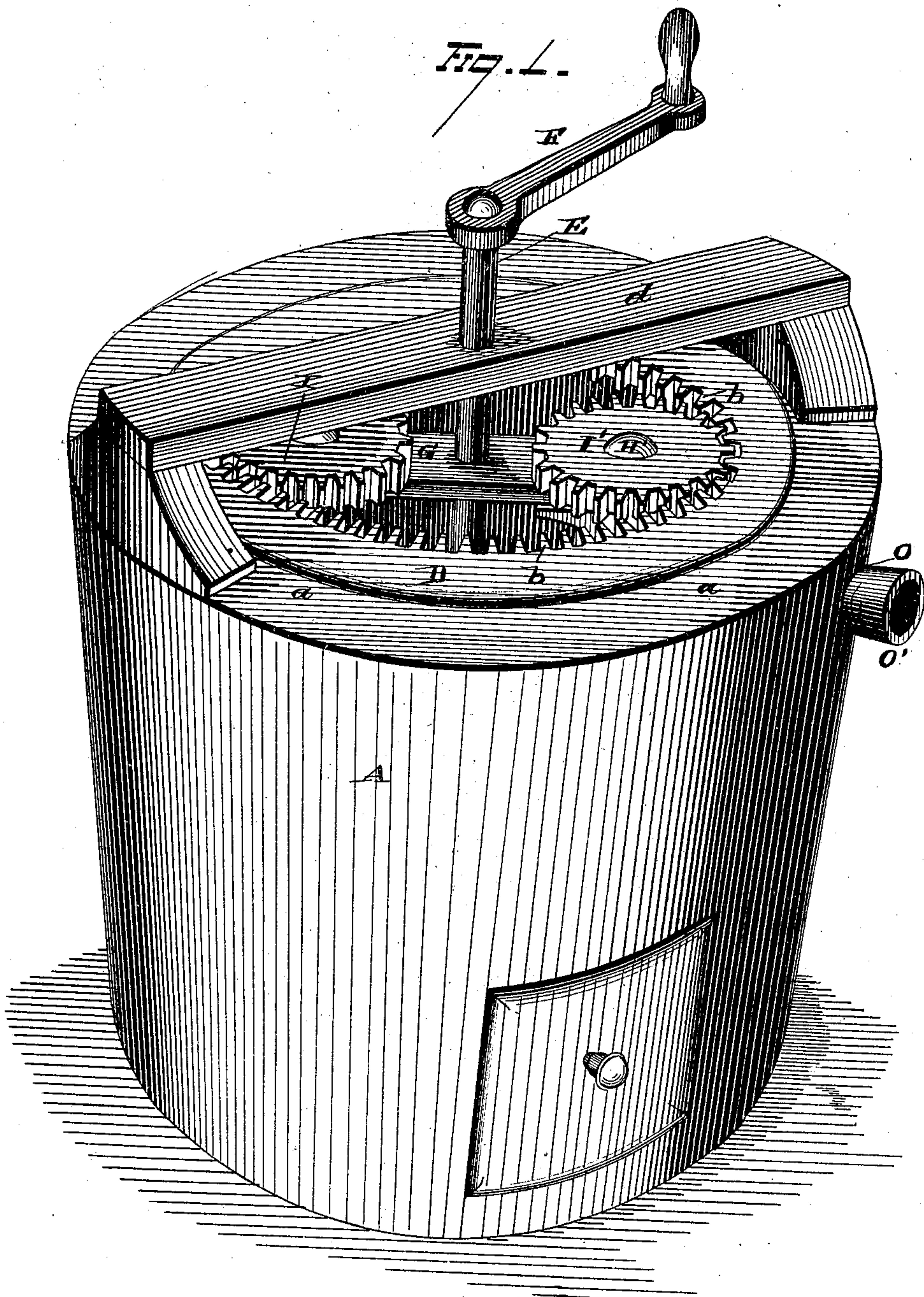


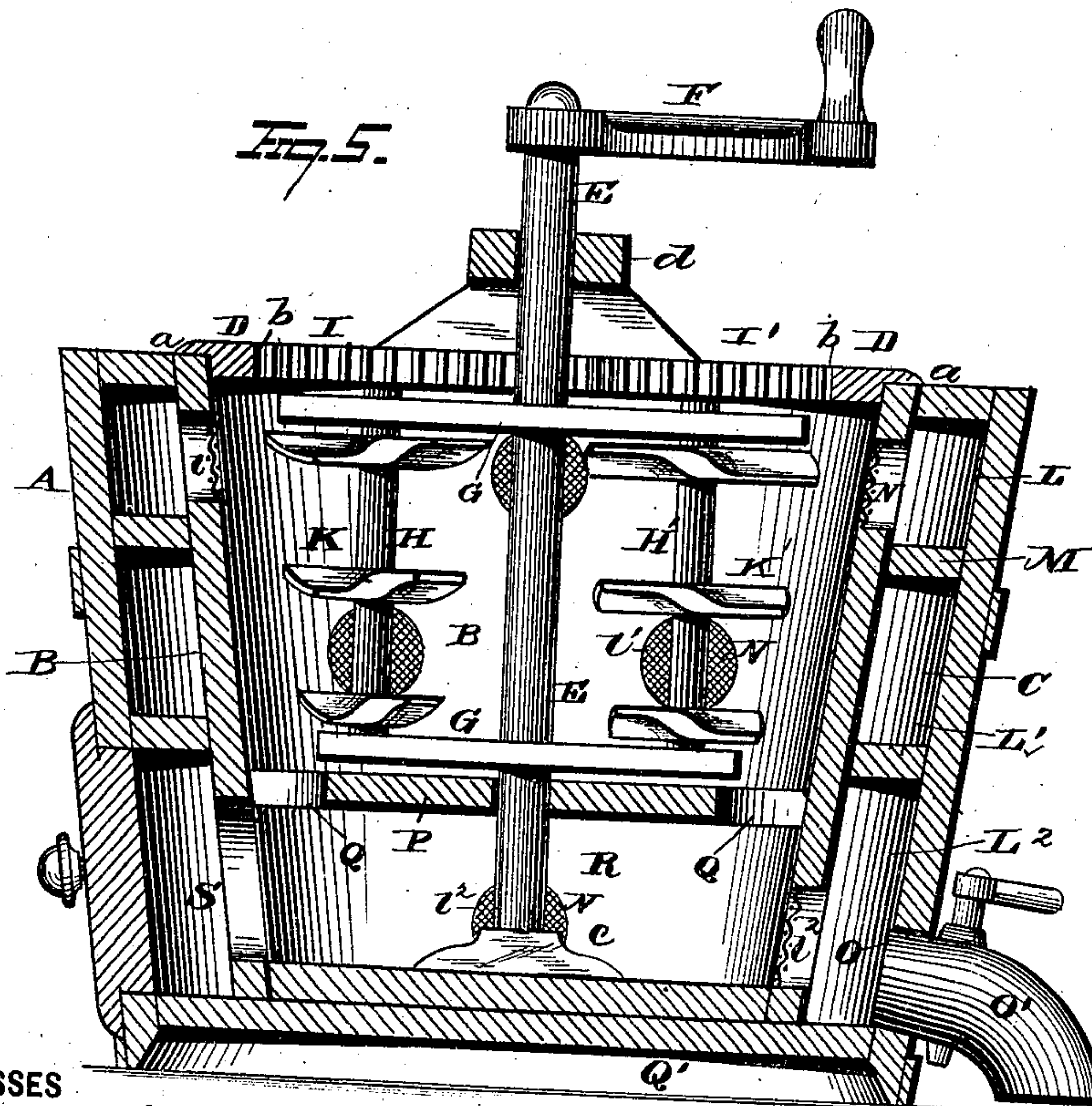
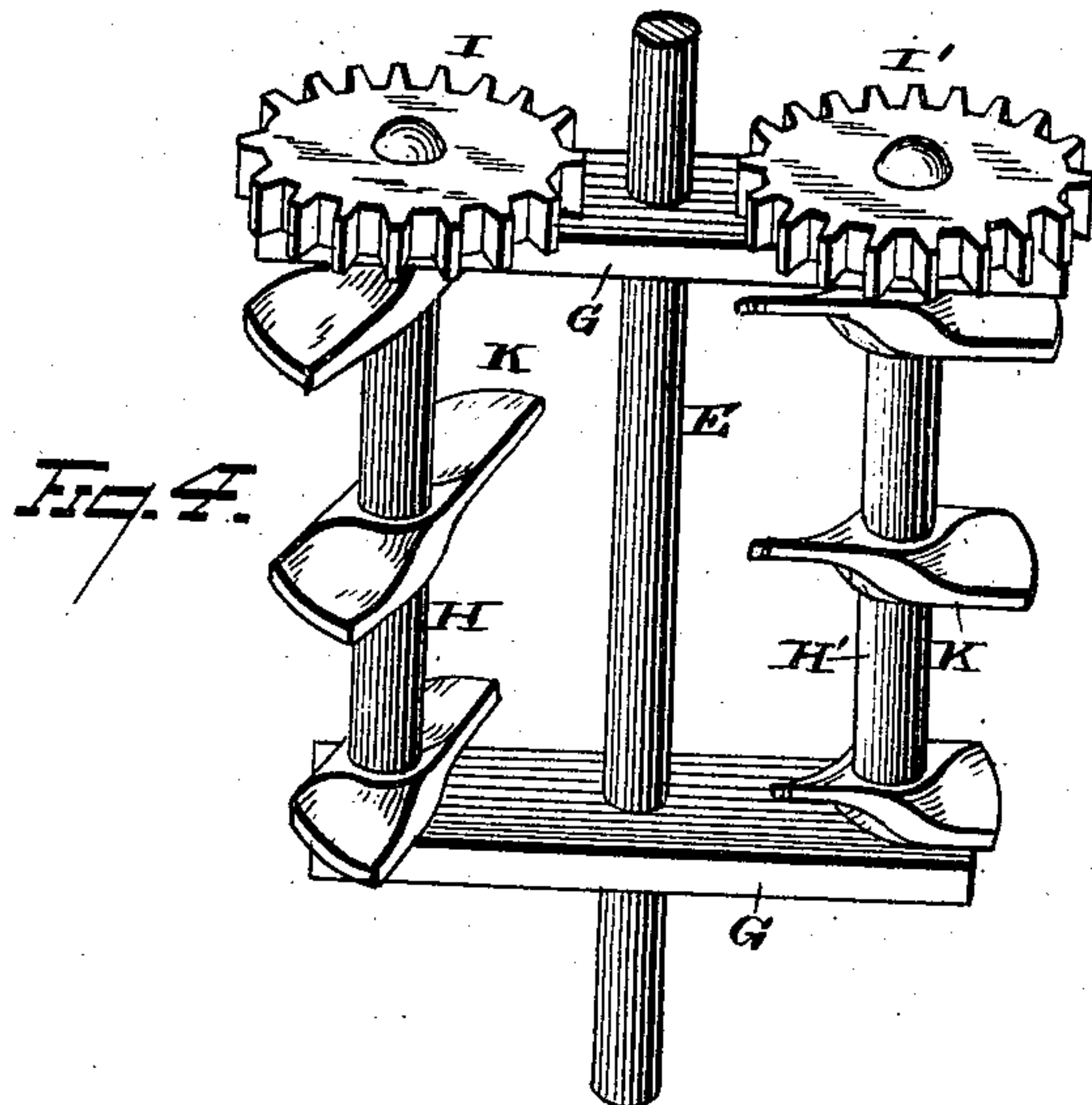
G. L. WITSIL.
Clay Washer and Grinder.
No. 229,932.
Patented July 13, 1880.



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FIG. 5.

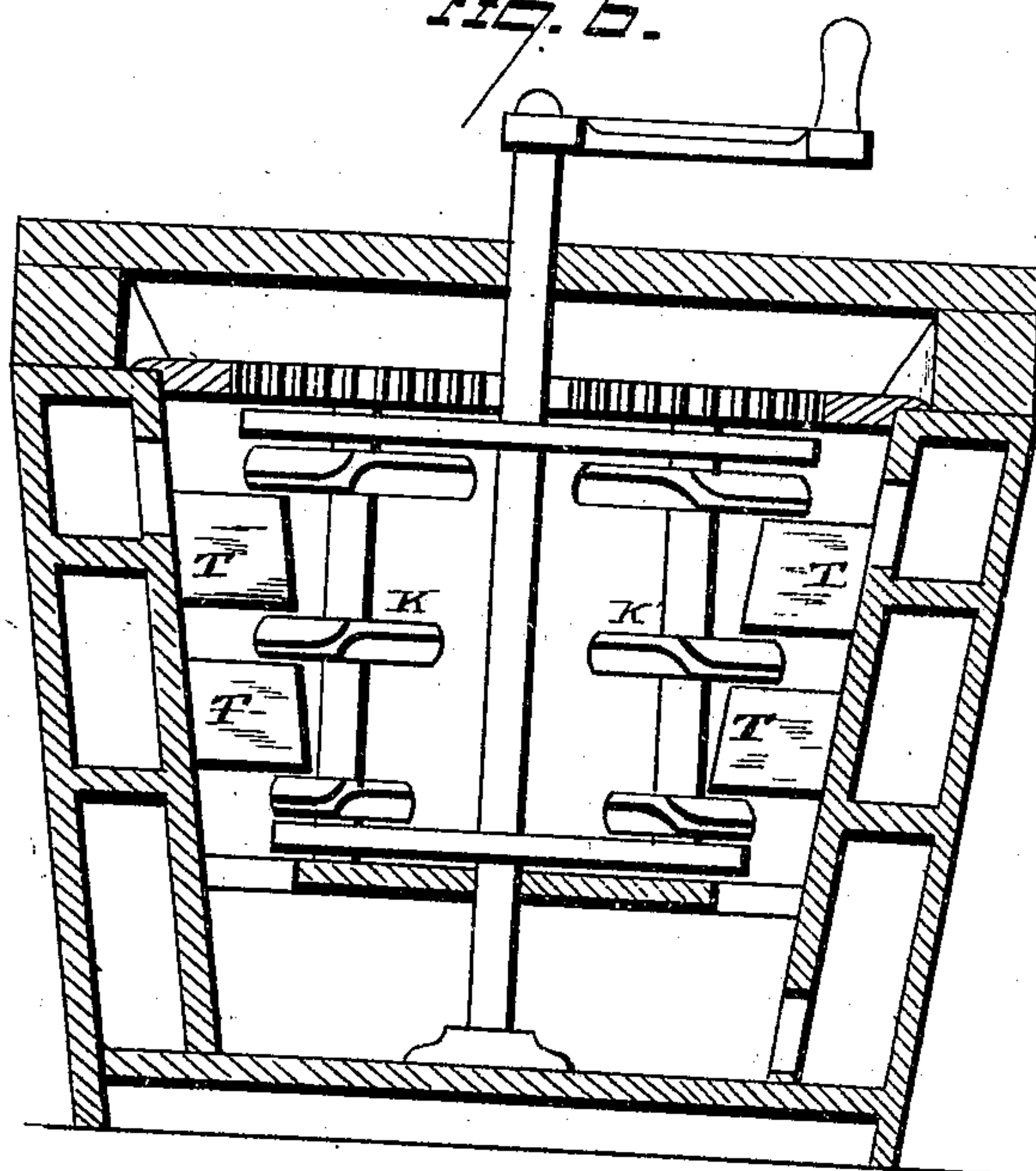
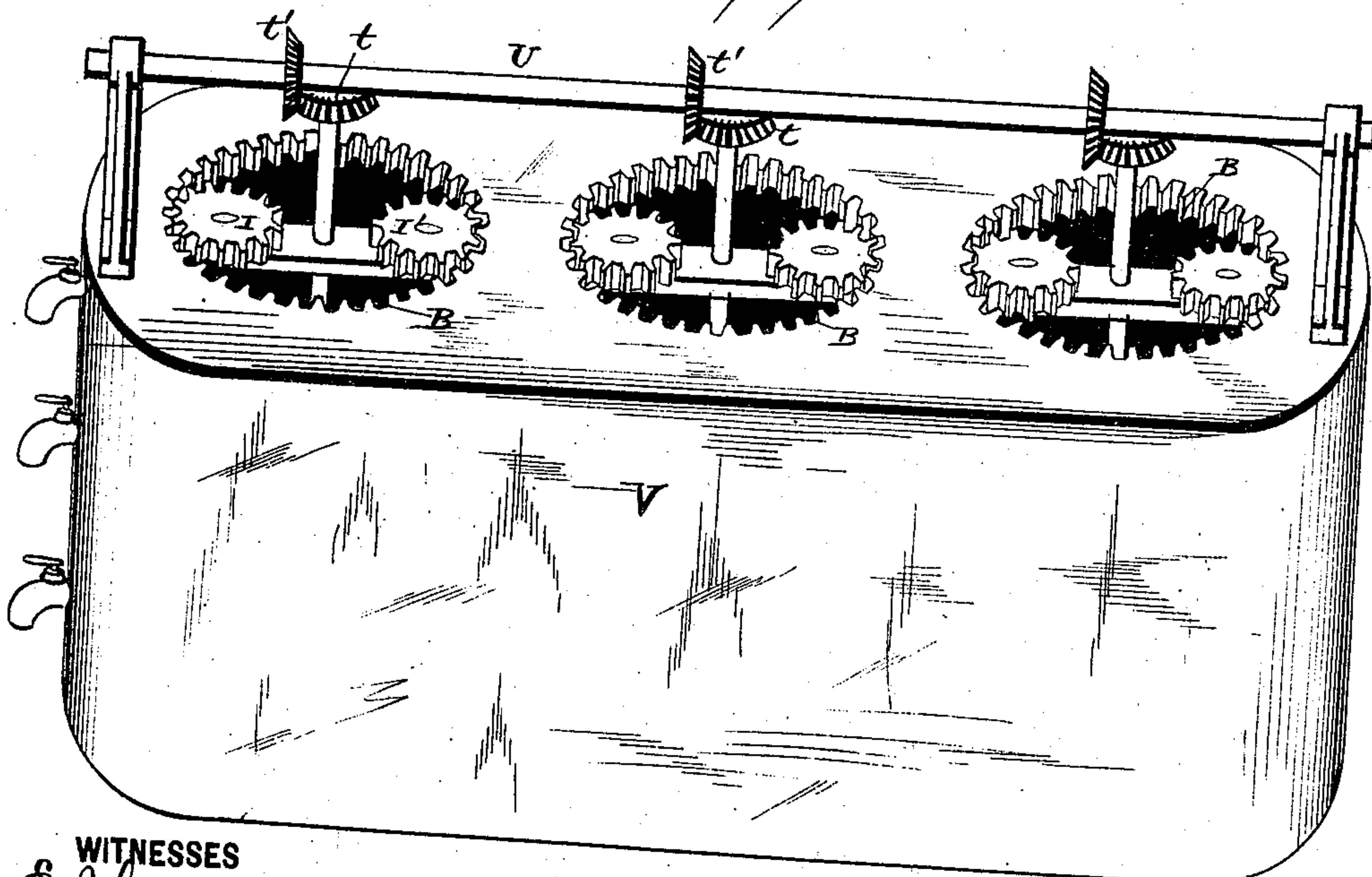


FIG. 7.



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UNITED STATES PATENT OFFICE.

GEORGE L. WITSIL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
THOMAS L. BATES AND BURGESS A. HINES, OF SAME PLACE.

CLAY WASHER AND GRINDER.

SPECIFICATION forming part of Letters Patent No. 229,932, dated July 13, 1880.
Application filed December 6, 1879.

To all whom it may concern:

Be it known that I, GEORGE L. WITSIL, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Clay Washers and Grinders; and I do hereby 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in machines for washing and grinding clay, the object being to provide a machine constructed and adapted to impart both rotary and ascending and descending currents to the clay and water placed in the machine, and thus operate to thoroughly wash the clay and separate stones and pebbles therefrom, and to subject the clay-mixture within the receptacle of the machine to such action that the clay-mixtures of different grades of fineness may be drawn off separately for the various uses and purposes desired; and to this end my invention consists, first, in the combination, with the receptacle of a clay washing and grinding machine provided with independent chambers for receiving clay of varying degrees of fineness, of a rotary frame carrying at its opposite ends, respectively, a right and left hand screw and means for imparting a rotary motion to the frame and screws, whereby a rotary current is imparted to the clay-mixture by the rotary frame and screws, and ascending and descending currents produced by the rotation of the right and left handed screws.

My invention further consists in the several details of construction and combinations of parts, as will hereinafter be described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view, in perspective, of my improved clay washing and grinding machine. Fig. 2 is a side elevation with a portion of the clay-receptacle broken away to show the inside of the machine. Fig. 3 is a plan view. Fig. 4 is a detached view of the rotary frame and right and left hand screws. Fig. 5 is a vertical section. Fig. 6 is a view, in vertical section, of

a modified form of construction for adapting the machine for grinding clay; and Fig. 7 is a view, in perspective, of a modification.

A and B represent, respectively, the outer and inner receptacles of the machine, which are constructed and arranged to form an intervening space, C.

To the upper end, *a*, of the receptacles A B is secured an annular flange, D, having teeth or cogs *b* on its inner edges.

E is a shaft having its lower end supported in a step, *c*, and its upper end journaled in a cross-bar or spider, *d*, secured to the upper end of the machine, the upper end of the shaft having a crank, F, secured thereto, though it is evident that it may be provided with a gear-wheel to render the machine adapted for operation by any suitable motive power.

To the upper and lower ends of the shaft E are secured the transverse bars G, within the outer ends of which are journaled the opposite ends of the screw-shafts H H', the latter having pinions I I' rigidly secured to their upper ends, said pinions being arranged to mesh or engage with the teeth on the inner edge of the annular flange or rim D.

Screw-shafts H H' are furnished with a right-hand screw, K, and a left-hand screw, K'.

When the shaft E is rotated it operates to rotate the transverse bars G, thereby rotating the right and left hand screws K K', through the medium of the pinions I I' and internally-toothed rim or flange D. The screws and transverse bars serve to impart a rotary current to the clay-mixture within the receptacle, while the right-hand screw forces the mixture upwardly and the left-hand screw causes the mixture to flow downwardly, and thus the clay is most thoroughly separated and washed and pebbles or other hard substances embedded therein allowed to fall to the bottom of the machine.

As heretofore stated, an intervening space, C, is formed between the inner and outer receptacles, and this space is subdivided into any desired number of chambers by means of the annular partitions M. The inner receptacle connects with each one of the chambers L L' L² by passages *l l'* *l²*, the latter being covered by wire-gauze N, or equivalent material,

to prevent any coarse substance from entering either one of said annular chambers. Each of said chambers L L' L^2 is provided with a discharge-conduit, O , the flow through which may be regulated by a stop-cock, O' , or by a gate.

Pipes or conduits O empty into shallow troughs for spreading the pulverized and washed clay, that the water contained therein may be quickly evaporated.

Within the lower portion of the inner receptacle is placed a false bottom, P , having any desired number of openings or passages Q formed in its periphery, the false bottom being raised a sufficient distance above the bottom Q' of the outer receptacle to form an intervening space, R , into which stones and pebbles will fall, and be removed through the opening S , which may be closed by any construction of door, lid, or grate.

In the operation of my improved machine water and clay are emptied into the inner vessel, and, rotary motion being imparted to the screws, the clay and water are subjected to the rotary action of the screws and screw-shafts as they are rotated within the tub or receptacle, and also have reverse currents formed by the right and left hand screws, the former operating to force the mixture in an upward direction and the latter through a downward course, whereby the water is thoroughly intermingled with the clay and operates to separate the finer and coarser particles thereof. The coarse pebbles and stones, falling by gravity to the lower portion of the receptacle, drop through the openings in the false bottom into the lower chamber, from whence they may be readily removed whenever necessary or desirable. The remaining portion of the mixture subdivides itself in the vessel according to its relative gravity, the very finest and lightest portion thereof being situated at the top of the vessel, from whence it is drawn off into the upper chamber, D , and from thence to any suitable drying-receptacle. That portion of the mixture which may be termed as of a second or intermediate degree of fineness will descend by its relative gravity to the central portion of the vessel, from whence it flows into the chamber L' , and is discharged therefrom into any separate and suitable receptacle. The heaviest and coarsest portion of the mixture descends to the lower portion of the vessel and enters chamber L^2 , and is discharged therefrom into a suitable trough or receptacle.

When it is desired to subject the clay to attrition, to grind the particles thereof, radial wings T may be secured to the inner vessel,

as illustrated in Fig. 6, and thus the screws will comminute the particles of clay and reduce the mass to a finely-pulverized state.

It is evident that any number of my improved machines may be operated from a single line of shafting, as illustrated in Fig. 7.

In this construction and arrangement of parts the rotary shafts are provided with bevel-gear wheels t , which engage with corresponding bevel-gear wheels t' on the shafting U .

The inner vessels, B , are placed in an elongated vessel, V , which is subdivided into any desired number of separate chambers, as herebefore described, for discharging the different grades of washed clay.

As many slight changes in the construction and relative arrangement of the several parts of my machine may be resorted to without departing from the spirit of my invention, I would have it understood that I do not limit myself to the exact construction and arrangement of parts shown and described.

I am aware that machines have been provided with screws attached to revolving shafts, the latter provided with pinions meshing with a stationary rack, and hence I make no broad claim to such construction or combination of parts; but,

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

1. The combination, with an inner and outer receptacle and intervening chambers having inlet and outlet openings, of a right-hand screw and a left-hand screw, both journaled in rotary transverse bars, and gearing for imparting rotary motion to said screws, substantially as set forth.

2. The combination, with the washing mechanism, substantially as described, of the perforated false bottom and lower chamber for pebbles and stones, substantially as set forth.

3. The combination, with the washing mechanism, constructed and arranged substantially as set forth, of the inner and outer vessels or receptacles provided with separate and independent chambers, having inlet and outlet openings and chamber formed between the bottom of the inner receptacle, and a false bottom placed therein, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 2d day of December, 1879.

GEO. L. WITSIL.

Witnesses:

F. O. McCLEARY,
E. I. NOTTINGHAM.