

(No Model.)

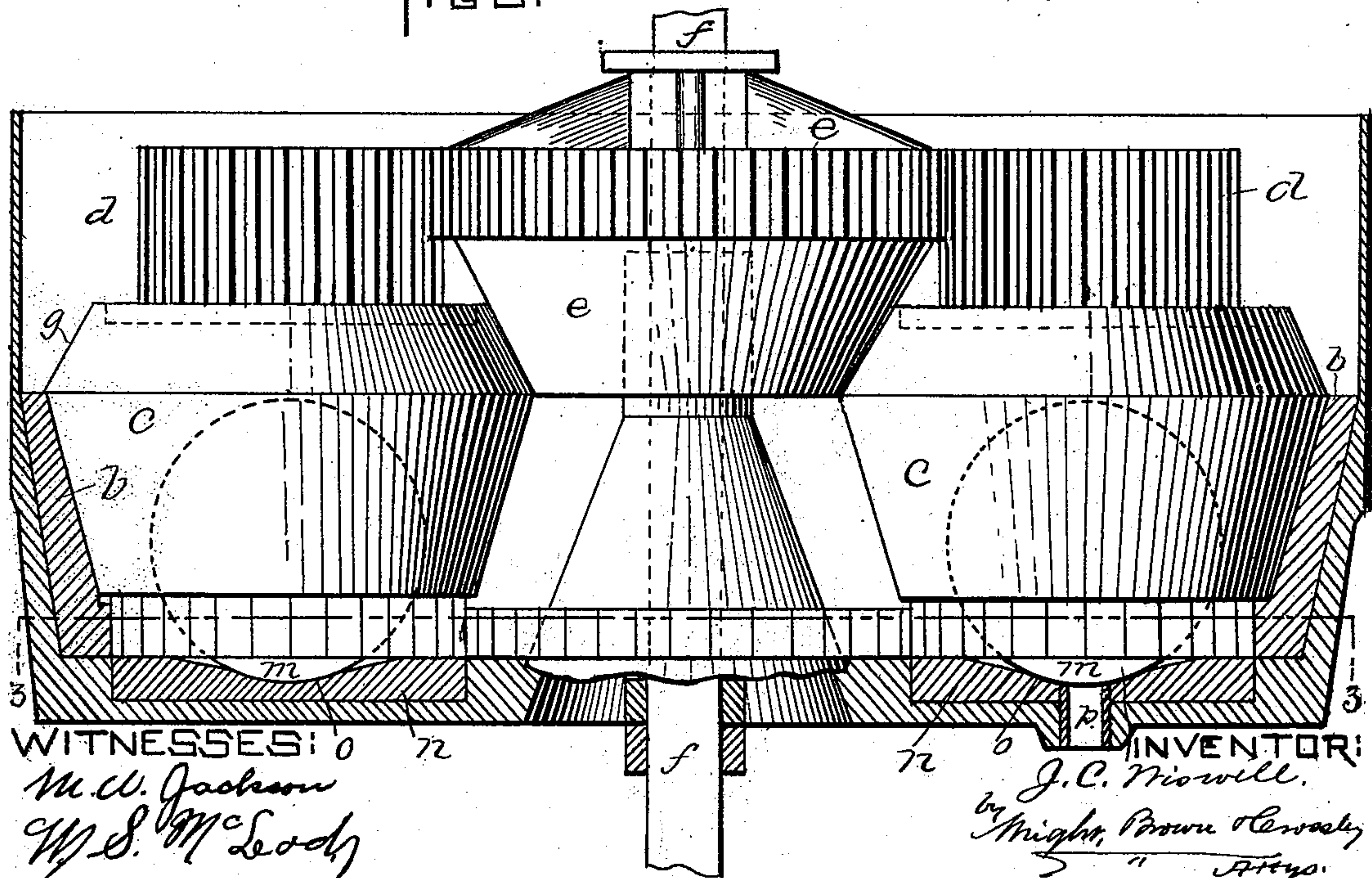
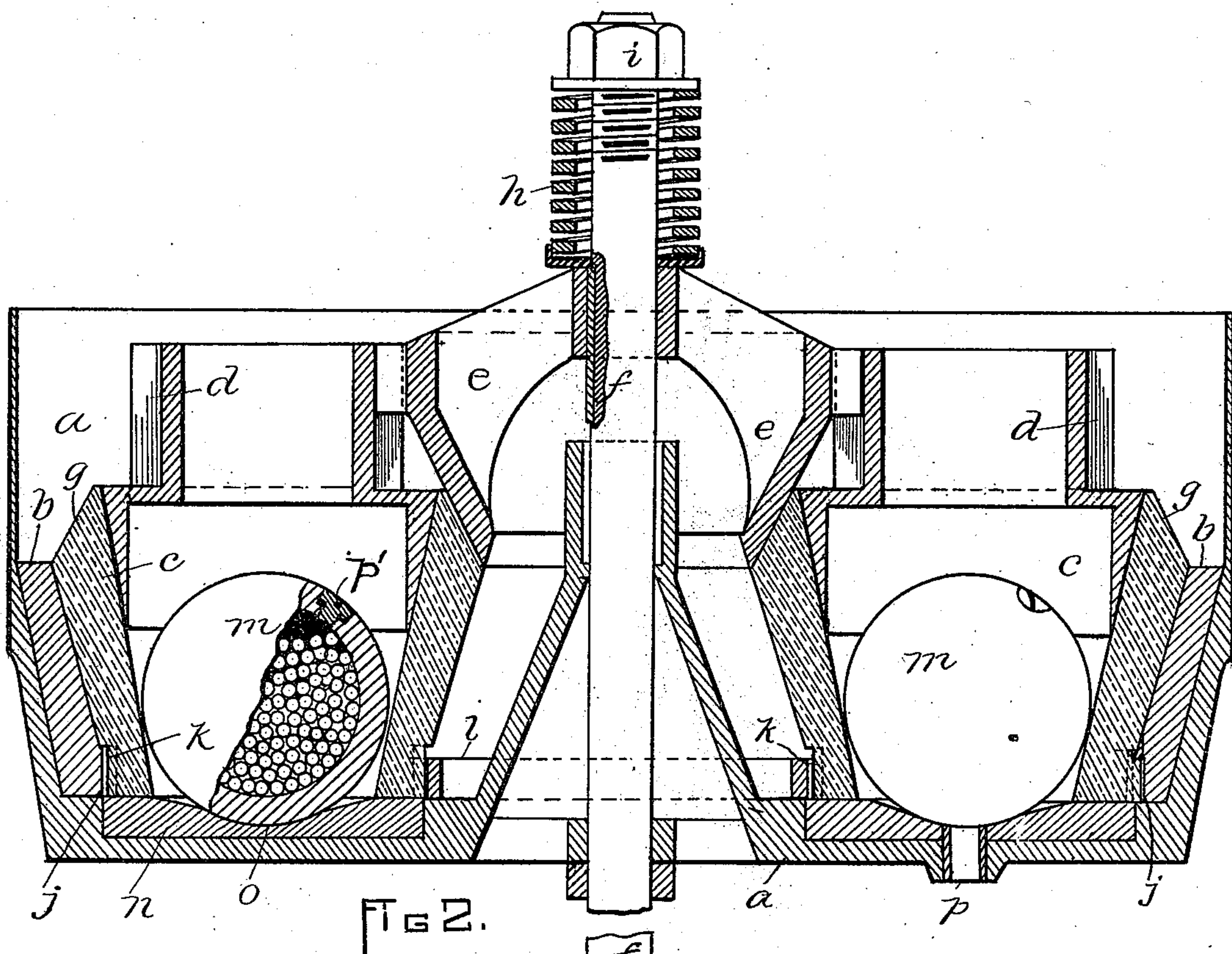
2 Sheets—Sheet 1.

J. C. WISWELL.  
AMALGAMATING MACHINE.

No. 504,508.

Patented Sept. 5, 1893.

FIG. 1.



WITNESSES:  
M. W. Jackson  
W. S. McLeod

INVENTOR:  
J. C. Wiswell.  
by Wright, Brown & Co.,  
Attys.



(No Model.)

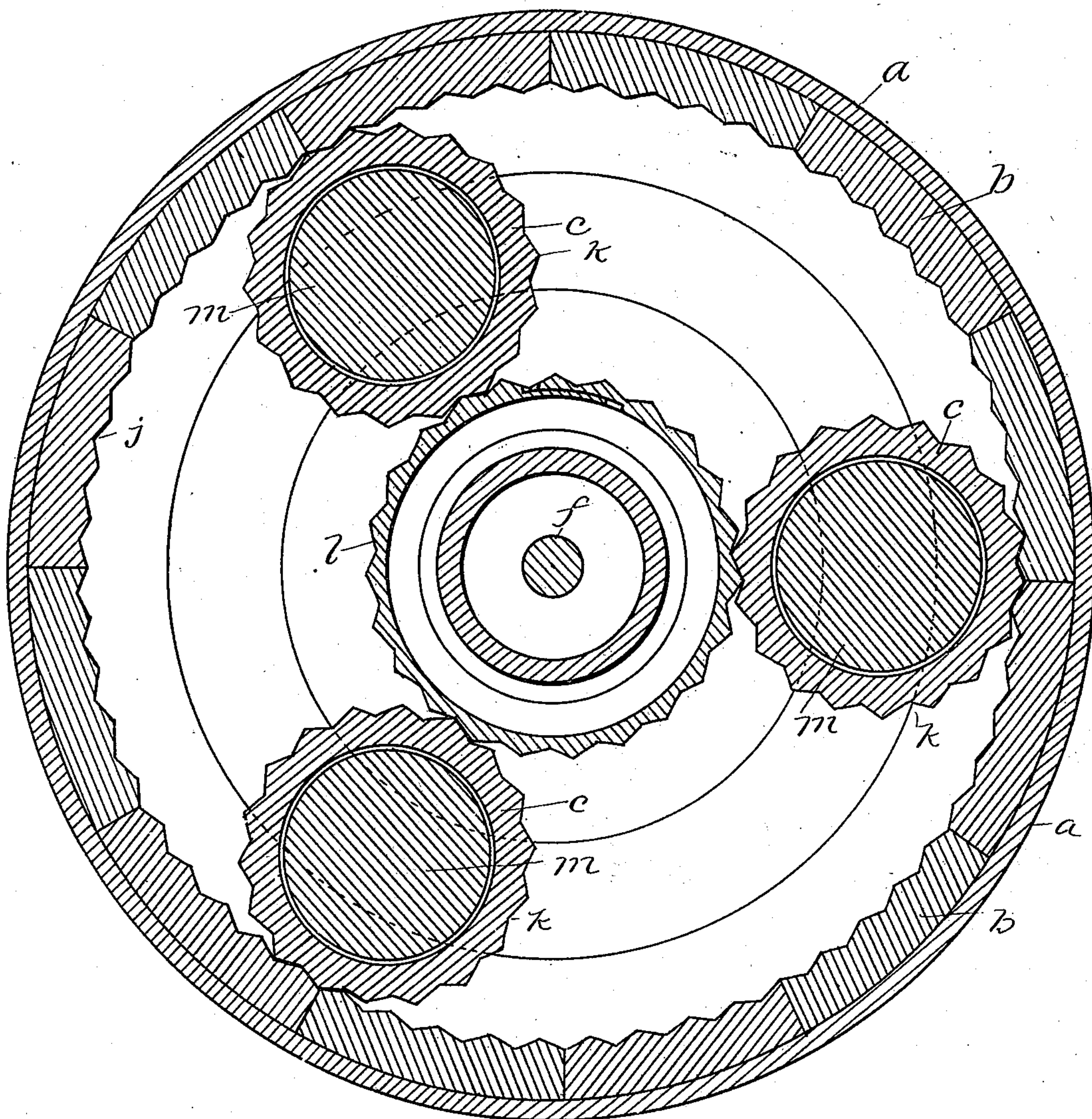
2 Sheets—Sheet 2.

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FIG. 3.



WITNESSES:

*W. W. Jackson*  
*W. S. McLeod*

INVENTOR:

*J. C. Wiswell.*  
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# UNITED STATES PATENT OFFICE.

JACOB CHARLES WISWELL, OF MEDFORD, ASSIGNOR TO CHARLES P. GORELY, OF BOSTON, MASSACHUSETTS.

## AMALGAMATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 504,508, dated September 5, 1893.

Application filed October 14, 1892. Serial No. 448,852. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB CHARLES WISWELL, of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Amalgamating-Machines, of which the following is a specification.

It is the object of my invention to provide such improvements in amalgamating machines as will effect the reduction to a very fine condition of all particles of minerals and the gangues in which they occur in nature without cutting or flouing the mercury, and allow of the latter being drawn out of the pan when desired without stopping the machine; and also to provide a machine which will be easy of operation, durable to a maximum degree and thoroughly efficient in every particular.

My invention consists of the improvements which I will now proceed to describe and claim, reference being had to the annexed drawings, and letters of reference marked thereon, forming a part of this specification.

Of the said drawings: Figure 1, is a vertical central sectional view of my improved amalgamator, showing a part of one of the balls broken out to illustrate one of the forms of their construction. Fig. 2, is a sectional view through the pan, showing the frusto-conical shells, and means for operating the same, in elevation. Fig. 3, is a horizontal sectional view taken on the line 3—3 of Fig. 2.

In the drawings: *a* designates the circular pan or bed, provided at its sides with removable metallic wearing plates *b*, which are arranged in an inclined manner.

*c* designates shells of frusto-conical form arranged upon the said bed; the shape of the said shells is such as to make them conform to the inclined wearing plates *b* formed in the sides of the pan. The said shells are provided upon their upper ends with elongated cogs or pinions *d*, which are adapted to be engaged by a pinion *e*, splined upon the central rotating shaft *f*, so as that it may be turned with said shaft and at the same time have a limited vertical motion thereon. The upper edges of the cones *c* are beveled as at *g*, and the lower portion of the pinion *e* is likewise beveled and arranged to bear upon the beveled surface *g* of the cones.

*h* designates a spiral spring surrounding the shaft *f* and bearing upon its lower end upon the pinion *e*, and resting at its upper end against a washer arranged upon the shaft *f* below the nut *i*. With this construction and arrangement of parts, it will be seen that as the shaft *f* is rotated it will rotate the cones *d* through the medium of the pinion *e*, and the spring *h* will serve with the weight of the pinion *e* to press the latter down upon the cones with the effect of imparting a lateral thrust or pressure upon the cones so as to cause them to bear against the plates *b* as they are rotated.

The plates *b* may be provided at their lower ends with cogs or notches *j*, and the cones may be provided with corresponding cogs or notches *k* at their lower ends, so as that when the said cones are revolved in the pan around the shaft *f*, they will be at the same time rotated upon their own axes. Instead however, of providing the lower ends of the plates with cogs or notches *j*, they may be made with plain surfaces throughout as shown in Fig. 4, and the cogged or notched part *j* may be made separate from the plates *b* if a cogged feature should be used at this point at all. In the present instance, the said cones will be caused to rotate three times upon their axes while making a single revolution around the pan.

*l* designates an expansible steel ring arranged in the bottom of the pan and notched on its outer surface in a manner corresponding to the notches formed on the lower ends of the cones *c*, this device being for the purpose of holding the lower ends of the cylinders in contact with the plates *b*. The ring *l* is a split steel ring and is contracted when placed in position, so that by its tendency to expand it will exert a pressure against the cones.

*m* designates a ball which is arranged in the cones as shown, so as to rest at its bottom upon the bed plate *n* of the pan, said bed plate being removable and provided with a round groove *o* corresponding in form to the surface of the ball where it rests upon the plate, and where most of the amalgamating is performed. As the cones are revolved in the bed the balls therein will be caused to rotate, thus assisting in effecting the pulverization of the ore in the bed. As shown in Fig. 1, the balls may be made hollow, and provided with a remov-



able plug  $p'$  so that they may be adjustably weighted.

$p$  designates an aperture formed in the bottom of the pan in the path of travel of the balls  $m$  through which the pulp may be discharged and through which the amalgam may be drawn off if desired while the machine is in motion. Proper means may be provided at any suitable point in the machine for discharging the pulp from the pan. The aperture  $p$  has been shown as open in the drawings, but it will of course be closed during the operation of the machine. The pulp will be drawn off through this aperture only when the machine is to be taken out of use. During the operation of the machine the pulp will discharge from a point above.

By making the plates  $b$  and  $n$  removable, as has been described, they can readily be taken out and replaced for the purpose of renewal or repair.

By rotating the crushing cones upon their axes, as well as revolving them around a common center in the pan, and at the same time providing the balls in the cones which travel upon the bottom of the pan as the cones are revolving, I am enabled to bring all of the particles of mineral matter to a thin and very fine condition, and to accomplish this end much more expeditiously and economically than by any means now known to me. By reason of the fact that all the surfaces which act on the ore in the operation of the machine are smooth and plain, cutting or flouing of the mercury is avoided.

The beveling of the upper edges of the cones, and providing the pinion  $e$  with a beveled surface, as described, and arranging it to bear upon the beveled surface of the cones whereby a lateral thrust or pressure is imparted to the cones, is an important feature of my invention, as are also the construction and arrangement of parts whereby the motion hereinbefore described is imparted to the cones.

By means of the nut  $i$ , I am able to adjust the tension of the spring  $h$  so as to cause it to bear with greater or less force upon the pinion  $e$  in order to hold the cones down upon the bed and impart the before described lateral thrust thereto, so as to cause them to bear against the plates  $b$ .

Having thus described my invention, what I claim is—

1. An amalgamating machine comprising in its construction a circular bed, a plurality of cones arranged upon said bed, and having plain exterior surfaces to bear against the sides of the bed, and a rotary pinion adapted to engage said cones above the plain surfaces, as set forth.

2. An amalgamating machine comprising in its construction a circular bed provided at its sides with removable inclined plates having plain faces, a plurality of cones arranged upon said bed, and having plain exterior sur-

faces bearing against said inclined plates, and a rotary pinion engaging said cones, to rotate and revolve the same, as set forth.

3. An amalgamating machine, comprising in its construction a circular bed, provided at its sides with removably inclined plates, a plurality of cones arranged upon the said bed, and bearing against said inclined plates, balls arranged in said cones and resting upon the bottom of said bed, and a rotary pinion engaging the said cones to rotate and revolve the same, as set forth.

4. An amalgamating machine, comprising in its construction a circular bed, provided at its sides with removably inclined plates, a plurality of cones arranged upon the said bed, and bearing against said inclined plates, balls arranged in said cones and resting upon the bottom of said bed, the latter being provided with a round groove  $o$  at the point where the said balls rest thereon, and a rotary pinion engaging the said cones to rotate and revolve the same, as set forth.

5. An amalgamating machine, comprising in its construction a circular bed, provided with inclined side plates, the cones arranged to travel in said bed and against the said side plates, the said cones having their upper edges beveled, as described, the rotary vertical movable pinion adapted to engage the said cones to drive the same, the said pinion being provided with a beveled surface adapted to bear upon the beveled upper edges of the cones, as set forth.

6. An amalgamating machine, comprising in its construction a circular bed, provided with inclined side plates, the cones arranged to travel in said bed and against the said side plates, the said cones having their upper edges beveled, as described, the rotary vertical movable pinion adapted to engage the said cones to drive the same, the said pinion being provided with a beveled surface adapted to bear upon the beveled upper edges of the cones, and a spring arranged to exert a yielding pressure on said pinion, as set forth.

7. An amalgamating machine, comprising in its construction, a circular bed, a plurality of cones arranged to bear upon said bed, a rotary pinion adapted to engage said cones to rotate and revolve the same, balls arranged in said cones and a removable plate forming the bottom of the bed upon which the balls roll, as set forth.

8. An amalgamating machine, comprising in its construction, a circular bed, a plurality of cones arranged to bear upon said bed, a rotary pinion adapted to engage said cones to rotate and revolve the same, and balls arranged in said cones said balls being hollow and capable of being adjustably weighted or loaded, as set forth.

9. An amalgamating machine, comprising in its construction, a circular bed, a plurality of cones arranged to bear upon said bed, a rotary pinion adapted to engage said cones



to rotate and revolve the same, said cones being notched or cogged at their lower ends, and a notched or cogged expansible ring arranged to engage the said notched or cogged ends of  
5 the cones, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of

two subscribing witnesses, this 18th day of January, A. D. 1892.

JACOB CHARLES WISWELL.

Witnesses:

ARTHUR W. CROSSLEY,  
M. W. JACKSON.