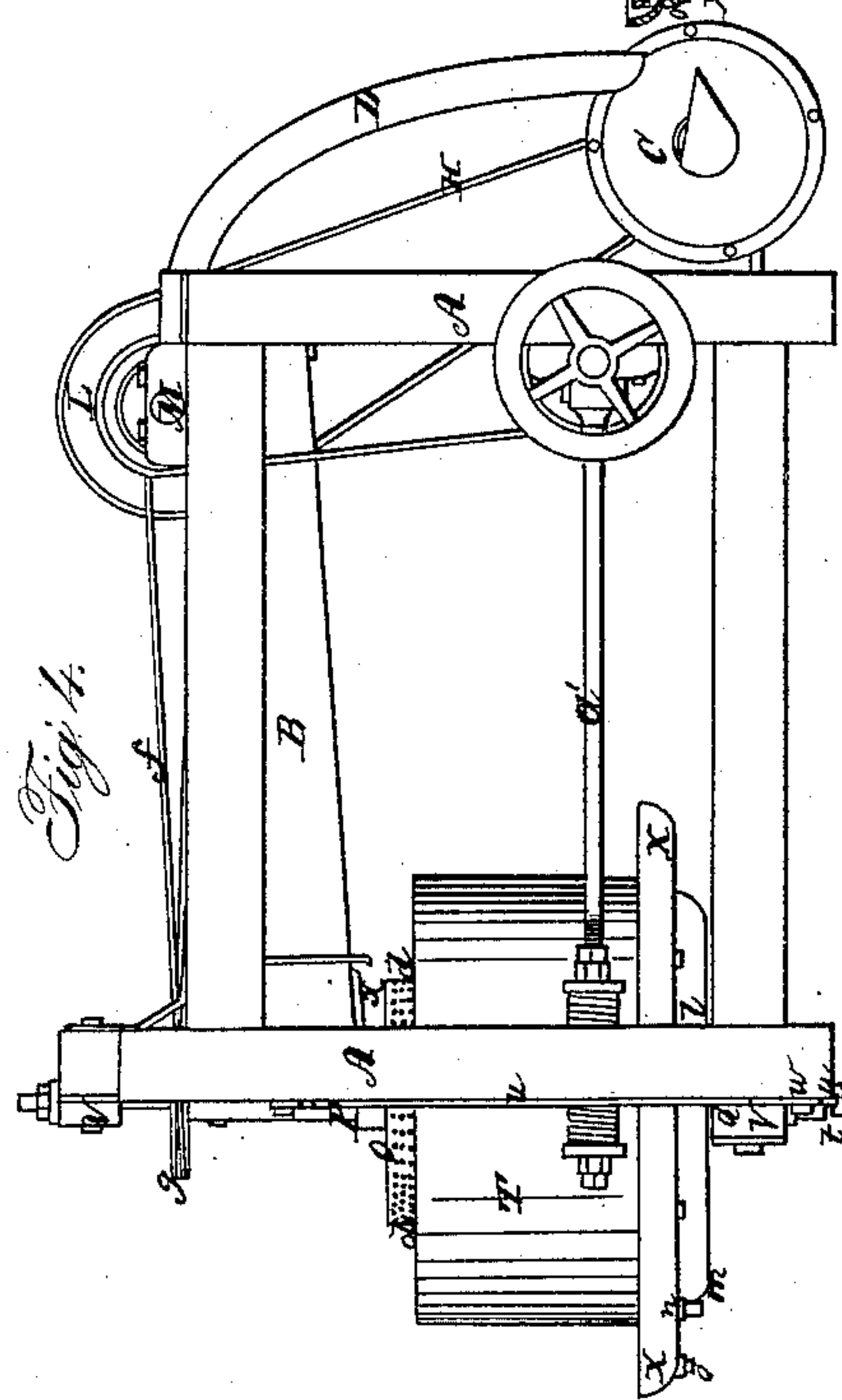
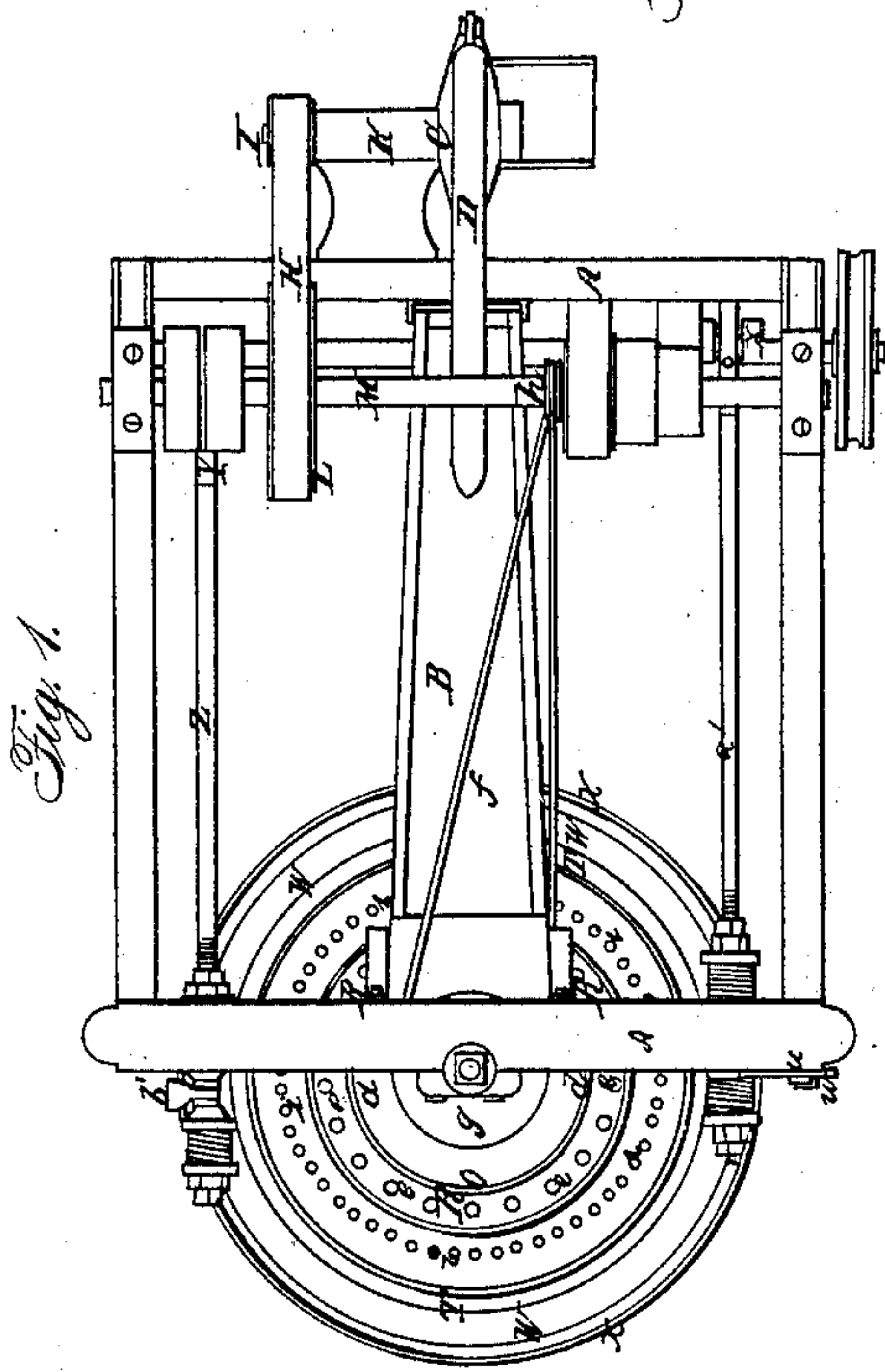
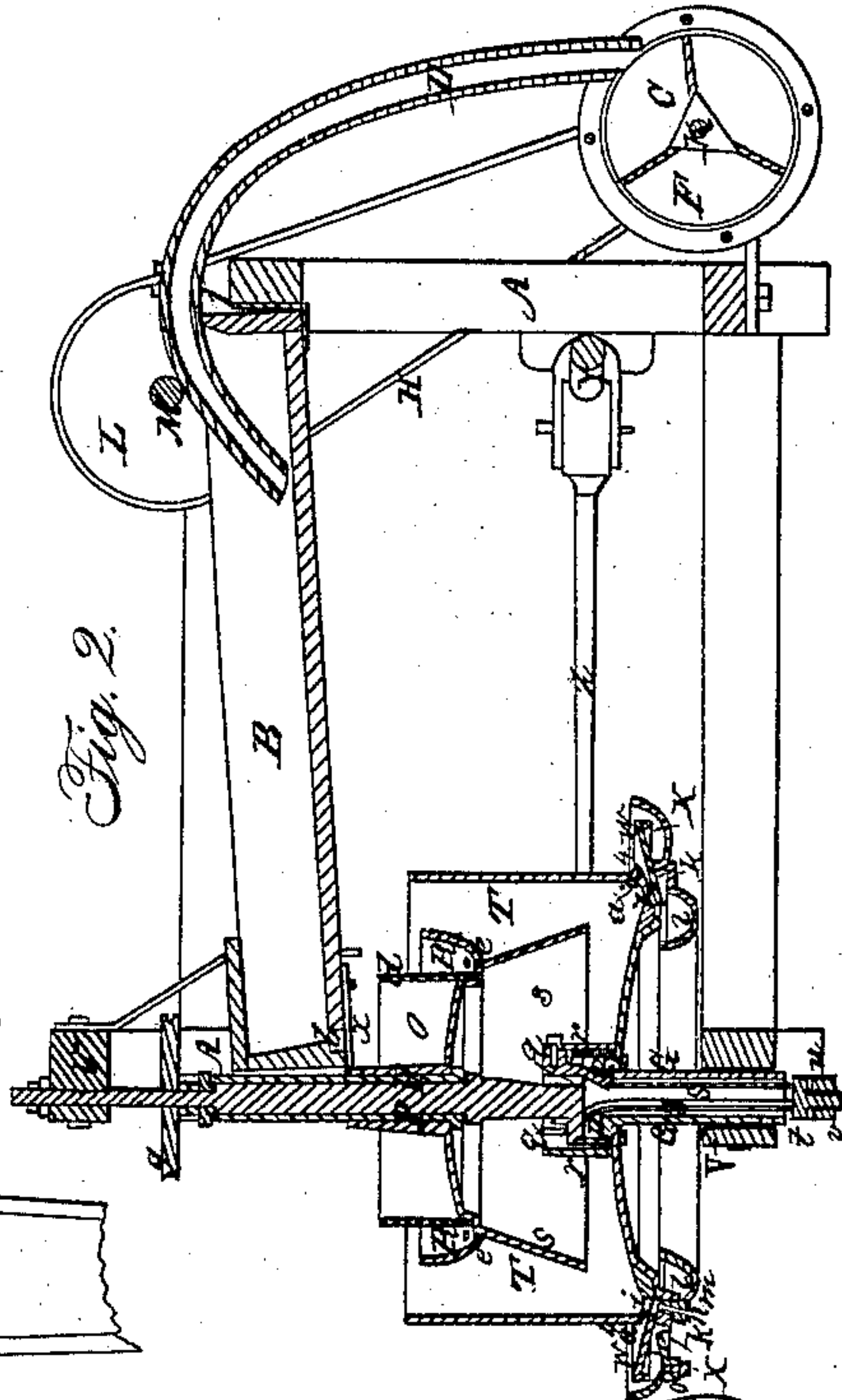
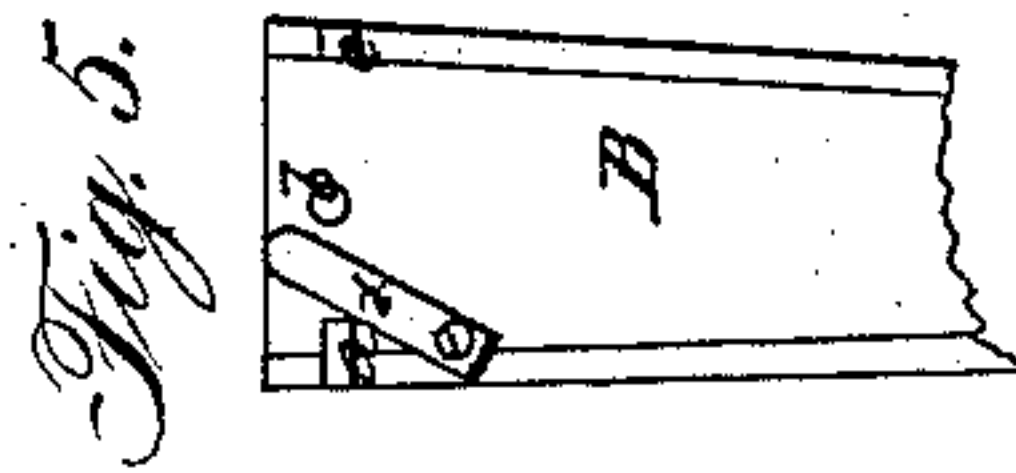
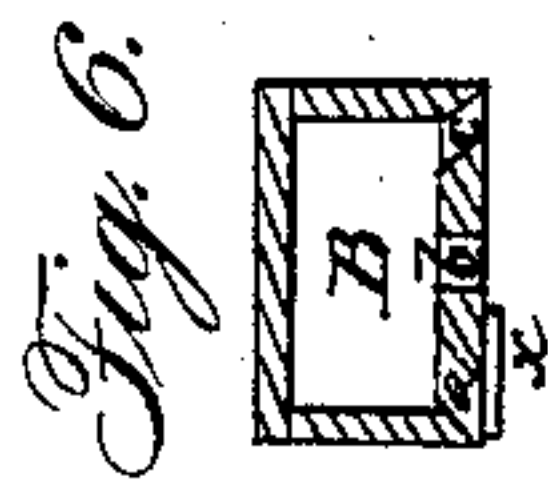
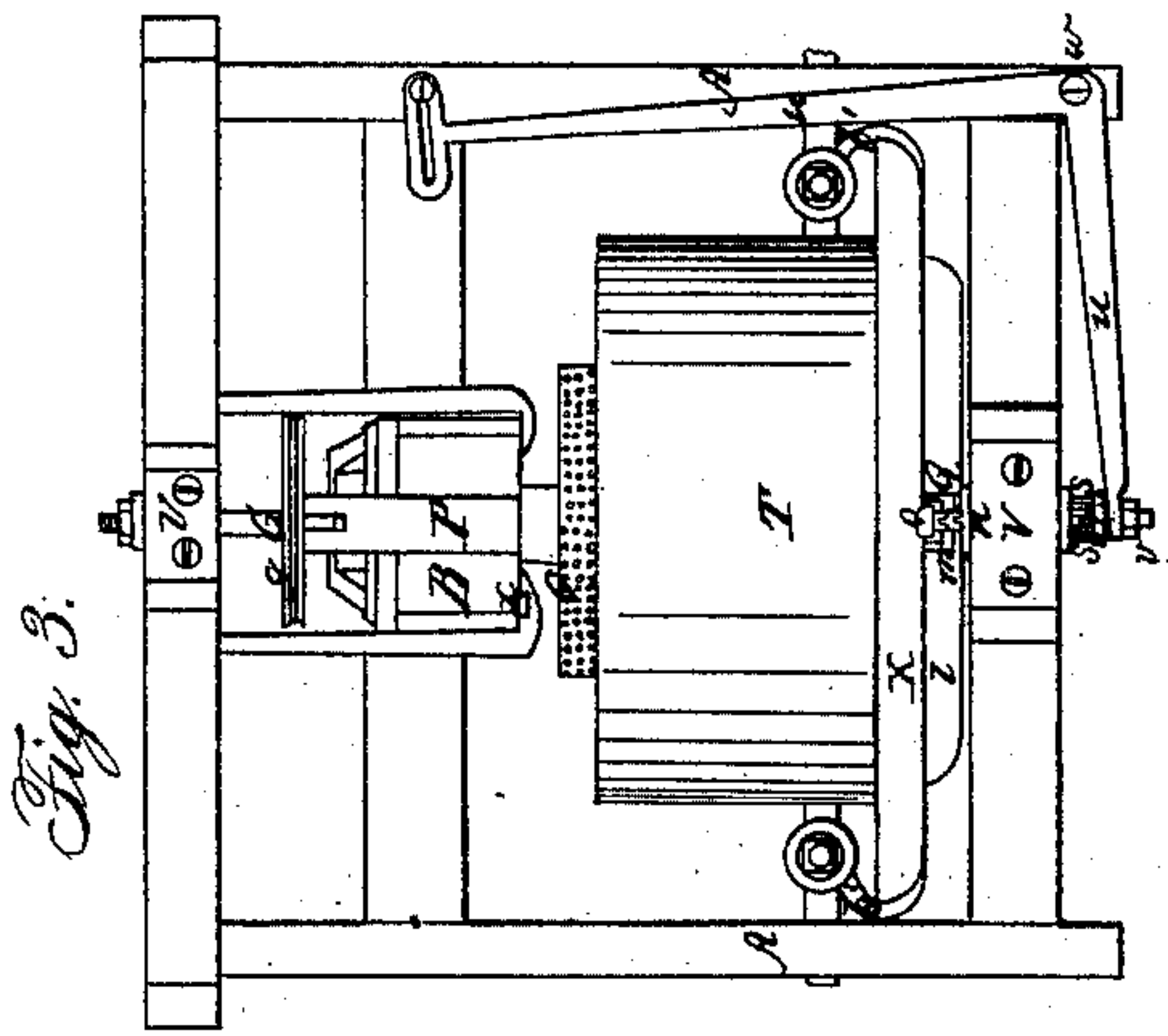


W. BALL.
Ore Amalgamator.

No. 8,344.

Patented Sept. 9. 1851.



UNITED STATES PATENT OFFICE.

WM. BALL, OF CHICOPEE, MASSACHUSETTS.

GOLD-AMALGAMATOR.

Specification forming part of Letters Patent No. 8,344, dated September 9, 1851; Reissued August 8, 1854, No. 274.

To all whom it may concern:

Be it known that I, WILLIAM BALL, of Chicopee, in the county of Hampden and State of Massachusetts, have invented a new and useful Improvement in Mechanism for Separating Gold from the Ore by Amalgamation; and I do hereby declare that the same is fully described and represented in the following specification and accompanying drawings, letters, figures, and references thereof.

Of the said drawings Figure 1, denotes a top view of my improved machine. Fig. 2, is a central, vertical, and longitudinal section of it. Fig. 3, is an end elevation, and Fig. 4, a side elevation of the same.

In the said drawings, A, represents the framework for supporting the operative parts of the machine. B, is a spout, or conducting trough, which is made to receive a current of washed gravel, auriferous ore, and water, either from a washing apparatus, or a stamp mill. In my machine, it is customary for me to employ a fan pump or blower, to elevate such stream of ore and water into said trough, so as to enable me to use the amalgamating apparatus, on the same floor or level, with the washing apparatus. The outer casing of said pump, is represented at C, in the drawings, the conducting pipe therefrom being seen at D, as extending upward, and discharging directly into the trough before described. Within this casing a fan wheel E, like that of an ordinary fan blower or blast apparatus is placed, and made to rotate with sufficient velocity to elevate the liquid which is received through the center of its case. The said fan wheel is rotated, by means of an endless band H, which not only passes around the pulley I, on the shaft K, of the said fan wheel, but also around a driving pulley L, fixed on a driving shaft M. This fan wheel pump apparatus however, forms no part of my invention, but is only a matter of convenience to enable me to use said invention on the same floor with other machinery as specified.

Fig. 5, represents a view of the lower side of the discharging end of the receiving trough B, while Fig. 6, is a transverse section of the same. The water in passing out of said trough, is discharged through three orifices, *a*, *b*, *c*, the two outer ones having such an inclination given to them, as will

cause the water to be thrown directly against the vertical perforated side *d*, *d*, of the upper revolving and distributing reservoir or vessel *o*, which vessel or reservoir is fixed upon a vertical tubular shaft P, which works upon and around the main vertical shaft Q, of the machine. The reservoir or vessel *o*, has its sides perforated with holes, and is surrounded by a concentric channel R, R, whose upper edge is arranged somewhat below the upper edge of the vessel O, as seen in the drawings, and whose bottom is punctured with a series of holes *e*, *e*, &c. This vessel is put in rapid revolution, by means of an endless band *f*, which works around a pulley *g*, on its shaft, and another pulley *h*, on the main driving shaft. From the underside of the trough R, and within the circle of its discharging holes *e*, *e*, I extend downward, in manner as shown in the drawings, a flaring partition or hollow conic frustum S, which is intended to dip into the water, contained in the lower vibrating distributing reservoir, to be hereinafter described. The said reservoir consists of a circular vessel or receiver T, which is affixed to the vertical shaft Q, supported in bearings as seen at U. V. The bottom of this reservoir T, declines toward a series of holes made through it, and in the circumference of a circle, concentric with the sides of the vessel, two of such holes being seen at *i*, *i*, in Fig. 2, which figure also exhibits the manner in which the bottom of said vessel declines toward such holes. The said series of holes, arranged in a circle, open into a mercury bath W, W, which extends underneath the holes, and concentrically around the main shaft, and has its bottom made with an inclination upward, as seen in Fig. 2. Another and secondary mercury bath, is shown at X, X, as placed under the bottom of the first mentioned mercury bath, and concentrically around the main shaft, and so that its bottom shall have an inclination upward, in a direction opposite to that of the bottom of the first bath, the vertical section of said bath, being represented by the drawing. Its inner boundary is a small upright ledge or wall *k*, over which the waste matter from the bath flows, and is received into a circular trough *l*, *l*, which extends concentrically around the main shaft, and serves to conduct the waste to a single discharging orifice *m*, made through it. Each mercury bath

is provided with a tap screw, or other proper contrivance *n*, or *o*, for drawing off its contents when necessary.

The lower part of the main shaft *Q*, is made hollow or tubular, for some distance up from its bottom, and for a short distance just above the bottom of the vessel *T*, the said shaft is increased in diameter or size as seen at *p*, and is made to have several openings *q*, made through it, so as to communicate, with the interior of the vessel *T*, and to allow water therein to flow down through such openings, into the tubular part of the shaft, and out at its lower end.

A tubular gate or ferrule *r*, is made to fit upon the large part *p*, of the main shaft, and to rise and fall freely in a vertical direction thereon. It has three or any other suitable number of rods *s*, *s*, extended down from it, and through any of the orifices made in the said enlarged part of the shaft. They also extend through the tubular part of the shaft and are united at their lower ends, to the head of a screw *t*, as seen in the drawing.

The said screw *t*, passes through one end of a bent lever *u*, and has a nut *v*, screwed upon it. The said lever is arranged, and has its fulcrum at *w*, as seen in the drawings. By turning the lever on its fulcrum, the circular ferrule or gate may be raised or lowered, as occasion may require.

I would remark, that to one of the external or lateral orifices of discharge of the receiving spout *B*, I apply a sliding plate or gate *x*, in such manner as to enable me to readily diminish said orifice, in order to regulate the flowage of water out of it, and thus regulate the amount of water discharged into the reservoir *o*. The lower vessel *T*, and the mercury bath attached to it, are together to have a reciprocating, or vibratory circular motion imparted to them, which motion may be produced by two cranks *Y*, *Y*, fixed upon a secondary shaft and standing in opposite directions therefrom. To each of these cranks one end of a connecting rod *z* or *z'*, is jointed, the opposite end of said connecting rod being suitably jointed to an ear *b'*, extended from any suitable part of the vibrating vessel.

On the nineteenth day of June, one thousand eight hundred and forty-nine, Letters Patent of the United States, numbered 6535, were granted to me for a new and useful machine for separating gold from the ore or extraneous matters, by means of mercury and water. Such machine contained a vibrating mercury bath, which was arranged in the central part of the machine. In my present machine, the mercury bath is not arranged at the center, but consists of a covered or partially covered mercury ring arranged concentrically around the vertical axis of the machine, and some considerable distance therefrom, as seen in the drawings. It is

partially covered as seen at *a'*, *a'*, Fig. 2, the cover during its vibratory motion serving to facilitate the union of the particles of gold and mercury. Such an arrangement and application of the mercury bath, enables it when agitated with a short vibratory motion, to operate to much better advantage on the ore, than it does when arranged at the central part of the machine, as in my machine heretofore patented. Besides this by using the distribution reservoir *O*, and its ring *R*, to which a constant continued rotary motion is given, the mixture of liquid and ore is not only separated from chips and much other extraneous matters, which are always more or less commingled with it, but it is discharged from the ring or trough *R*, *R*, in numerous jets or streams, whereby it is thrown and properly distributed into the water of the reservoir *T*, *T*; that is equally distributed over its line or circle of discharging orifices, or those connecting the vessel *T*, with the main mercury bath.

As it is desirable to maintain a head of water within the vessel *T*, sufficient to cause the currents discharged through its bottom, to pass through the ring of mercury in the mercury bath, I make use of the regulating ferrule or gate, which was before described as applied to the center shaft of the said vessel *T*. As the surplus water is discharged over the top of said ferrule, and down through the hollow shaft, it will be evident that by means of said ferrule we can regulate the depth of water within the vessel *T*, for by raising the ferrule we increase the depth in said vessel, and by lowering it we decrease the same.

By making stationary the spout or contrivance which conveys the water, or discharges it in streams, upon the screen of the distributor, and at the same time making such screen to rotate, and to stand vertically the ore is much better washed, and separated from extraneous matters, and the perforations of the screen are much less liable to be choked, than when the screen, (arranged horizontally) and the contrivance which discharges water upon it, are simultaneously moved together, with a short vibratory movement, such being the arrangement and operation of the parts in my machine as heretofore patented.

What I claim therefore as my invention is as follows:

1. I claim the combination of the partition *S* (dipping below the surface of the water) with the lower distributors provided at the center with a discharge aperture for the water and light particles and at the periphery with apertures for the discharge of the water and heavier particles; for the purpose of preventing the escape of gold, over the central or waste pipe.

2. I also claim the arrangement of the

sliding tube ferrule or waste gate, directly upon the hollow axle of the lower distributor T, the same being for the purpose of regulating the head of water within the said distributor.

3. I am aware that it is not unusual in gold washers to use a succession of baths; therefore I do not claim such arrangement in general, but I also claim arranging the secondary mercury bath concentric with and below the primary one in such a manner that

the currents of water, et cetera, return toward the center of the apparatus, thereby saving room and causing the said currents to pass more slowly. 15

In testimony whereof I have hereto set my signature this second day of July 1851.

WM. BALL.

Witnesses:

FRANCIS GOULD,
JOHN NOBLE.

[FIRST PRINTED 1913.]