

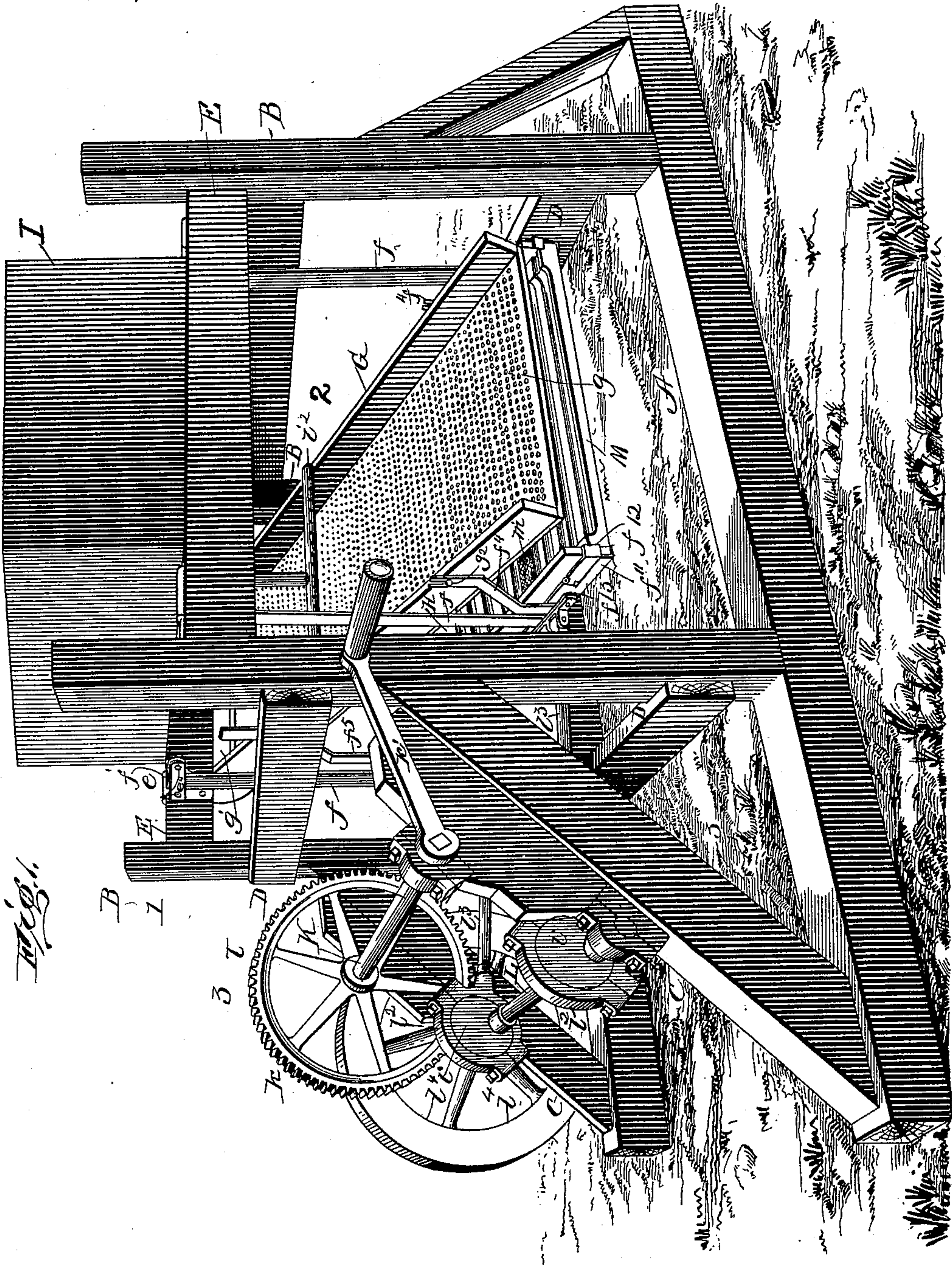
(No Model.)

3 Sheets—Sheet 1.

W. F. MITCHELL.
ORE WASHING MACHINE.

No. 583,602.

Patented June 1, 1897.



Witnesses
Marion Fowler
Giles P. Moore

Inventor
William F. Mitchell
by *C. A. Sturtevant*
his Attorney

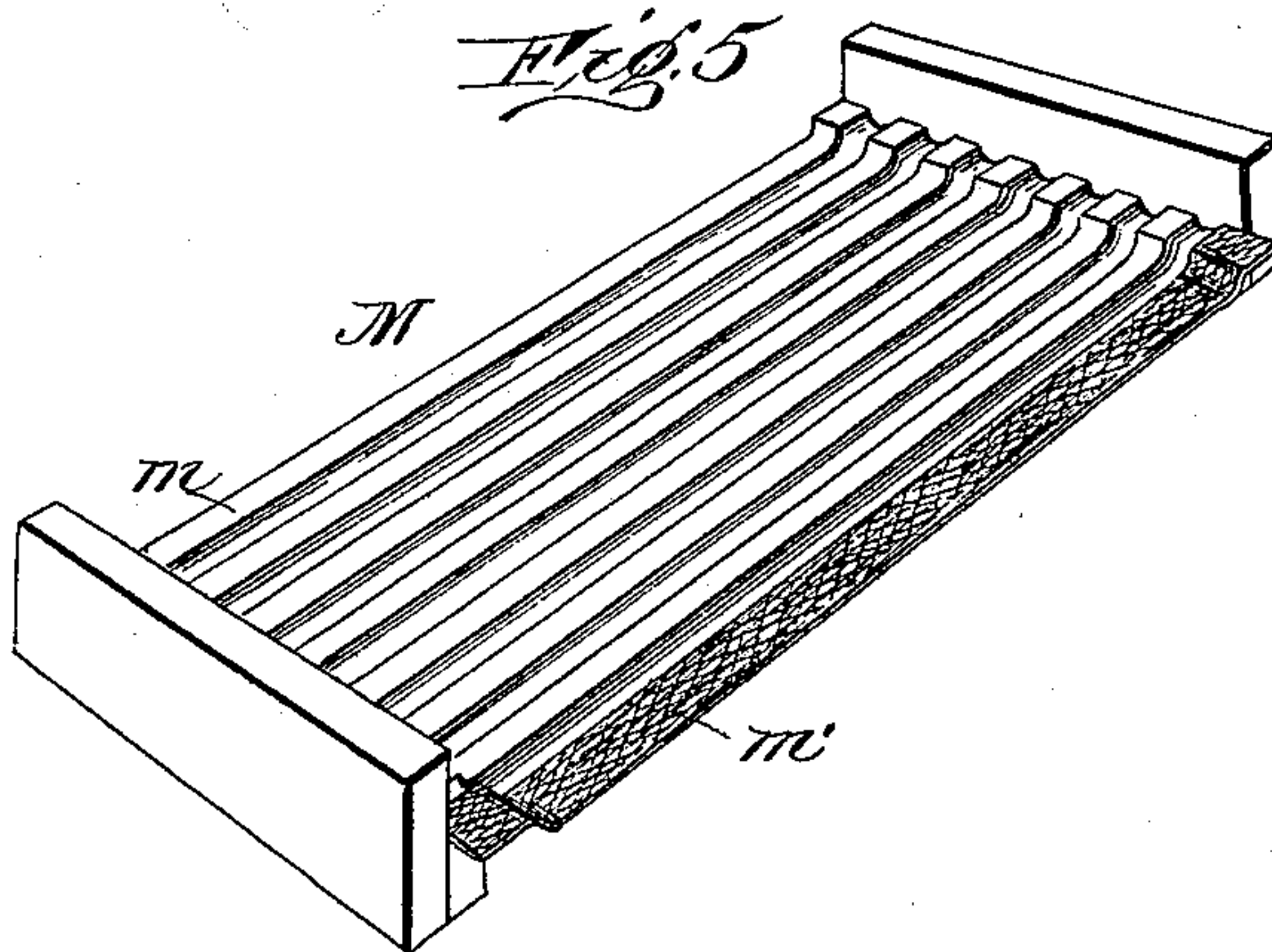
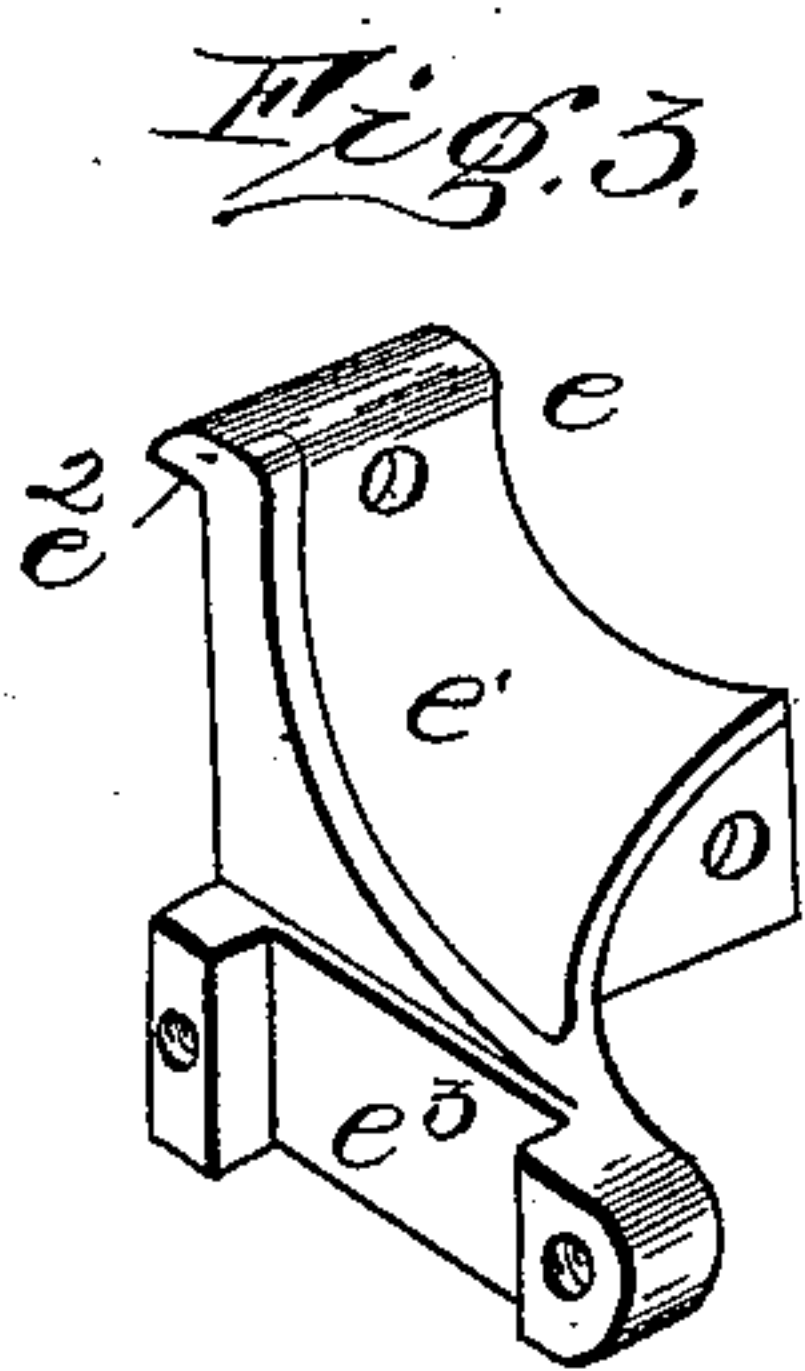
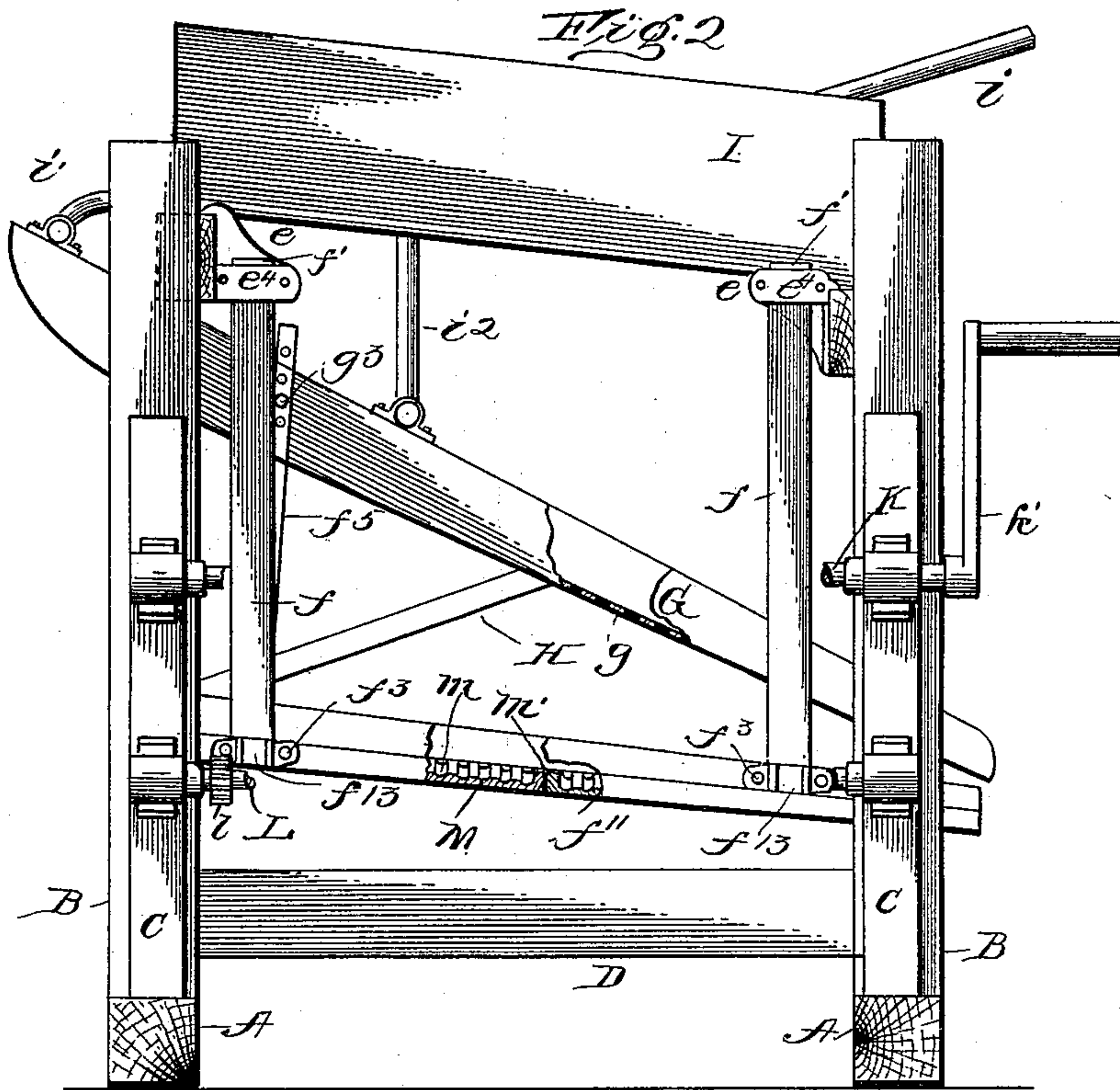
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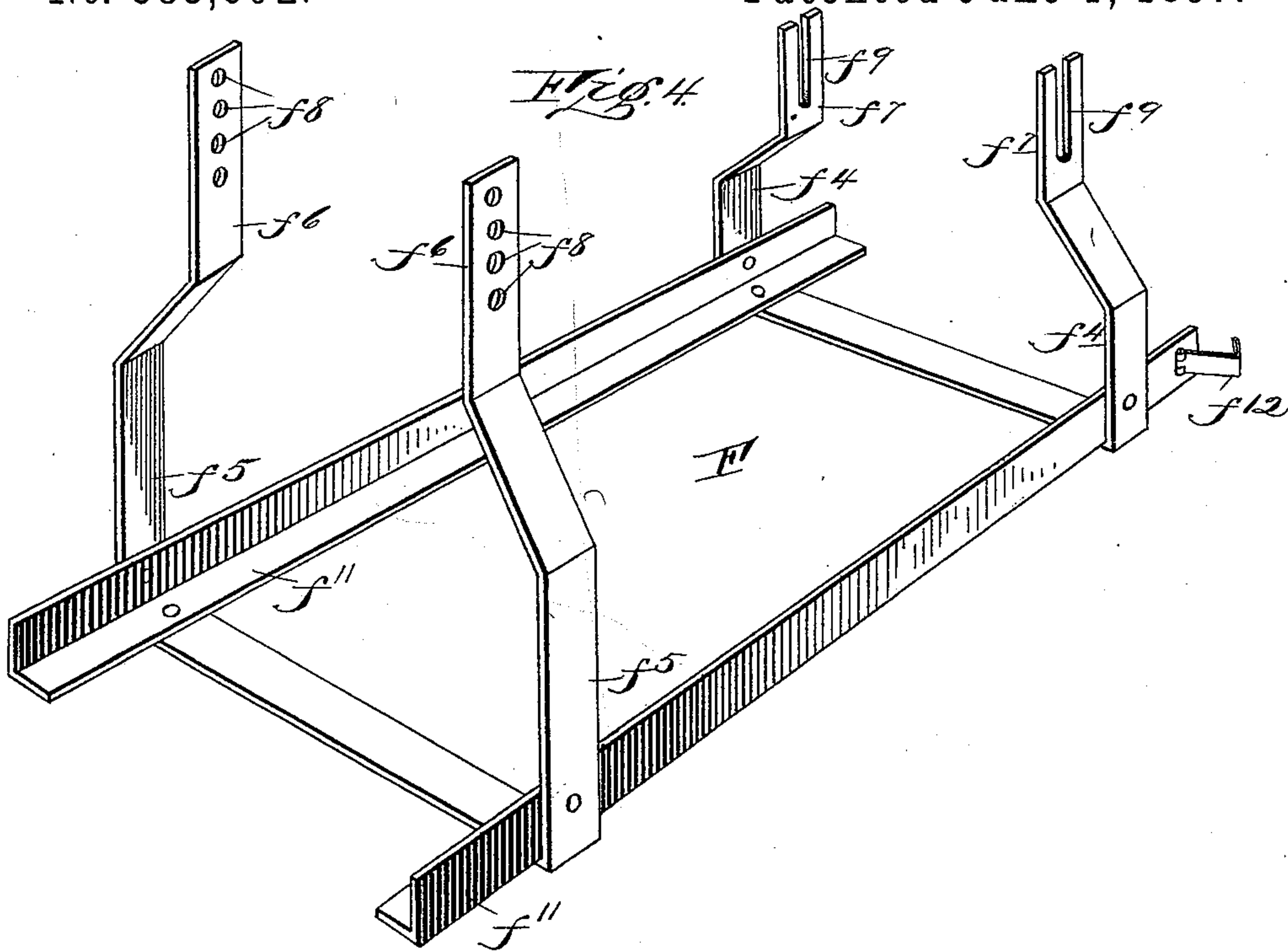


Fig. 6.

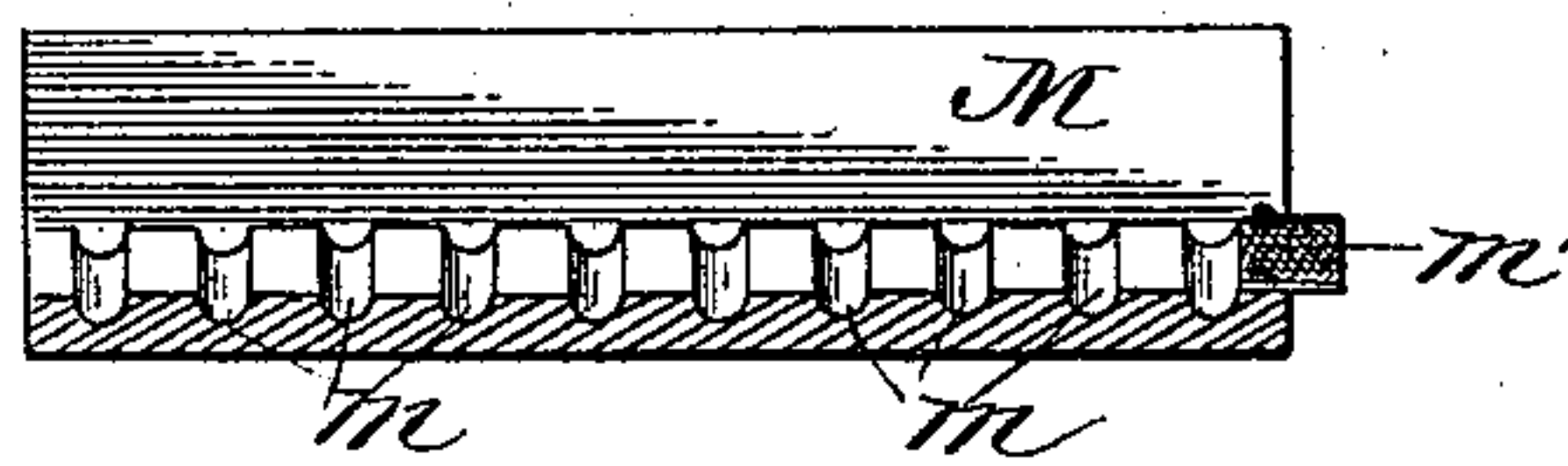
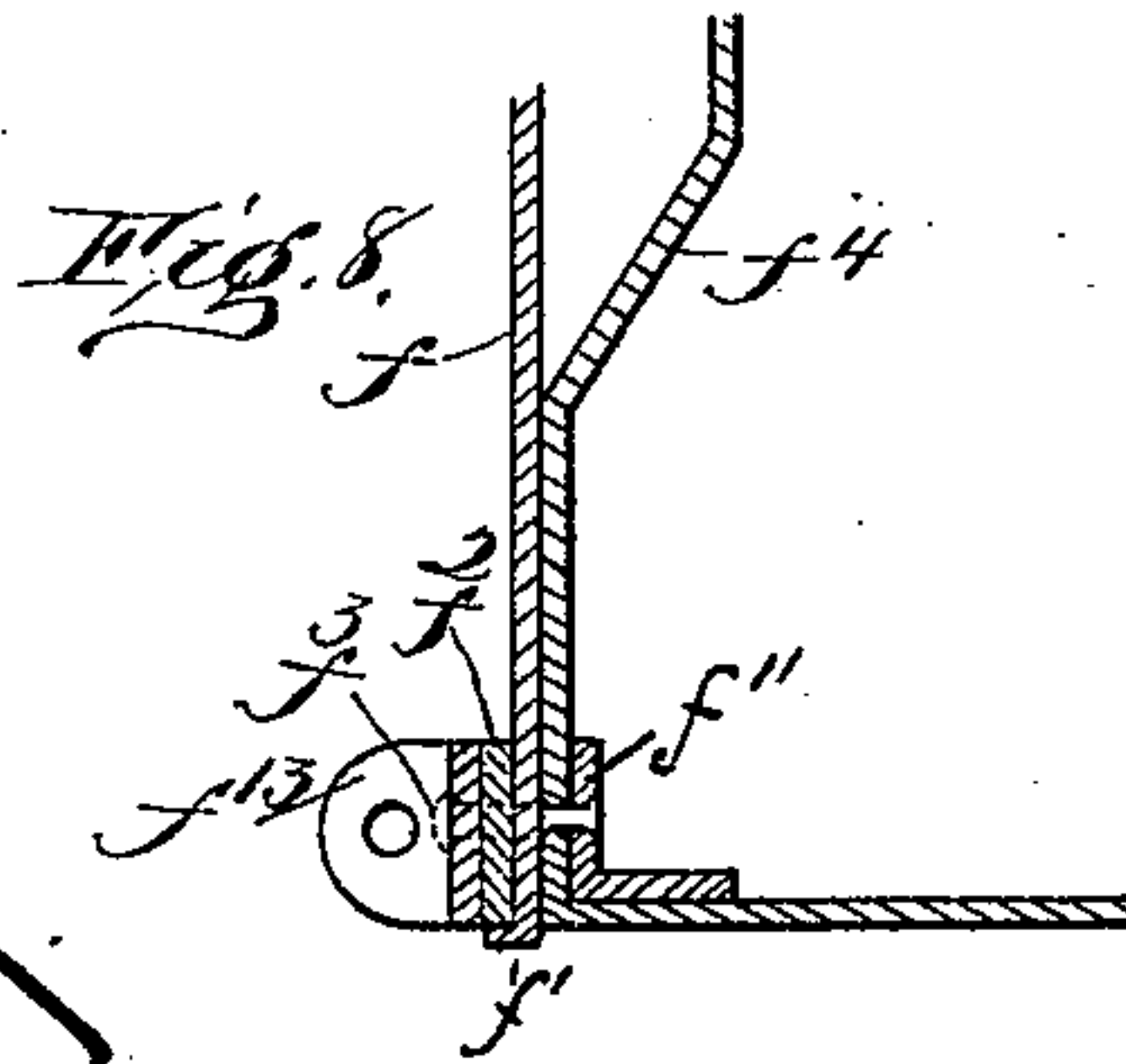
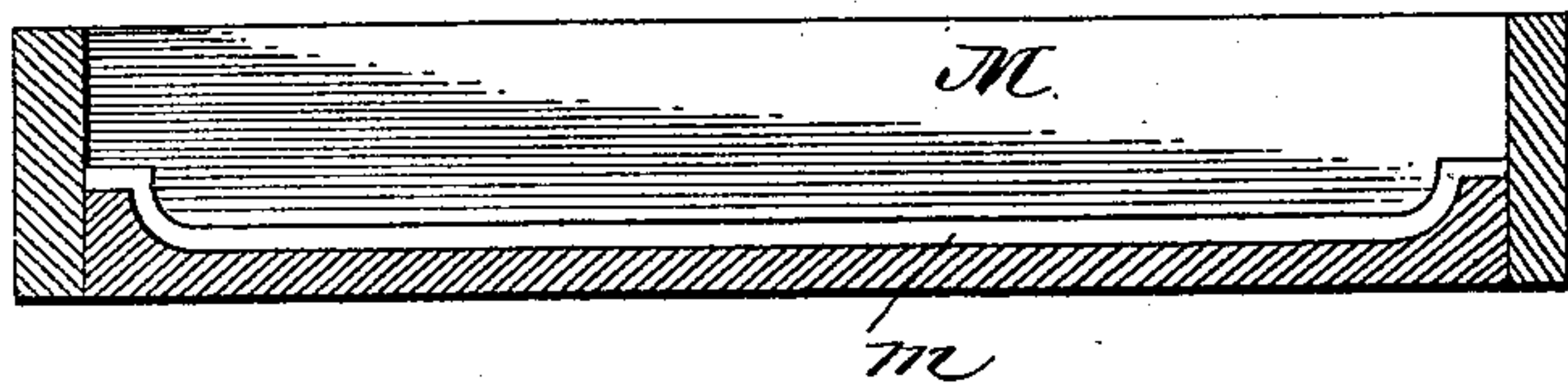


Fig. 7.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM F. MITCHELL, OF SALT LAKE CITY, UTAH.

ORE-WASHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 583,602, dated June 1, 1897.

Application filed June 30, 1896. Serial No. 597,639. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. MITCHELL, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake, State of Utah, have invented certain new and useful Improvements in Ore-Washing Machines, of which the following is a description, reference being had to the accompanying drawings and to the letters and figures of reference marked thereon.

My invention relates to machines for washing ore, and more particularly to machines for saving gold from gangue by means of amalgamation.

My object is to provide a simple and inexpensive construction in which the ore-bearing dirt is brought many times in contact with the amalgamating material, said material being held in such a way that its flow out of the machine is prevented, whereby the fine or flour gold is given every opportunity to fully settle and not be carried off.

A further object is to so construct the members by which the amalgamating agent is held that they can be readily removed and freed of the gold deposit.

To these ends the invention resides, first, in the construction of the machine generally, and, secondly, in the construction of the members in which the amalgamation proper takes place.

In the accompanying drawings, Figure 1 is a perspective view of the machine. Fig. 2 is a side elevation with the actuating mechanism and one of the side tie-beams removed. Fig. 3 is a detail of one of the brackets in which are held the supports for the riffle-frame. Fig. 4 is a perspective of the riffle-frame. Fig. 5 is a perspective of one of the riffle-boxes. Fig. 6 is a cross-section of one of said boxes. Fig. 7 is a longitudinal section showing the construction of the riffles, and Fig. 8 is a sectional detail showing the attachment of the hanger-strips to the riffle-frame.

Referring now more particularly to the drawings with the view of describing the present machine generally, 1 represents the frame, 2 the members for acting upon the gangue, and 3 the actuating mechanism for imparting the necessary motion to the mem-

bers comprising the working portion of the machine.

The frame may be of any suitable structure and in the form shown comprises sills A, upon which are supported uprights B, said members being held firmly together by oblique braces C and side and end tie-beams D and E, respectively.

The members for acting upon the gangue (above referred to as group 2) are next to be considered. The riffle-frame F, holding the riffle-boxes, is hung from the end tie-beams E in such a manner that it can be oscillated laterally, while above these riffle-boxes is obliquely supported a frame G, projecting over the riffle-frame at each end. The body of this frame over the riffle-frame supports a sieve *g*, while its upper end is provided with a hopper *g'*, the lower end of the frame being left open. An inclined table H leads from the screen-frame to the head of the riffle-frame and is secured to said frames.

Supported upon the tie-beams E is a reservoir I, adapted to receive water to be used in the action of the machine upon the gangue, this water being supplied by any suitable means, as the pipe *i*, and being distributed by the pipes *i'* *i''*, the former discharging over the hopper *g'* and the latter at a convenient point over the screen *g*. Thus, the gangue or other material to be operated upon being placed in the hopper, it is suitably sprayed, and, an oscillating motion being imparted to the riffle-frame or one of the parts supported thereby, the material is fed down the screen, being again sprayed in its course. The larger particles empty from the tail of the screen-frame, while the finer particles containing the ore and the flour gold sift through the screen and are fed along the table to the riffle-frame. Here they pass over the riffles containing quicksilver or other amalgamating agent, and the amalgam is deposited in the riffles, the waste material falling from the tail of the riffle-frame.

Manifestly any suitable mechanism can be used for giving to the apparatus its oscillating movement, but I prefer to employ that herein illustrated, which is most conveniently supported upon the braces C at one side of the frame. In this construction a shaft K

extends across the braces, being supported in suitable journals, while below it is a counter-shaft L. At one end of the shaft K is a gear-wheel k , which meshes with a corresponding gear-wheel l upon the counter-shaft, the wheels being proportioned as may be desired. Eccentrics l' upon the counter-shaft bear collars l^2 , provided with threaded openings or other suitable means for connection with links l^3 , which links engage brackets f^{13} upon the riffle-frame. The usual balance-wheel l^4 is placed upon the counter-shaft outside of the brace C, and motion is, in the present instance, imparted by the crank k' .

Returning now to consider the details of construction, the brackets e upon the tie-beams E for the attachment of the strips f , by which the riffle-frame is hung, have each a body portion e' , provided at its top with lugs e^2 , which rest upon the upper edge of the beam E, while in the said body portion is provided a slot e^3 , adapted to receive the hanging strip f and extending at right angles to the back of the bracket adapted to lie against the beam. A plate e^4 fits over the slot when the strip f is in place and retains it in position. The strips f are of flexible material, such as spring-steel not hardened or tempered, and are provided at their ends with angle portions f' , which fit over the brackets e and under the riffle-frame F. The attachment of these strips to the brackets has been above described. They are held to the frame by plates f^2 , clamped over them by means of bolts f^3 , passing outside of the edges of the strips.

The sieve-frame G is, in the present instance, supported upon the riffle-frame by members $f^4 f^5$, of generally U-shaped form. The base of each of these members passes under the riffle-frame, and the members are firmly bolted or otherwise secured to the frame. The upright arms f^6 and f^7 thus serve to support, respectively, the upper and lower ends of the sieve-frame. In the arms f^7 slots f^9 are provided for the reception of headed lugs g^2 upon the sieve-frame, but in the arms f^6 a series of openings f^8 is provided, whereby the bolts g^3 , which secure the upper end of the frame to the uprights, can be placed in any suitable opening, and the inclination of the sieve thereby varied.

Some attention should be given to the construction of the riffle-frame F and its riffle-boxes M. This frame is formed by the members $f^4 f^5$, having at each of their lower inner corners angle-plates f^{11} , thus forming a frame into which the riffle-boxes M are pushed, the boxes being retained in position by means of a catch f^{12} upon the lower portion of the frame. As here shown, this catch is simply an angle-iron pivoted upon the sides of the angle-plates and having its angular portion projecting inwardly to rest against the end of the lowest riffle-box.

Each riffle-box M is provided with a series

of riffles m , extending transversely thereof, the sides of the boxes being raised to prevent waste of quicksilver at the time of change of motion of the frame, while in order to prevent the material being acted upon from flowing between the meeting edges of boxes during its passage down the riffle-frame a strip of canvas or other suitable material m' is attached to an edge of each box to extend over upon its neighboring box, and thus cover any crack that may be between the boxes.

The construction of the present machine thus being apparent, it will be seen that several advantages are thereby secured.

The entire machine is small and is simple in its construction and operation, while the shafts K and L, journaled upon the braces C, tend to bind together the two parts of the frame. In addition to this all of the working parts can be readily removed for cleaning or repair, and the sieve and riffle-frames can be readily adjusted, the former by means of the openings f^8 and the latter by reason of the bracket connection between the tie-beams E and the strips f , the plates e^4 clamping said strips at any desired height and the angular projections on the ends of the strips making it impossible for said strips to fall.

Another feature of the present construction lies in the formation of the riffle-frame from the angle-plates f^{11} and the members $f^4 f^5$, as in this way material is economized and the few parts used are placed to the best advantage.

In the use of the riffle-boxes another advantage is secured. Instead of having a single riffle-plate the present machine provides a series of removable riffle-boxes, each having several riffles, these boxes being slid into the riffle-frame and locked thereon by the catch f^{12} . Thus when one set of boxes have become filled with deposit said set is removed and another set substituted, the action of the machine being continued with the new boxes while those just taken from the frame are being cleaned.

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

1. An ore-washing machine, comprising a main frame, an inclined riffle-frame suspended by hangers within the main frame to vibrate at right angles to its length, and formed of parallel angle-bars and having inwardly-projecting riffle catches or retainers at their lower ends, a series of riffle-boxes mounted at their ends on said angle-bars and held in place against downward movement by said catches or retainers, to permit the removal of the lowermost riffle-box and the insertion of a clean riffle-box between the upper ends of said bars, and mechanism for operating said riffle-frame, substantially as set forth.

2. An ore-washing machine, comprising a main frame, pairs of hangers depending within the frame, parallel inclined angle-bars

mounted on said hangers, riffle-boxes mounted on said bars, upper and lower upright arms carried by the angle-bars; the upper arms having a series of perforations and the lower arms being forked or slotted at their upper ends, an inclined sieve or screen having side pins or studs at its lower portion mounted in said slots or forks and provided with bolts or screws extending through any of said perforations to adjust its upper end properly, an apron or table leading from the screen to the upper end of the riffle, and mechanism for vibrating the riffle and screen at right angles to the length thereof, substantially as set forth.

3. An ore-washing machine, comprising the main frame, an inclined riffle-frame suspended by hangers therein and provided with a series of riffle-boxes, the upper arms screwed at their lower ends to opposite sides of the riffle-frame and provided with a series of perforations, the lower shorter arms secured at their lower ends to the riffle-frame and having slotted upper ends, the screen or sieve having side pins or studs near its lower end mounted in said slots and provided with screws near its upper end passed through any of said perforations, a table or apron between the screen and riffles to conduct the screened material to the upper end of the riffle, and mechanism for vibrating the riffle-frame, substantially as described.

4. In an ore-washing machine, a riffle-frame and sieve comprising the parallel angle-bars to support the riffle-boxes, the U-shaped screen or sieve supports connecting the said angle-bars and having their arms projecting thereabove; the upper longer arms being perforated and the lower shorter arms being slotted, and upper and lower pairs of hangers

secured at their lower ends to the said angle-bars, substantially as described.

5. In an ore-washing machine, a riffle-frame and sieve or screen support comprising parallel angle-bars to support the riffles, the U-shaped screen-supports connecting the upper and lower ends of said bars with their arms projecting upwardly; the upper arms being perforated and the lower arms slotted to receive the screw-bolts and pins respectively, the upper and lower spring-hangers secured at their lower ends to said angle-bars and the brackets having recesses to receive the upper ends of said hangers and provided with clamping-plates to hold them in said recesses, substantially as set forth.

6. An ore-washing machine, consisting in the main frame, the spring-hangers, the inclined parallel angle-bars secured to the lower ends of said hangers, the removable abutting riffle-boxes mounted upon the said angle-bars and provided with flexible flaps closing the joints or spaces at their abutting ends, catches for holding the boxes against downward displacement, arms projecting up from the upper and lower ends of the angle-bars, a sieve or screen mounted adjustably on the upper ends of said arms and carried thereby, a water-supply for the screen and an operating mechanism mounted on the main frame and connected to one of the angle-irons to vibrate the riffles and screens at right angles to their length, substantially as described.

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

WILLIAM F. MITCHELL.

Witnesses:

GERTRUDE E. CORKER,
SAMUEL F. WALKER.