

(No Model.)

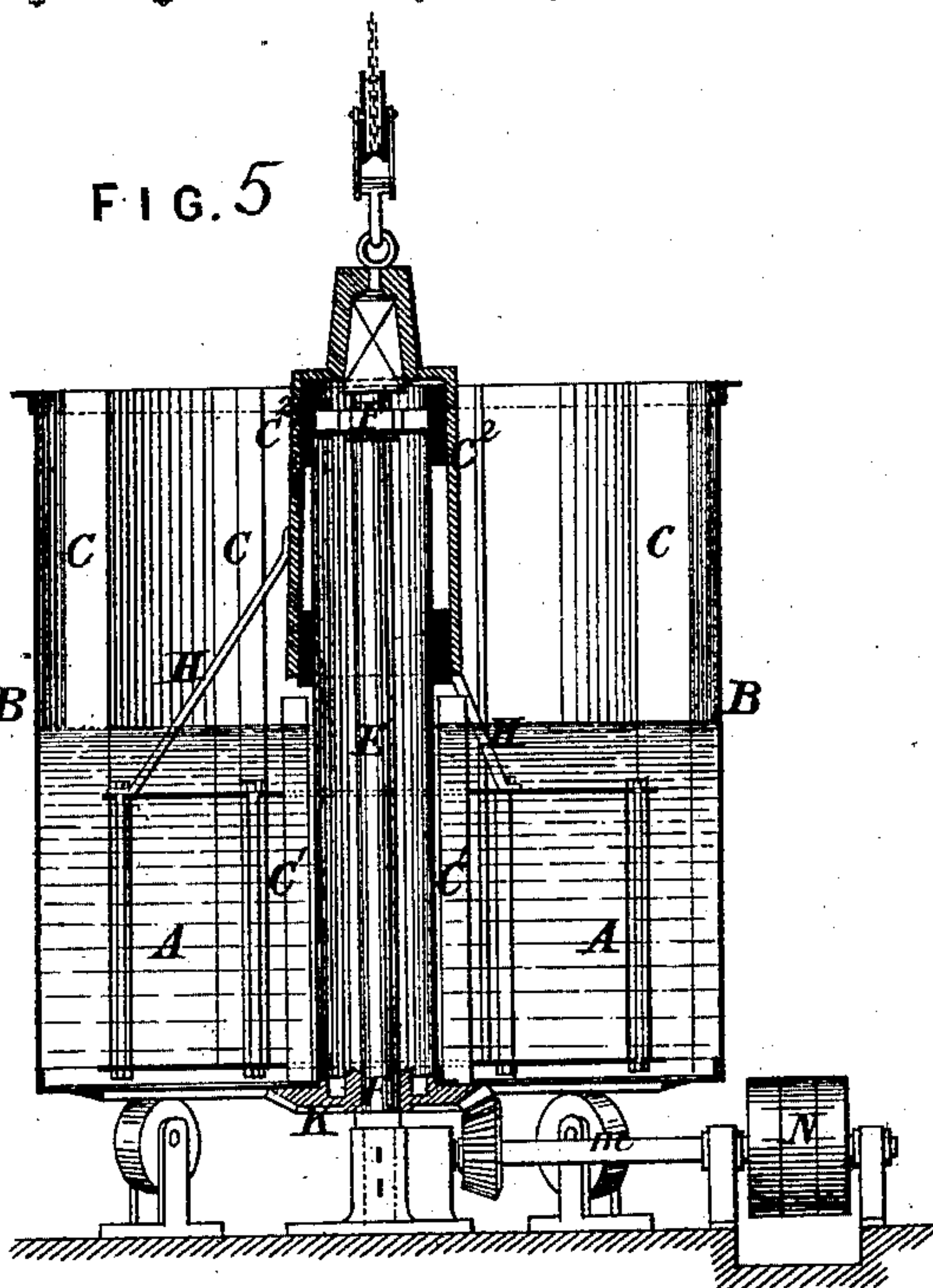
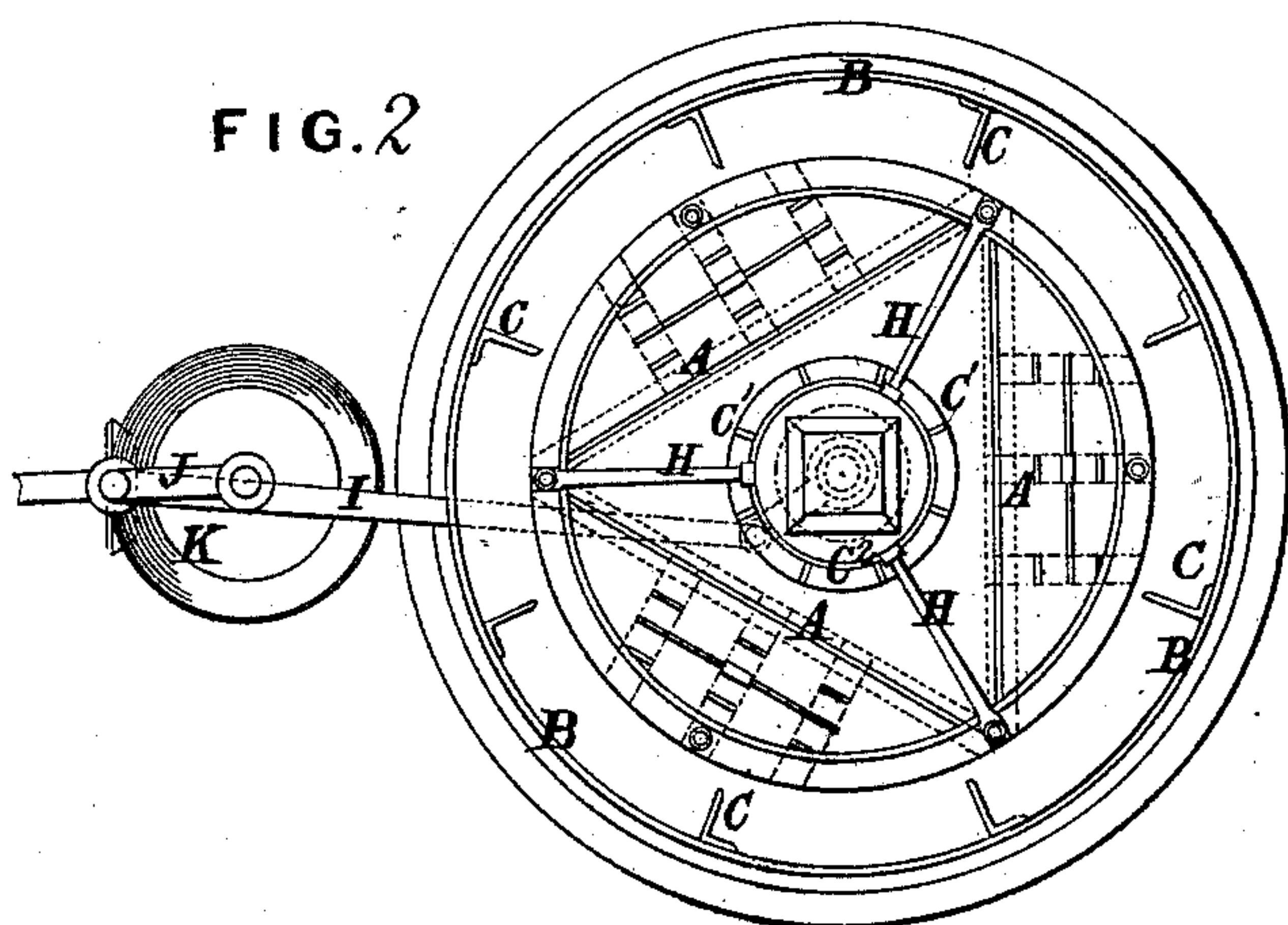
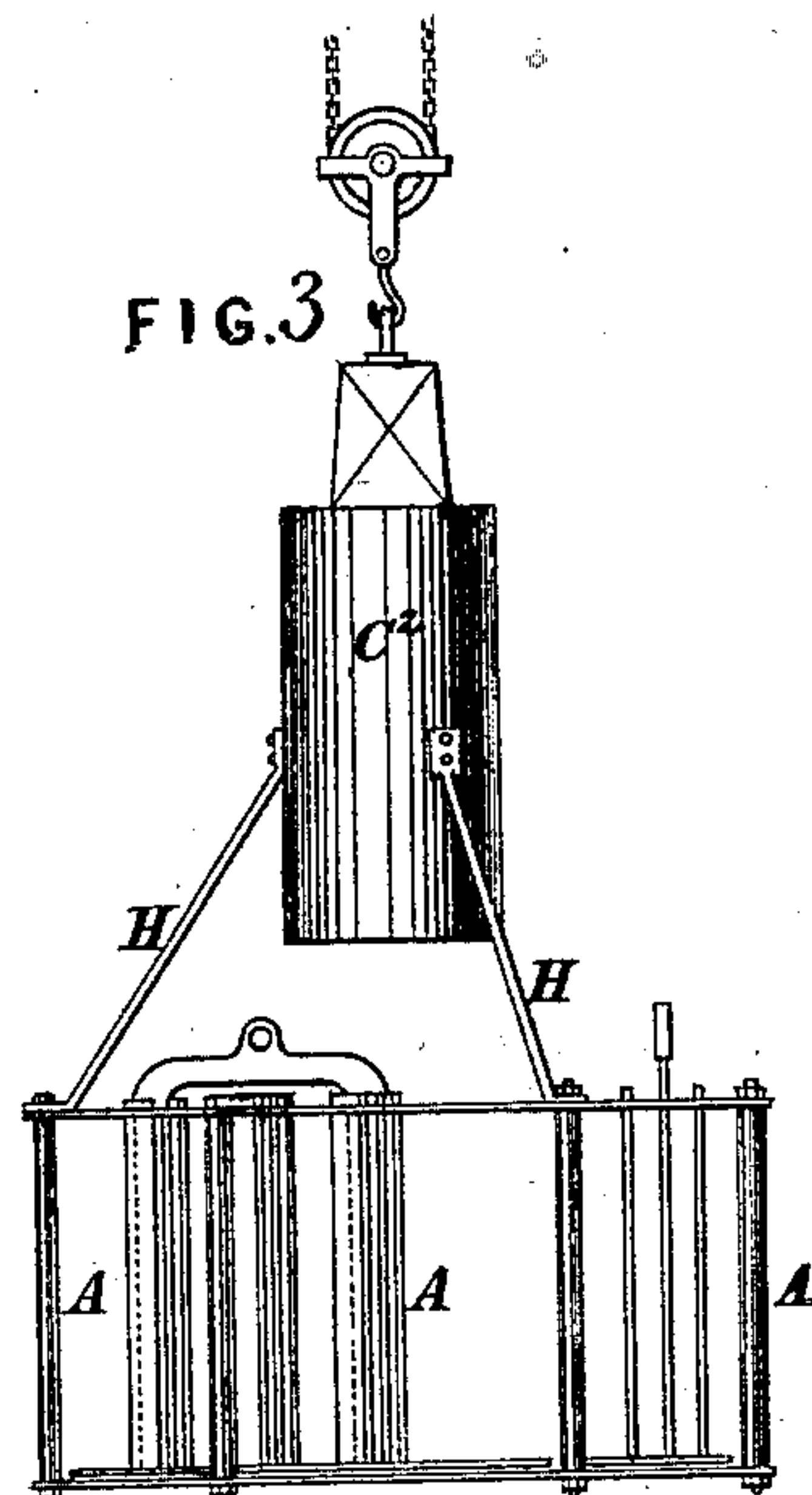
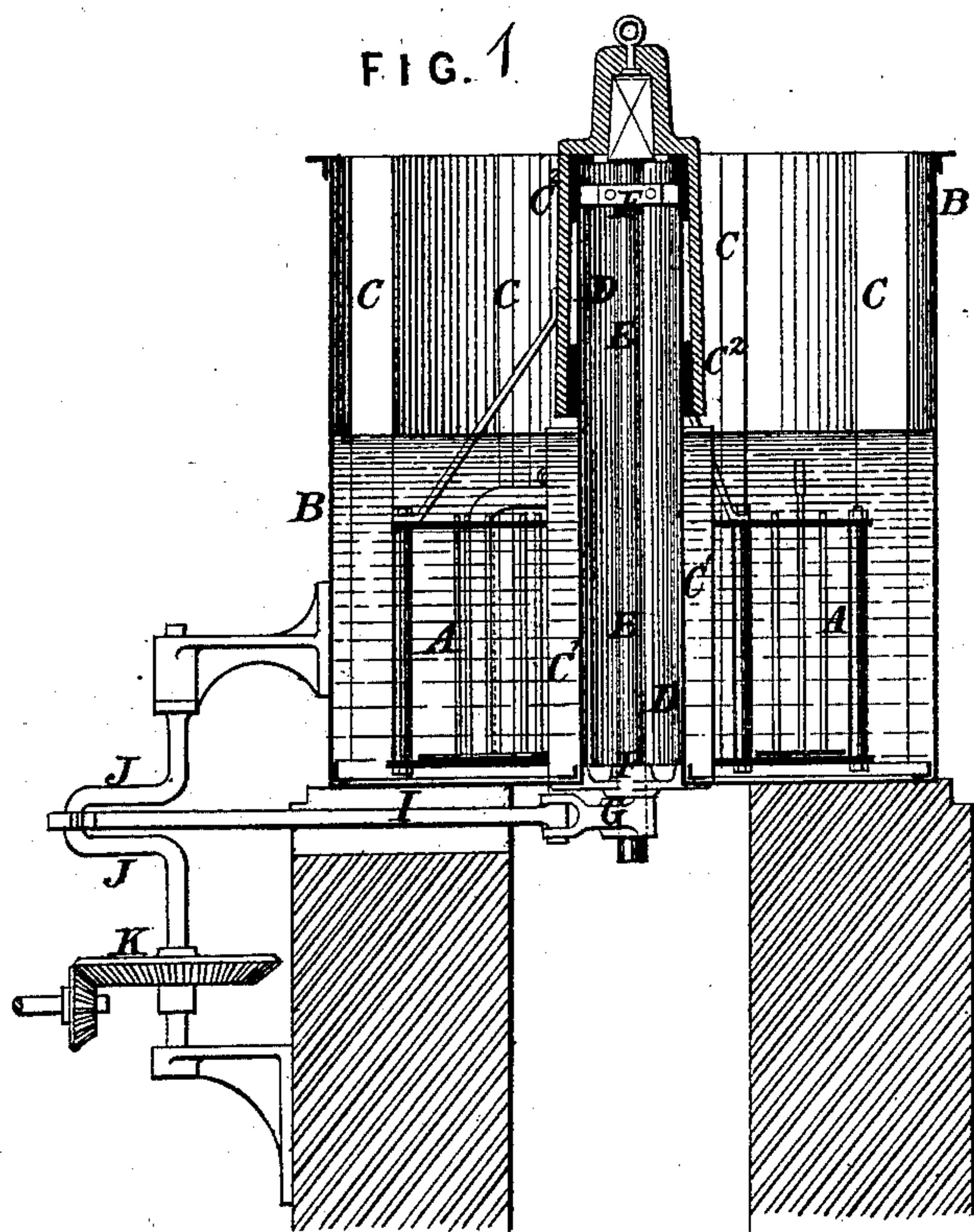
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R. J. HUTCHINGS.

APPARATUS FOR PICKLING AND SWILLING METAL PLATES AND OTHER  
WARES.

No. 282,084.

Patented July 31, 1883.



Witnesses

Chas. H. Smith  
J. Haile

*Inventor*

R. J. Hutchings  
for Lemuel W. Perrell atty

(No Model.)

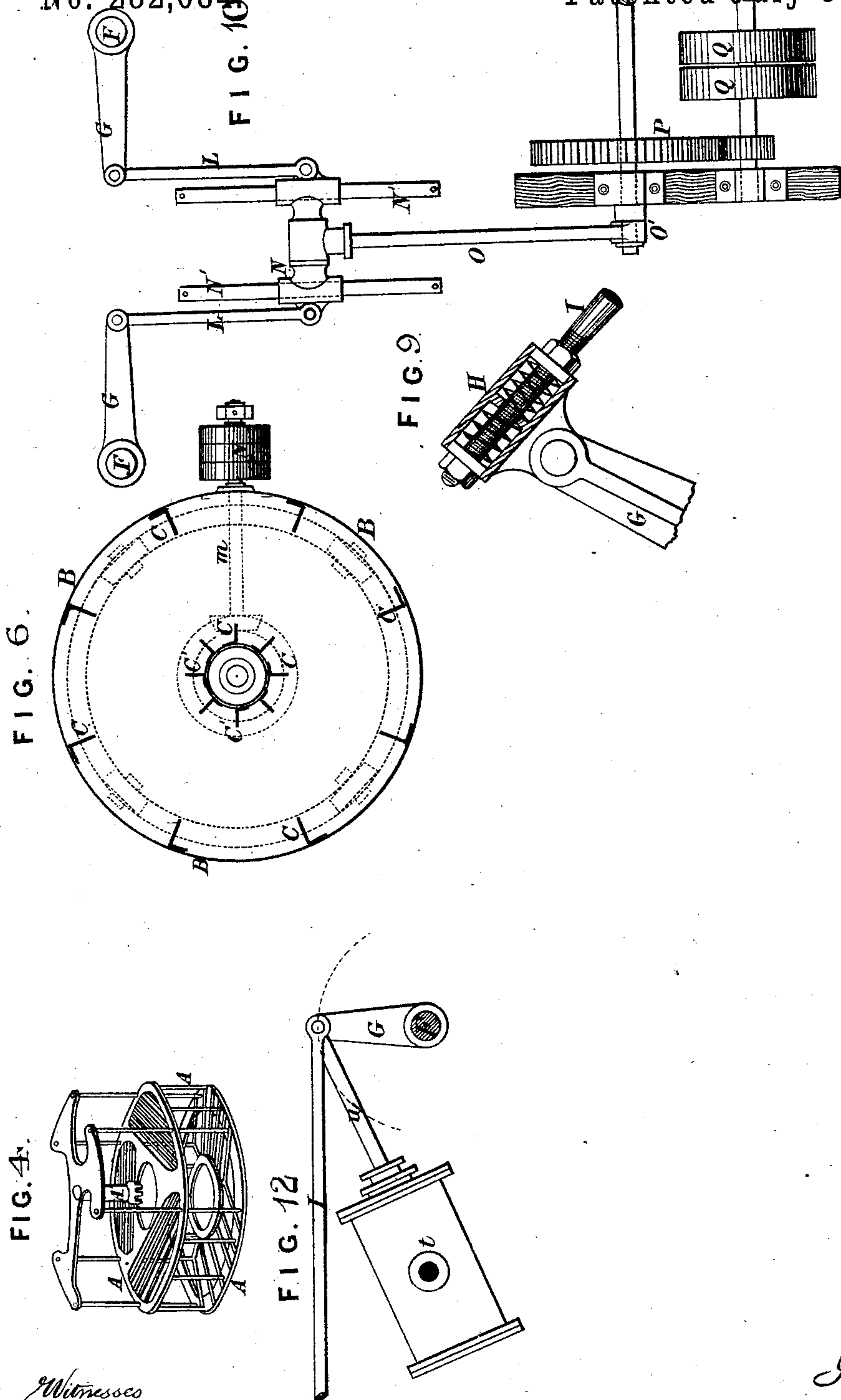
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J. Hall

Inventor

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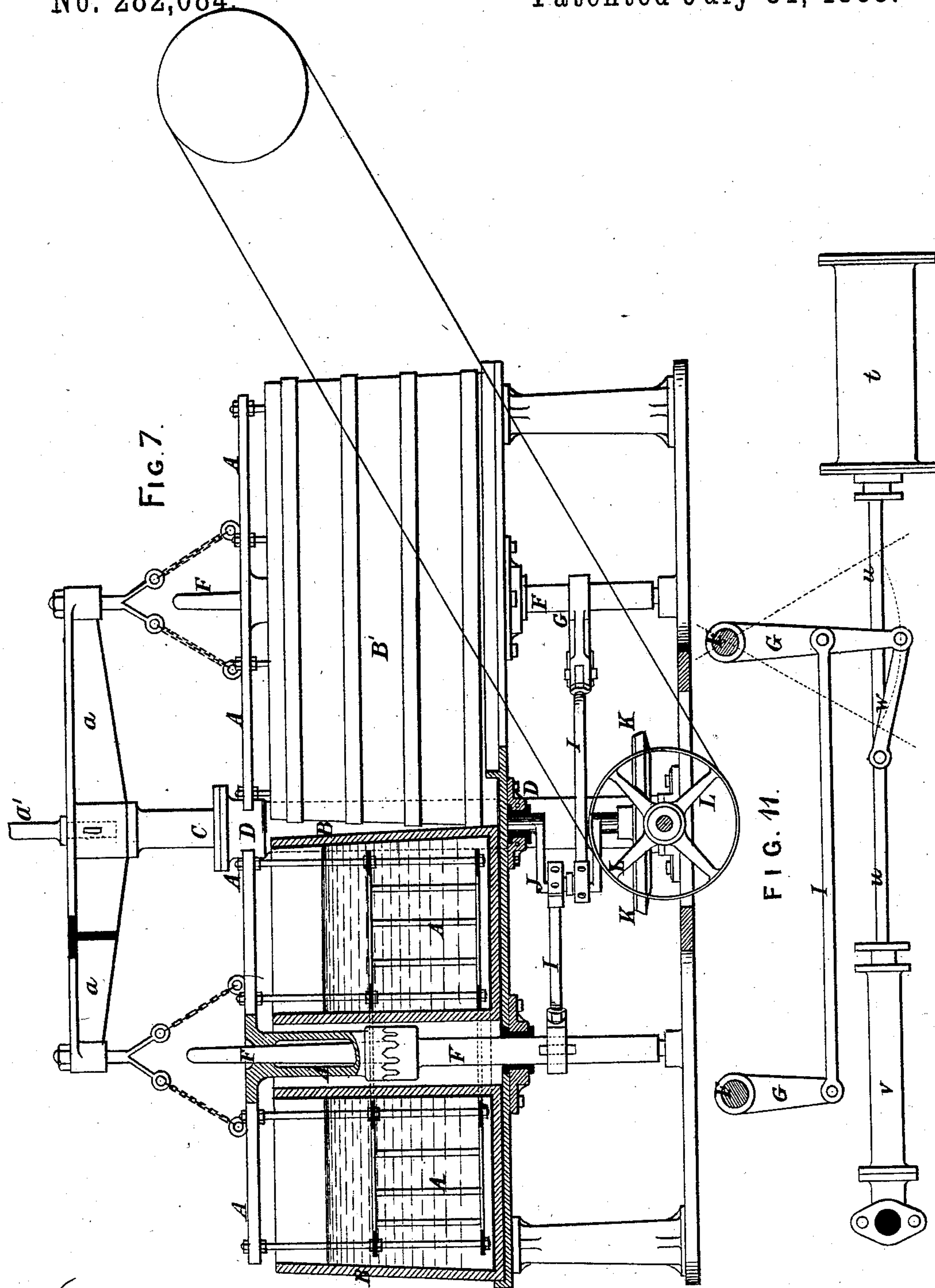
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J. Maile

J. Hark

*Inventor*

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per Lemuel W. Ferrell atty

Lemuel W. Perrell

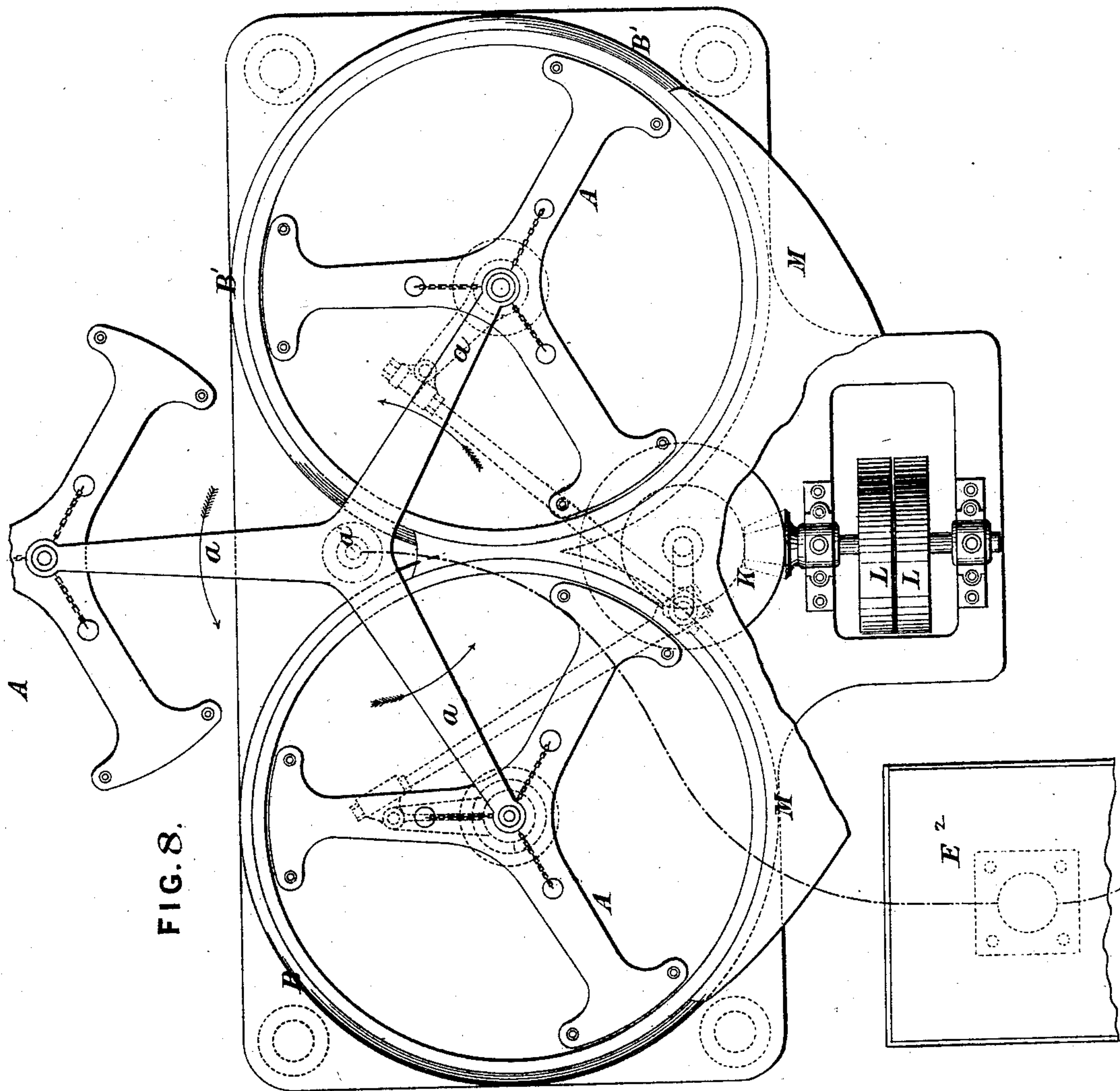
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# UNITED STATES PATENT OFFICE.

RICHARD J. HUTCHINGS, OF SWANSEA, COUNTY OF GLAMORGAN, ENGLAND,  
ASSIGNOR OF TWO-THIRDS TO WILKINS TRICK, OF SAME PLACE, AND  
JOHN WILLIAM HUGHES, OF LONDON, ENGLAND.

APPARATUS FOR PICKLING AND SWILLING METAL PLATES AND OTHER WARES.

SPECIFICATION forming part of Letters Patent No. 282,084, dated July 31, 1883.

Application filed March 15, 1881. (No model.) Patented in England March 18, 1876, No. 1,171.

*To all whom it may concern:*

Be it known that I, RICHARD JAMES HUTCHINGS, of Swansea, in the county of Glamorgan, England, have invented new and useful Improvements in Apparatus for Pickling and Swilling Metal Plates and other Wares, (for which I have obtained a patent in Great Britain March 18, 1876, No. 1,171,) of which the following is a specification.

My said invention relates to improved means, as hereinafter described, of cleaning metal plates by pickling and swilling them preparatory to their receiving a coating of tin terne or other metal or alloy; also equally applicable to both black and white pickling, and to the pickling of any article of iron or other metal which may be afterward coated with tin terne, copper, or any other metal or alloy; applicable also to the pickling of culinary utensils of cast-iron—such as kettles and saucepans—also for horses' bits and other articles which are exposed to rust, and for the preparation of wares to be galvanized or otherwise treated. Wares known as "sundry wares," of sheet-iron or "black plate," which have been stamped or wired, for example, may be pickled with machinery made according to my invention, and great saving effected thereby.

In order that my said invention may be properly understood, I will describe the same with reference to the accompanying drawings, and to the letters and figures marked thereon.

Figure 1 is a vertical section of machinery or apparatus for heating, pickling, and swilling metal plates constructed according to one arrangement of my invention. Fig. 2 is a plan of the same.

A is the cradle or frame for carrying the plates to be pickled.

B is the bath.

C C are ribs or projections on the inner side of the bath. There may be any number of these ribs or projections.

D is a hollow shaft or well at the center of the bath, open at top and bottom, provided at its outer circumference with ribs or projections C', and containing a spindle or shaft, E, working in bearings F. The oscillating mo-

tion is imparted to the cradle A, through the medium of this shaft E, by a crank at the lower end thereof.

G is the arm, keyed onto the shaft E.

J is a rotating crank, and I the connecting-rod coupling the crank and the arm G.

K are a pair of bevel-wheels, by which the shaft E is caused to oscillate or revolve in one or the other direction. The upper part of the shaft E terminates in a tapered square part, which fits into a socket formed in the sleeve C<sup>2</sup>, from which the cradle A is suspended by means of rods H, and the top of the sleeve C<sup>2</sup> is provided with a ring, by which the cradle and its contents may be raised or lowered out of or into the pickling-bath B or into the swilling-bath, as may be required.

Fig. 3 is a side elevation of the cradle A, shown suspended from a snatch-block and containing any convenient number of racks or spaces, as best suited for the sizes or number of plates or articles to be treated. Three of these cradles are necessary for carrying on the operation; but sometimes I use four or more.

Fig. 4 is a perspective view of a modified construction of the cradle A. This cradle may also be made of any desired shape or size, and may have any number of pockets or spaces as may be deemed necessary to suit the plates to be treated. I prefer to make the cradles of brass and in one casting.

When in operation, the shaft E, with the cradle A, is caused to oscillate or revolve either continuously or intermittently, thereby passing the plates in the racks or cradles through the pickling-liquor, the liquor in the bath may be heated by steam-coils or by any other known heating appliance; but this heating of the liquor is in some cases unnecessary. When the plates have been sufficiently immersed and treated in the bath B, the cradle A is raised from the spindle E, and is transferred, with its contents, to the spindle of another similar bath containing water, where the plates are washed or swilled in a similar manner, and the acid thereby removed. The third cradle, which has meanwhile been emptied of its plates that have been rinsed in the second or swilling



bath, is now filled with plates which are to be pickled and dropped into the pickling-vat. By this method it will be observed that a great amount of work can be done in a short time, as one cradleful of plates is being pickled while another is being rinsed and a third emptied and refilled with plates.

Sometimes I use two acid baths to one swilling-bath, whereby more work may be carried on, in which case I employ four cradles instead of three.

Fig. 5 is a vertical section of one modification of an arrangement for carrying my invention into effect. Fig. 6 is a horizontal section of the pickling-bath B. According to this arrangement, the cradle A, with its contents and attachments, is fixed, while the bath B revolves and is supported by friction-rollers underneath; otherwise the construction of the apparatus is very similar to that shown at Figs. 1, 2, and 3. The bath B is here preferably provided, as before, with ribs or projections C and C'. The shaft E is keyed or otherwise fixed into a socket or foot, and the bath B, with its bearings F, revolves around the said shaft, the lower one of which may be formed, as shown, in one with a bevel-wheel, K, fixed to the bath B, and gearing with another bevel-wheel fixed upon a shaft, *m*. The shaft *m* is shown driven in one or the other direction by means of the pulleys N; but it may be driven in any other suitable manner by a crank, for example, as hereinafter described.

Fig. 7 is an elevation of another modification according to my invention, where two baths are used side by side, with the pickling-bath shown in section. Fig. 8 is a plan of such apparatus.

A A are the cradles, suspended by chains or rods or otherwise, (so that the cradles may be oscillated,) to the triangular arms *a a a*. B is the pickling-bath, and B' the swilling-bath. C is the plunger of the elevator, and D the cylinder for same.

E<sup>2</sup>, Fig. 8, is an accumulator in connection with the pumps and elevator. D, as shown in dotted lines *a'*, is a stem above the triangular frame *a*, working through a bearing for giving additional guidance to the plunger when raising the cradles out of the baths, or for lowering them.

In Fig. 7 the sleeve A', projecting from the under side of triangular arms *a a a*, is shown partially in section and fitting around the upper part of the shaft F. F F are two rocking or oscillating central shafts, with the teeth thereon engaged with those on the under side of the sleeve A'. They are of a novel shape, as shown, whereby they are readily in gear, and there being parallel faces or sides, as well as the  $\Lambda$ -shaped points and roots, there is no liability of the cradles A being lifted during work. When they (the cradles) are elevated clear of the bath, the cradles A, suspended from the triangular arms *a*, turn in the direction shown by the arrows, Fig. 8.

G is an arm or lever keyed onto the shaft F, to which is connected a spring-box, H. (Shown detached and enlarged at Fig. 9.) The springs, which may be of steel or an elastic material, serve to lessen the jar on the return-strokes, and act on the end of the connecting-rod I; but this arrangement may be considerably varied.

J is a single-throw crank, to which both connecting-rods I are connected; or it may be a double-throw crank.

K is a bevel-wheel and pinion, and L are fast and loose pulleys driven from an engine or from an intermediate pulley in any convenient part—for example, the crank-axis of the pumps. The pumps are for forcing the accumulator up, from which the necessary power is transmitted to the elevator in any well-known manner.

The bevel-gearing K, pulleys L, and framing therewith are covered by a slope or platform, M, (shown broken in Fig. 8 to show the gearing more clearly,) so that when the cradle is raised out of the acid or pickling bath, the acid-droppings from the plates may return to the acid bath, and not drop into the machinery, which would otherwise be very considerably affected thereby.

Fig. 10 illustrates an arrangement where the two similar cradles may be operated direct from one crank. F is the center shaft; G, the arm keyed thereon. The connecting-rod L is pivoted to it, and at the other end to cross-head N, sliding on and along the bar N'. O is a connecting-rod from the cross-head N, at the other end pivoted to the crank wheel or arm of a crank, O', actuated by spur pinion and wheel P. Q Q are fast and loose pulleys.

Instead of motion being derived from a rotating crank, it may be direct from a fixed steam-cylinder, such as shown at Fig. 11. F are the shafts, and G the arms thereon. *t* is the steam-cylinder; *u*, the piston-rod at the other end, serving as the plunger in the pump or pumps *v*.

The arms G are coupled together by a rod, and one arm G connected to the piston-rod *u* by pin and link *w*, as shown; or the motion may be derived from an oscillating cylinder, as shown in Fig. 12.

*t* is the cylinder, and *u* the piston-rod, connected to one arm G, which is connected to the opposite arm G by a rod, as shown.

I claim as my invention—

1. The combination, with two vats containing pickling, swilling, or rinsing liquor, and three cradles for containing the metal plates to be operated upon, of mechanism for supporting such cradles, and elevating, transferring, lowering, and moving them while in the vats, substantially as specified, whereby the metal plates can be pickled, swilled, or rinsed by consecutive operations performed simultaneously on separate sets of plates, so that the sets of plates in two of the cradles are being pickled or



swilled while the plates are being removed from-and others placed into the third cradle, substantially as set forth.

5 2. A frame for holding the articles to be pickled or swilled, and a vat for containing the liquor therefor, and a central well in said vat, in combination with a shaft within the well, and means, as described, for removably connecting the frame and shaft, substantially as  
10 set forth.

3. The frame for holding goods to be pickled or swilled, in combination with a vat which may contain the liquor therefor, said vat being provided with a central well, and with ribs  
15 located on the interior of said vat to increase the scouring action of the liquor, in combination with a shaft, to which the aforesaid frame is connected, as described, and mechanism for oscillating said shaft, substantially as de-  
20 scribed.

4. In an apparatus for swilling and pickling metal goods, the separate frames or cradles for holding the goods to be treated, connected as described, in combination with vats for hold-  
25 ing the pickling-liquor and a vat for holding the swilling-liquor, and mechanism for imparting motion to the cradles while in the liquor, and with mechanism for transferring the cra-

dles and the plates held by them from and into the vats, substantially as and for the purposes  
30 set forth.

5. The combination, with the vat B, having a well through it, of a shaft located within said well, mechanism, as described, for oscillating said shaft, a frame for receiving the goods to  
35 be pickled or swilled, a sleeve connected with such frame, the said sleeve and shaft being constructed as described, whereby they are coupled when the sleeve is lowered upon the shaft, and devices for lowering and raising the frame,  
40 substantially as described.

6. The combined pickling and swilling apparatus, consisting of a pickling-vat, a swilling-vat, a three-armed cross-head, mechanism, as described, for raising and lowering said  
45 cross-head, and three frames for holding goods to be pickled and swilled successively in said vats, one attached to each arm of said cross-head for moving the goods in the liquor in the vats, substantially as set forth.

R. J. HUTCHINGS.

Witnesses:

E. S. BREWER,

EUGENE W. ECAILLE,

*Both of 33 Chancery Lane, London.*