

H. McKENZIE.
Processes and Apparatus for Making Extracts.
No. 150,597. Patented May 5, 1874.

FIG. II.

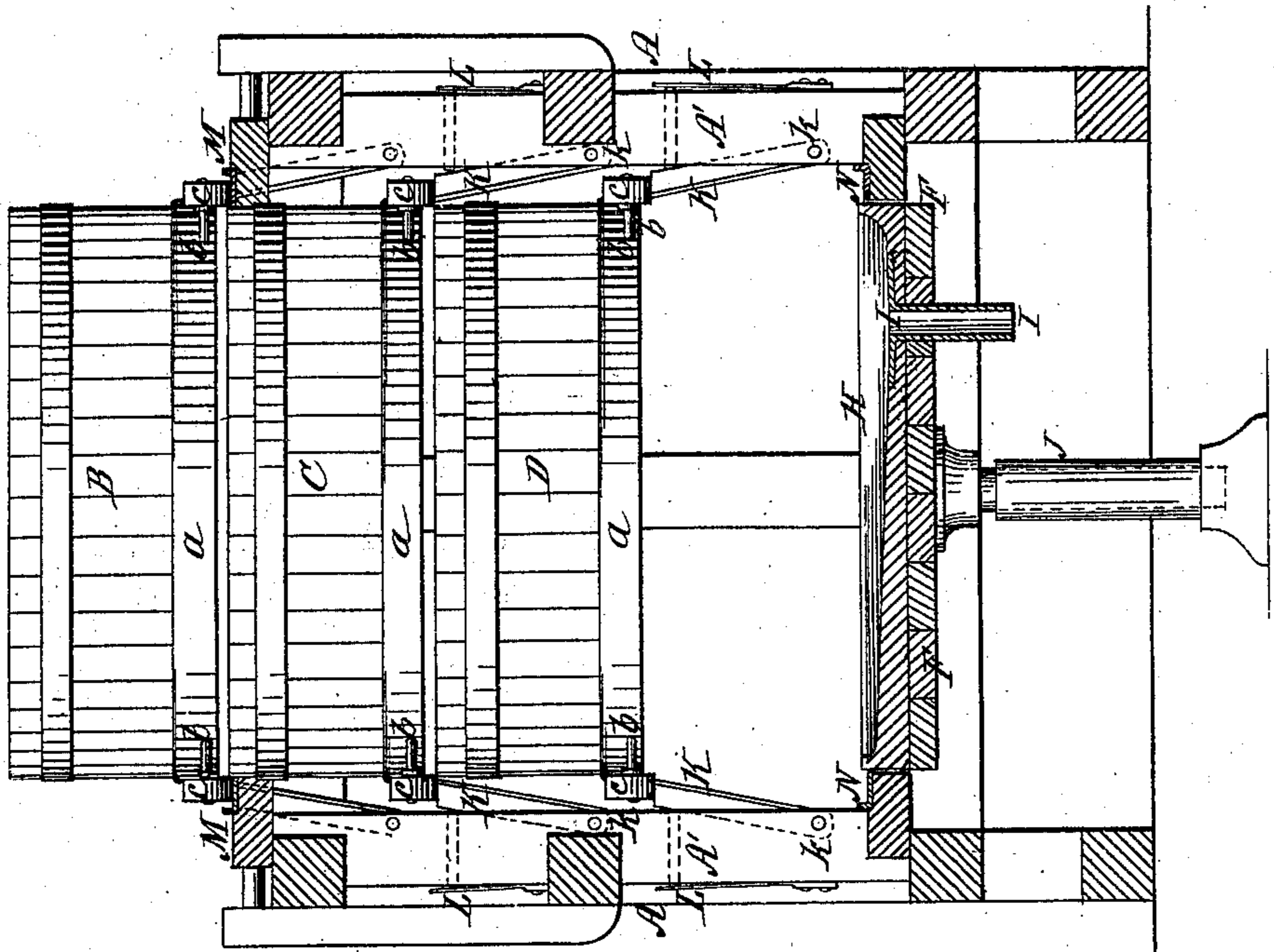
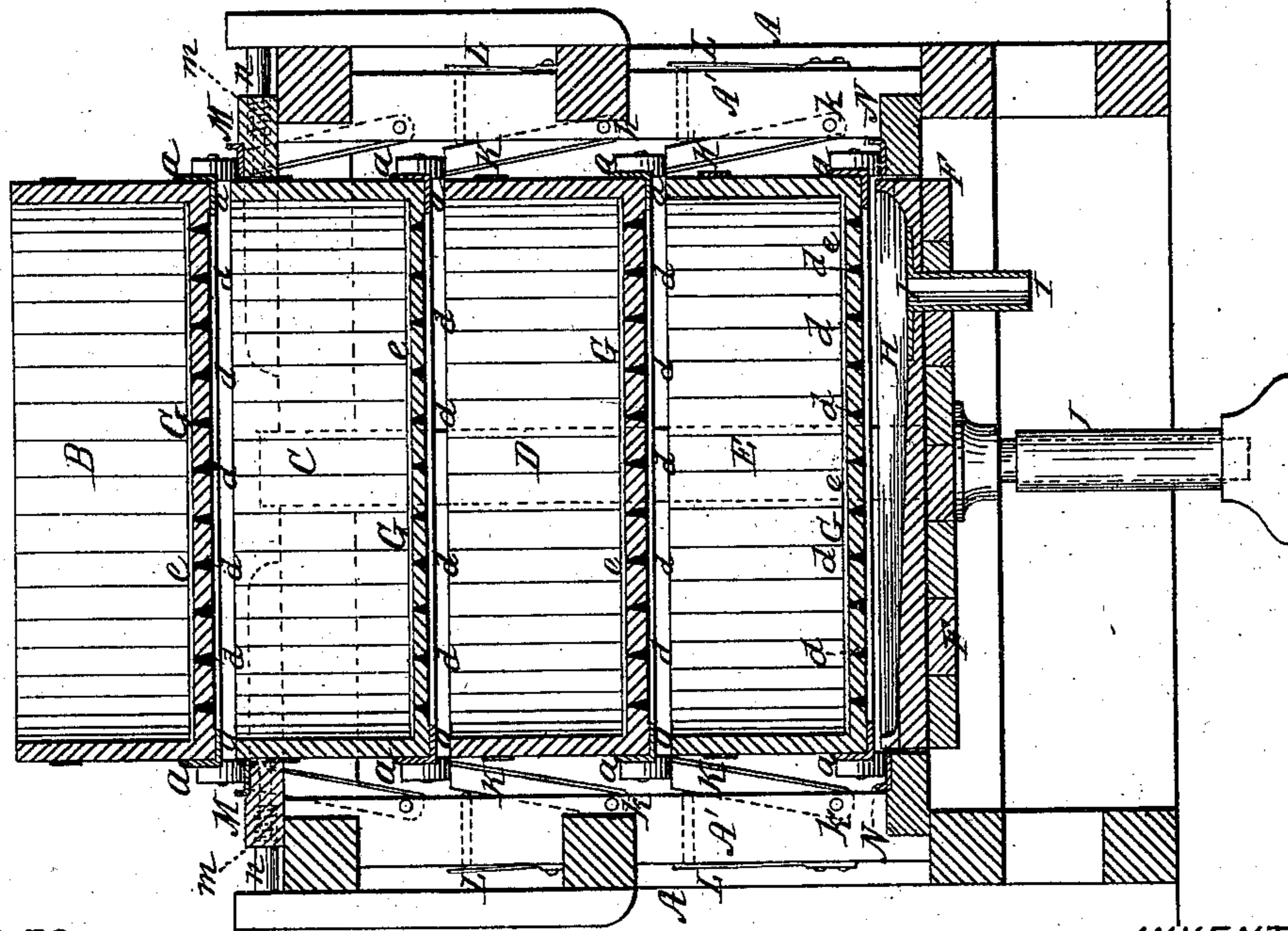


FIG. I.



WITNESSES:

J. Rutherford
Jos. D. Patten

INVENTOR:

Henry McKenzie
by *Johnson and Johnson*
his Attorneys

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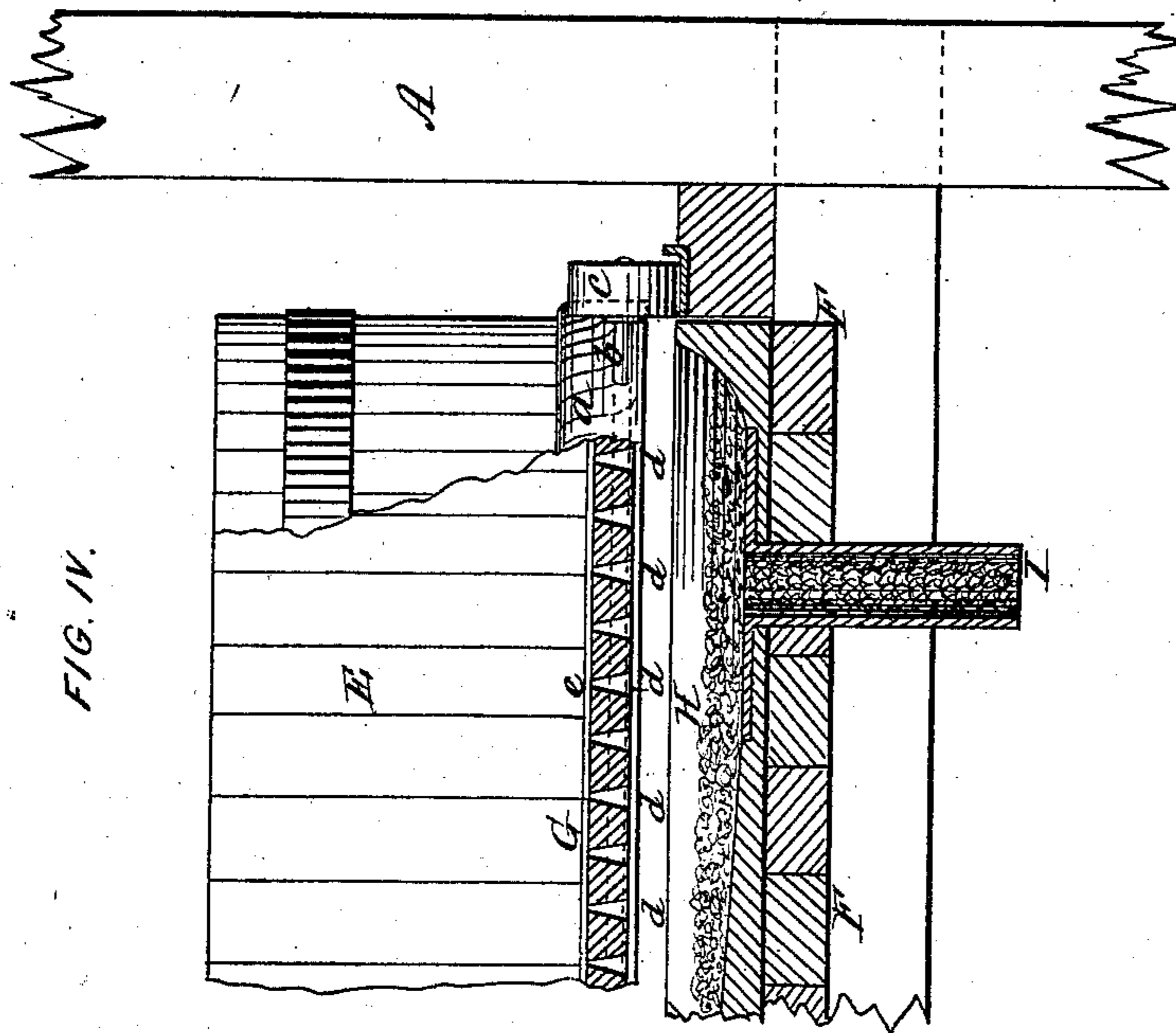


FIG. IV.

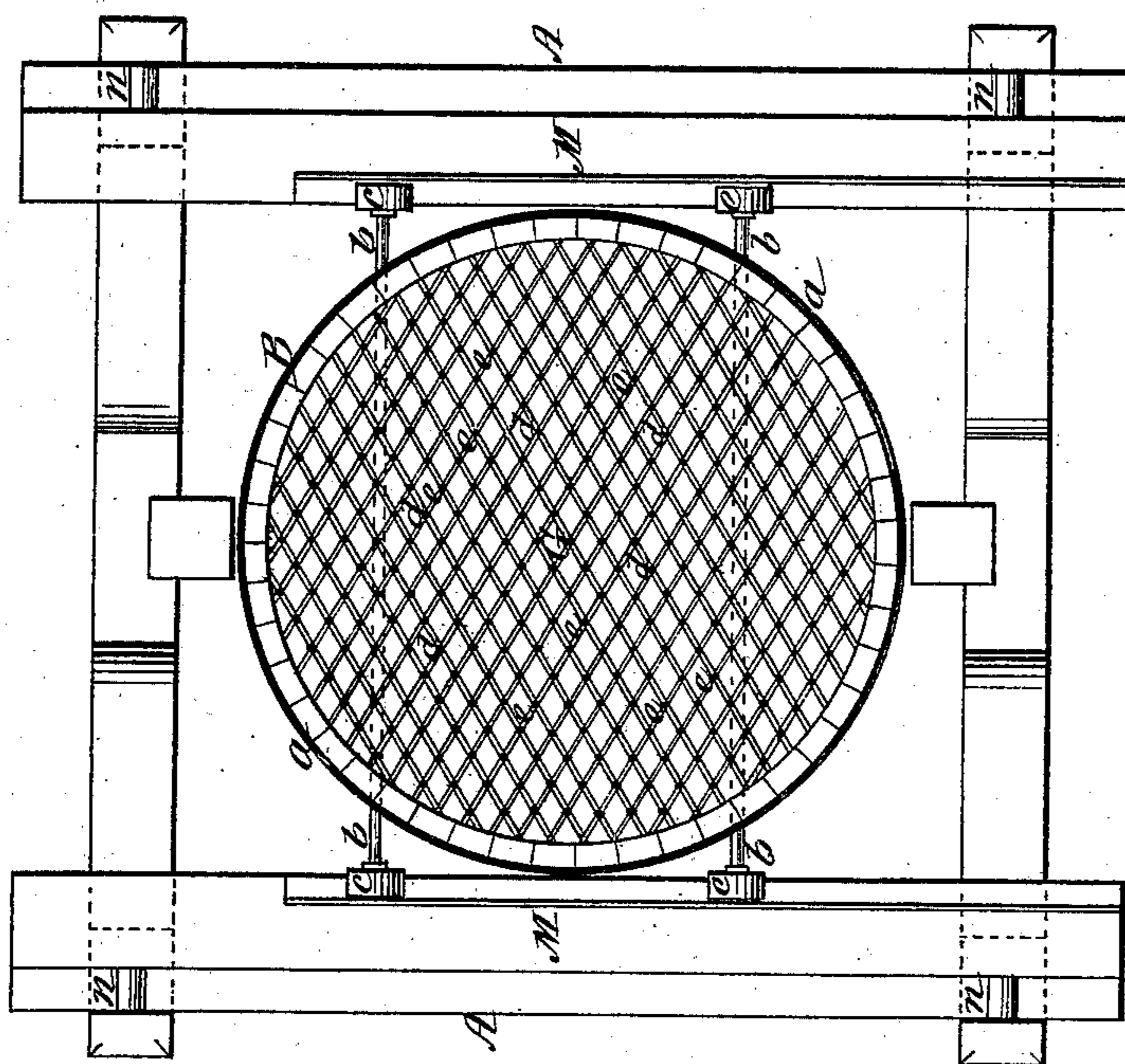


FIG. III.

WITNESSES:

A. Rutherford
J. D. Vatten

INVENTOR:

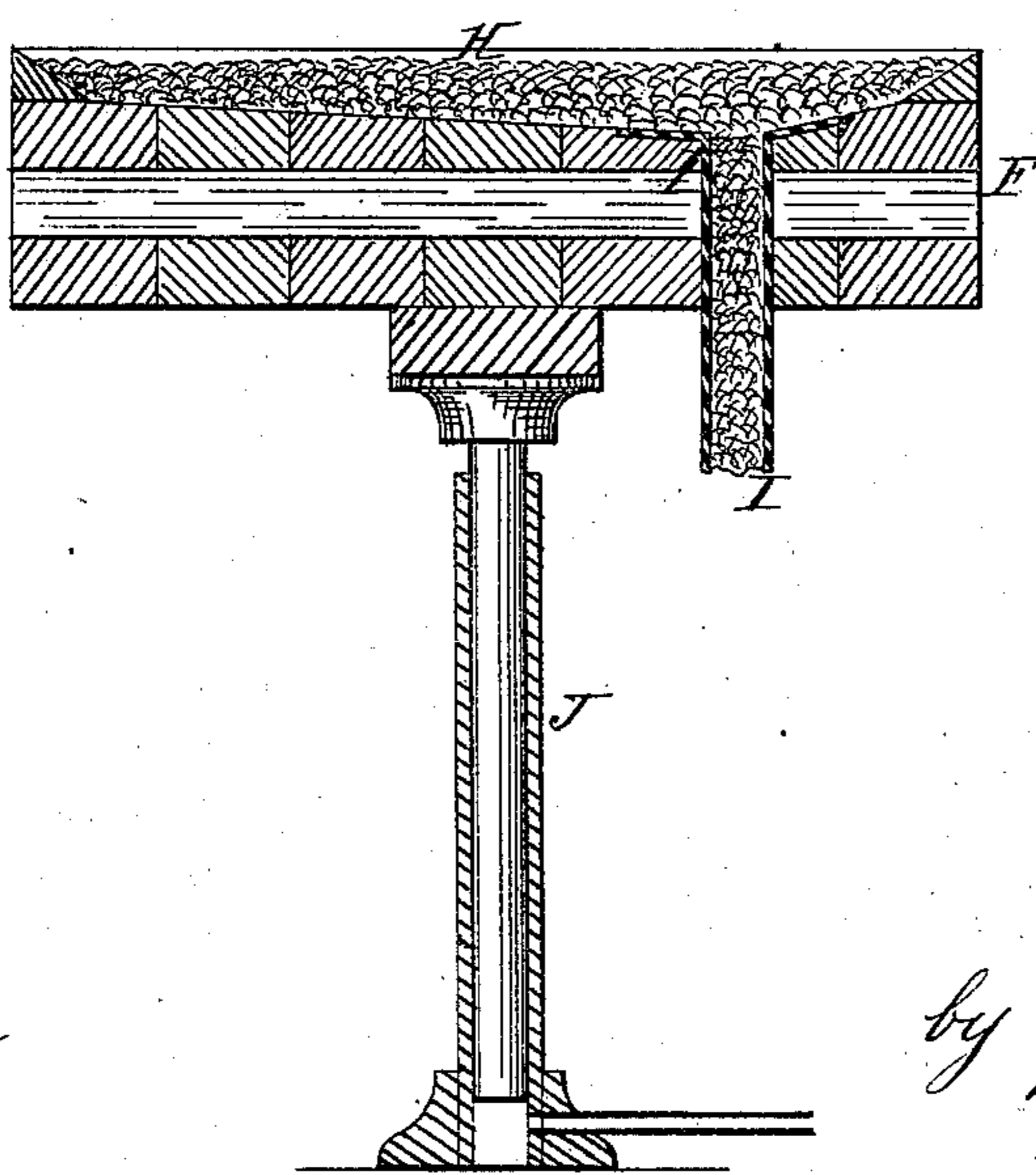
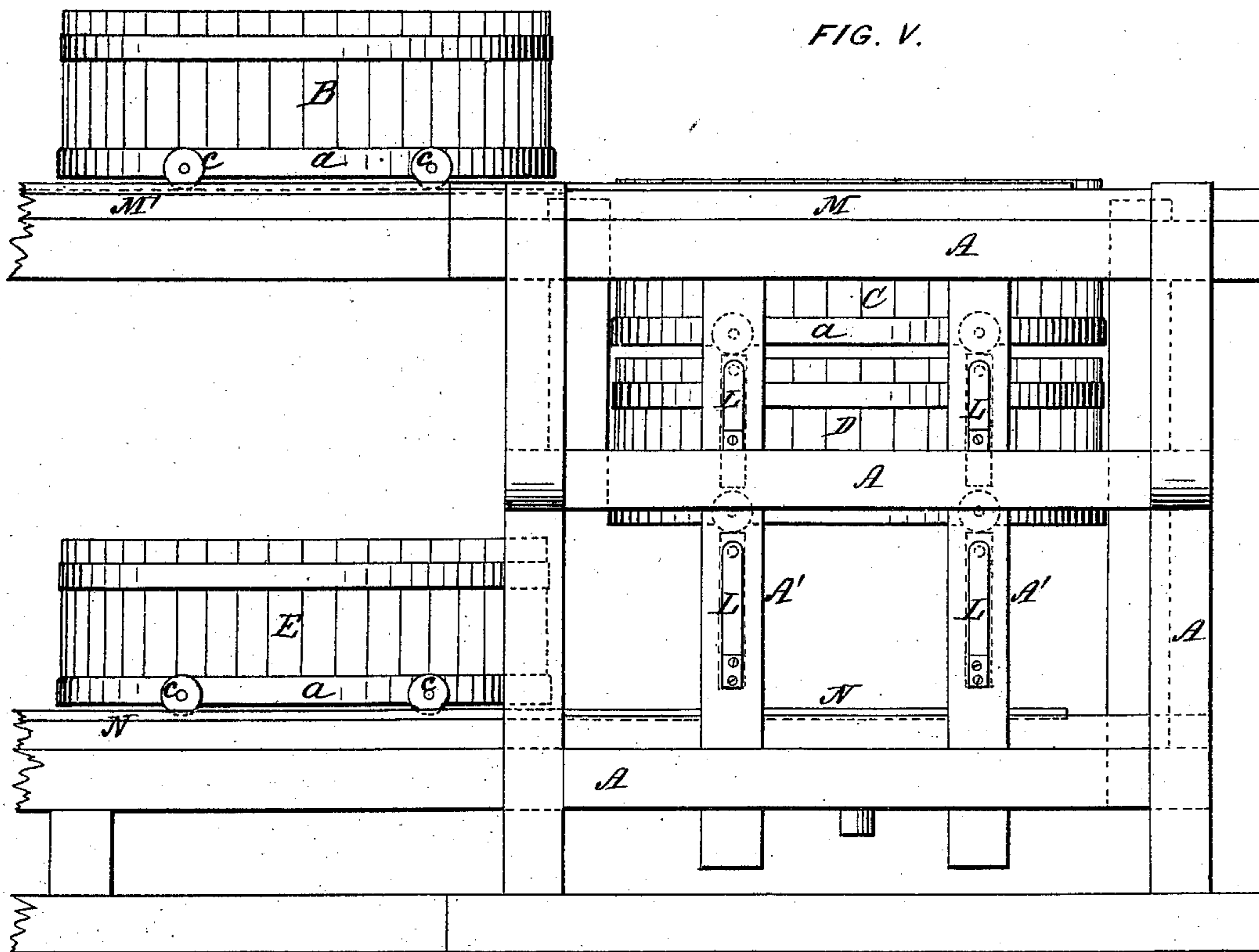
Henry McKenzie
by *Johnson and Johnson*
his Attorneys

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J. no. D. Patten

INVENTOR:

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by Johnson and Johnson
his Attorneys

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FIG. VI.

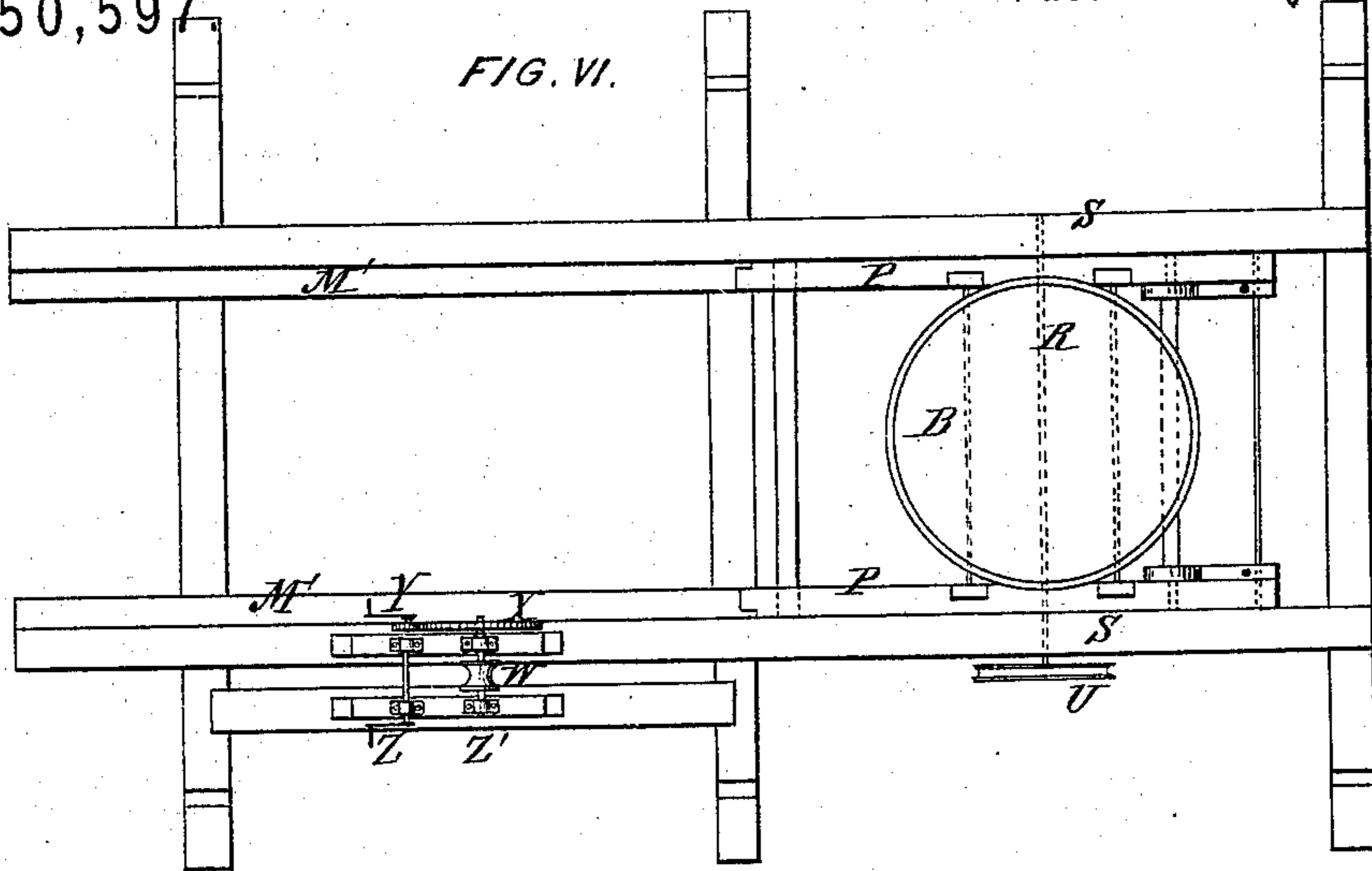


FIG. VII.

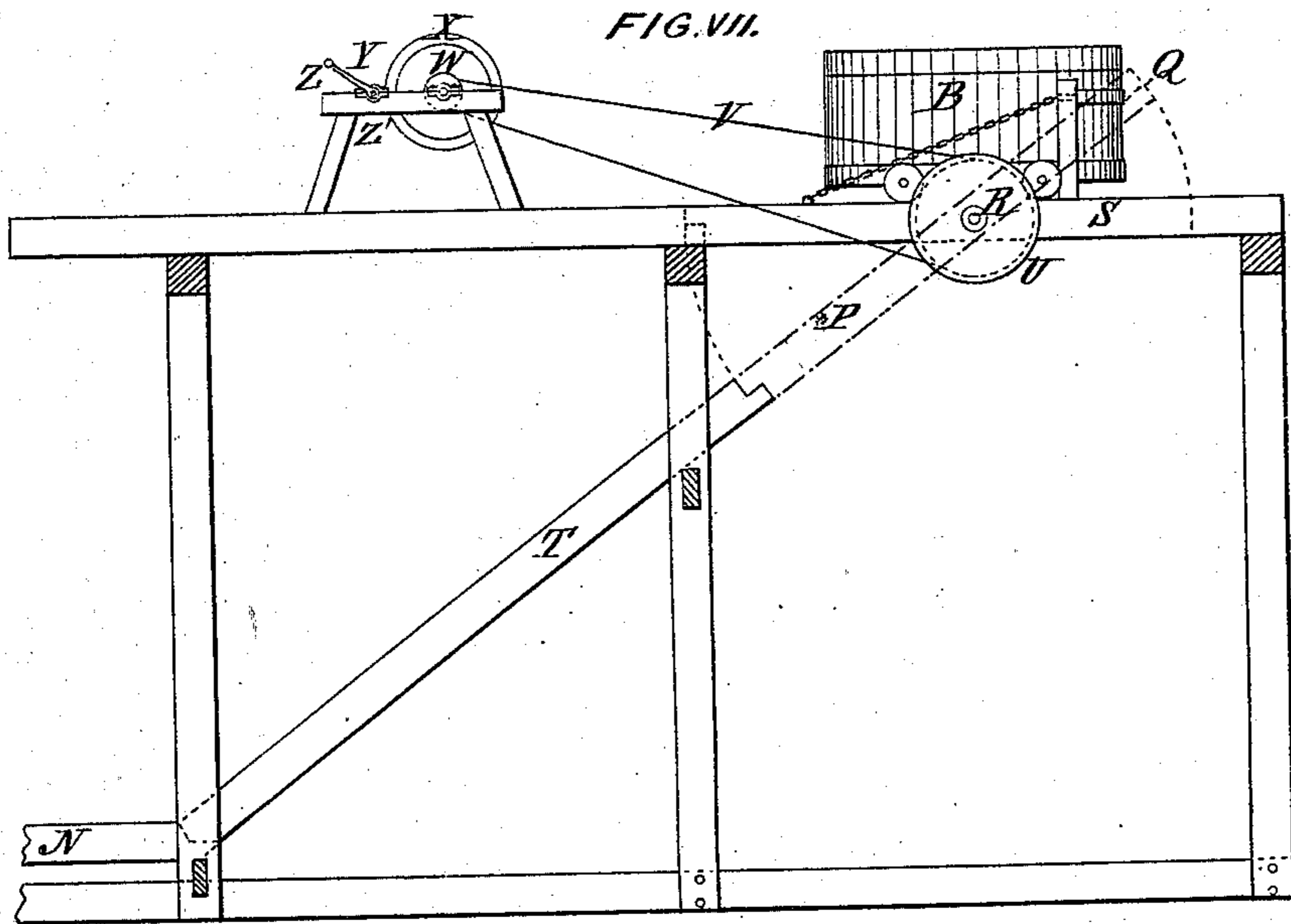


FIG. VIII.

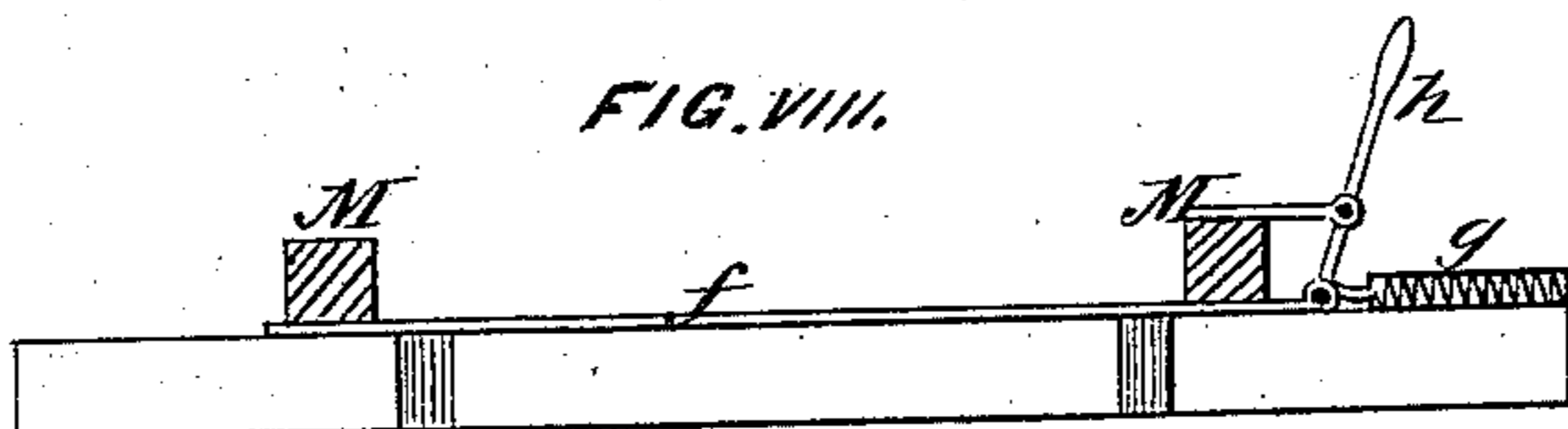
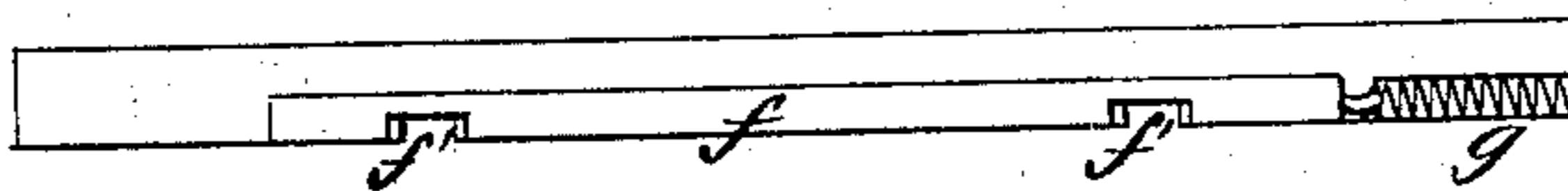


FIG. IX.



WITNESSES:

J. R. Rutherford
J. D. Patten

INVENTOR:

Henry McKenzie
by Johnson and Johnson
his Attys

UNITED STATES PATENT OFFICE.

HENRY McKENZIE, OF MARQUETTE, MICHIGAN.

IMPROVEMENT IN THE PROCESSES AND APPARATUS FOR MAKING EXTRACTS:

Specification forming part of Letters Patent No. **150,597**, dated May 5, 1874; application filed May 1, 1874.

To all whom it may concern:

Be it known that I, HENRY McKENZIE, of the city of Marquette, in the county of Marquette and State of Michigan, have invented certain new and useful Improvements in Method and Apparatus for Leaching; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings and to the letters of reference marked thereon, which form a part of this specification.

The methods hitherto practiced for leaching consist mainly of saturation and percolation. In the system of saturation the bark can never be completely exhausted, for the reason that there is an equalization of strength between the bark and the menstruum, while neither by such system nor by that of percolation is it possible to obtain a uniform grade of liquors, as the first run gives only a maximum in proportion to the quantity of material under treatment, with a steady diminution until the bark is nearly or quite exhausted. By these methods fully one-half of the liquors obtained are too weak for general use, and have to be rehandled and stored, and are commonly used as the solvent for fresh leaches. The rehandling of tannic liquors is very detrimental in rendering them more liable to sour, and depriving them more or less of their tannic properties. The contents of each leach or tub are also usually treated in mass on the same horizontal plane, and the expense of handling the material in its removal from the large tubs is frequently greater than that of preparing it and conveying it into the leach.

By my process, liquors of nearly uniform grade and nearly maximum strength are produced by a continuous process, completely exhausting successive small masses.

The distinctive feature of my invention consists of a nest of interchangeable tubs for leaching, operated within an open frame, in such manner that the lower tub will maintain a position upon a base track to be elevated by a platform, while the tub displaced at the top by the elevation of the nest will be delivered upon an elevated track in position to be run

off to a dumping-frame, whereby the tubs are displaced in succession from one track to another, and during such operation each tub is supported in said open frame independently of the others, with the platform lowered out of the way to leave a free and unobstructed space for the introduction of a fresh leach at the bottom of the supported nest; and whether the platform be at its lowest or highest position, or moving from one to the other, it performs the function of a "catch-pit" to collect the drippings from the nest above, and the formation of such catch-pit as an integral part of the elevating-platform, the motor whereof is combined therewith and controls its ascent and descent from below said platform.

In carrying out this method, the nest of tubs is raised simultaneously by the platform, which afterward descends to leave a free space for the insertion of a fresh leach beneath the nest, and as the leaching of the bark progresses, the top tub is run off an elevated track, dumped, and again returned filled upon a base track, to take its place in the nest which it had left.

By this method, the clear water or other solvent is first brought in contact, after the operation is commenced, with the weakest or most exhausted material, and, extracting the remaining strength, passes down to the next, which is somewhat stronger, and so on, till, having gained a little from each, it is brought in contact with and passes through the tub of fresh bark, and is then about one hundred per cent. stronger than the liquor usually obtained by any other process.

The apparatus is of such novel construction as will give this continuous system of leaching without interruption, avoiding nearly all the manual labor in handling the material, while effecting a great saving in the amount of material required to furnish a given strength or quantity of liquors; and the operation may be suspended any time without detriment to the liquor or material. The operation is rendered continuous, at stated intervals, by the displacement of the top tub and the supply of a fresh-filled one at the bottom, and this is effected by the simultaneous raising of the nest by means of a suitable hydraulic press or other power applied to the platform. After this

movement of the nest of tubs the intermediate ones are supported within the frame separately and independently of the other at suitable heights, and by means which will allow of their upward movement from the base to the top track.

In the accompanying drawings, Figure 1 represents a vertical section of my new system of leach-tubs in the positions they occupy when the nest is completed and in operation; Fig. 2, a similar view, showing the nest of tubs in elevation, raised and supported separately, with the platform lowered to give place for a tub containing fresh material; Fig. 3, a top view of the apparatus; Fig. 4, a sectional view of the lower tub and the catch-pit platform on which it rests, on an enlarged scale; Fig. 5, a side elevation of the apparatus, showing a tub of fresh material on the base track ready to be run in place beneath the nest, and the top tub partly run off the dump; Fig. 6, a top view of the tilting frame and dumping apparatus, and Fig. 7 a side view thereof.

The frame A is constructed in any suitable manner to give the strength required, and of sufficient height to hold the number of leach-tubs desired to operate with; in the example shown there being four, B C D E, of any suitable form, and about three feet in height, and holding about a cord of ground bark. Near the base of the frame is arranged a horizontal catch-pit or platform, F, upon which the nest of tubs is supported while being raised, for which purpose the platform has a vertical movement in guides in the frame, as will be hereafter more fully described. Each tub is bound at its bottom with a wrought angle-iron, *a*, which embraces both the sides and bottom edge of the tub, and through which the axles *b* of truck-wheels *c* pass and have firm bearings, and the axles being likewise embedded in the under side of the bottom, to give a firm and durable support to the bottom of the tub, and especially to prevent it from springing under the influence of the water and steam used at different stages of leaching. The bottom G of each tub is of peculiar construction, adapted to the system of percolation and drip-feeding, having a multitude of perforations, *d*, of conical form, with the enlarged portion opening at the lower side to prevent their choking. The smaller ends of these perforations open into the top surface of the bottom, which has channels or grooves *e*, in any suitable manner, that intercept each opening *d*, and form a net-work of ducts, to direct the fluids into and out of each opening. The vertically-movable platform F has its central upper surface made into a "catch-pit," H, to collect the liquor from the tubs, and the latter are arranged for interchanging their positions, vertically, over this catch-pit, wherein is also formed a filter, being bedded with any suitable filtering substance. The filtering-pit inclines to one side of the center, at which depression the outlet-opening I is located, through which the liquor passes to suitable receptacles.

A hydraulic press, J, or other suitable lifting power, is arranged beneath this catch-pit platform as the means by which it is elevated and depressed, the limit of its ascent being governed by the height of the tubs; and the function of this platform is to raise the nest of tubs simultaneously, to displace the lower one to give place for the insertion of a tub with fresh bark, and at the same time carry the uppermost tub of the nest above the top of the frame A, and so on in succession, delivering one to be run off to be emptied, and making room for the supply of a fresh-filled one at the base at proper intervals. During this operation the platform descends out of the way, as each top tub is put by it in position to be run off. To do this each tub in the ascent of the nest passes over strong arms K, of the exact height occupied by each tub, and pivoted in the side timbers A' of the frame at *k*, so as to be pressed back to let the tubs pass, and when the truck-wheels of the latter reach a point above these arms K they are forced inward by springs L, so that their upper ends will form abutments or stops, upon which the truck-wheels rest, and maintain each tub in its proper position within the frame independent of each other, but directly in line. The supports for the upper tub are formed by railway-tracks M on the top of the frame, sections of which tracks are made to move outward, in the same way as the abutting-stops K, as each top tub is forced up between them, and to be again brought in line with the track of the wheels of the tub by the springs *m*, arranged in any suitable manner behind them, the said sectional tracks being held in place by guides *n* in the cross-timbers of the frame. In the instance shown, the truck-wheels *c* are the means for pressing back the supports K for each tub; but I do not confine myself to this particular construction, as this may be accomplished in various ways, so long as the movement of the tubs themselves serves to automatically displace the tub-supports while in transit to the top track, during the operation of displacement and return of the tubs to the nest. The tubs are run into position in the nest upon a lower railway, N, which leads from any convenient part of the building, and passes on either side of the platform F, on a level therewith, and upon this track the lower tub rests above the catch-pit, so as to leave the platform free to be raised with the nest of tubs, in the manner stated. The emptying of the tubs of their contents is effected away from the leach by running the top one out on the track M' and dumping it. For this purpose the end of the track is provided with a tilting frame, P, having a front band, Q, which partially embraces the tub, to hold it while the frame is tilted back with the tub to dump out the contents. This frame P is a part of the track M', and is mounted upon an axle, R, made fast to the tilting frame P, and having its bearings in the side timbers S on each side

of the tilting frame. This frame P is made to tilt outward to dump the tub, and inward and downward to form a junction with, and a continuation of, an inclined track, T, which joins the base track, as shown in Fig. 7 of the drawings. The means for operating the tilting frame consists of a pulley, U, on the axle of the frame P, from which a cord, V, extends to a small pulley, W, on the axle of a short shaft, on which there is a cog-wheel, X, gearing into a pinion, Y, of a double-crank rod, Z, mounted in a frame, Z', on the side of the track. By turning the crank-handles to the right the frame P is turned down to dump the tub, and by turning the handles to the left the frame and tub are brought up and turned down inward, to bring the frame-rails in line with the inclined track upon which the tub is lowered to the base track; in doing which a hooked rope is fastened over the hind axle and passed round a roller, to which brake-levers are applied for letting the tub down without danger. The junction of the tilting frame is made with the elevated track by a notched slide-bar, *f*, top and side views of which are shown in Figs. 8 and 9, so that by sliding the bar *f* so that the notches therein will be opposite to the ends of the frame P, the latter can be turned on its axle either way for the purpose stated. A spring, *g*, is arranged to force the bar *f* back and hold it in place; and the bar is operated by a handle, *h*, attached at the side of the track. In tilting the tub to dump it is held in place by a rod hooked into an eye on the frame P and over the axle of the tub, which rod is unhooked in lowering the tub. This hooked rod may be held in position for use by a chain. When the tub is lowered the ropes are detached and the tub pushed along the base track under a "stock-bin" or chute, where it is again refilled and ready to assume the first or lower position in the leach-frame.

In the operation of the leach the press J is lowered, allowing the platform F to descend to the level of the base track N. The tubs are then all filled with fresh bark and run upon the track and raised by the press one at a time, leaving the intermediate tubs resting upon their supports K and the top tub upon the elevated track M, in which position the hot water or other fluid is let onto the material in the upper tub by means of a sprinkler—a patent for which granted to me bears even date herewith—and passes by percolation down through the nest onto and upon the catch-pit, where it is filtered drop by drop, and passes off by suitable pipes. In this condition the tubs remain for about an hour and a half, when the top tub is run off and its contents dumped; meanwhile, a tub of fresh bark being in waiting upon the lower track, the press is put into operation and elevates the nest, so as to bring another tub to the top. The press then descends, leaving the space below the suspended tub to receive the next

filled tub in position beneath the nest, when, after standing a similar length of time, the same operation takes place of displacing one and supplying a fresh tub, during which process the material in the upper tubs is thoroughly exhausted of whatever strength may remain in it. Each successive tub receives the drippings from the one above it, and the liquors receive a constant accession of strength from the less exhausted material in the tubs below, into which it drips, and with which it comes in contact in its downward progress, the material constantly increasing in freshness and the liquor in strength.

The operation of displacing an exhausted tub and supplying a fresh-filled one being done quickly, there is little or no interference with the continuous drip or leaching of the tubs above, as the liquor either falls into the catch-pit or into the tub going into place, so that the operation of renewing the tubs is made without interrupting the leaching operation.

I claim—

1. A nest of interchangeable tubs for leaching, operated within an open frame, A, substantially as described.
2. The combination of a nest of interchangeable tubs, the lower one whereof being run on a base track in position with the nest, and the upper one run off an elevated track, with an elevating-platform, F, to displace the tubs in succession from one railway to another, substantially as described.
3. An elevating-platform, F, for a nest of leaching-tubs, having combined therewith a catch-pit, H, to collect the dripping liquor.
4. The combination of a nest of interchangeable leaches with a filtering catch-pit, H, forming a part of and carried by the platform F, which elevates the leach-tubs.
5. The combination, in a leach-tub, of the conical bottom perforations *d* and the network of grooves or channels *e*, substantially as and for the purpose described.
6. The combination of the leach-tubs with the yielding stops or supports K therefor, in their transit to the top of the frame.
7. The combination of the leach-tubs with the sectional yielding track M at the top of the frame.
8. The combination of the movable platform F and interchangeable leaching-tubs with the fixed base track N, arranged in relation to the platform F, as described, whereby the bottom leach is supported in position while awaiting the elevating action of the platform.
9. The tilting frame or dump P, provided with supports, Q, for the tub, in combination with the track M M' and the devices for lifting said frame and tub to empty its contents.
10. The base and elevated tracks N M M', in combination with the dumping-frame P and the inclined track T, with which the tilting frame forms a junction, as described, whereby the empty tub is transferred from the upper to the lower track to be refilled for leaching.

11. The combination of the leach-frame A with the elevated and base tracks M M' and N, the elevating-platform F, and the nest of leaches, substantially as described.

12. The combination of the platform F and the leaching tubs with the elevating device J, substantially as described.

13. The combination of the angle base-irons *a* of the leaching-tub with the axles *b* of the track-wheels *c*, whereby the sides and bottom

of the tub are firmly bound together to sustain the weight and strain of the material in the tub, as hereinbefore set forth.

In testimony that I claim the foregoing as my own, I have affixed my signature in presence of two witnesses.

HENRY MCKENZIE.

Witnesses:

A. E. H. JOHNSON,

J. W. HAMILTON JOHNSON.