as described.
40

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

JAMES J. FITZGERRELL.

Witnesses:

WM. McCONNELL,
J. O. A. CARPER.