

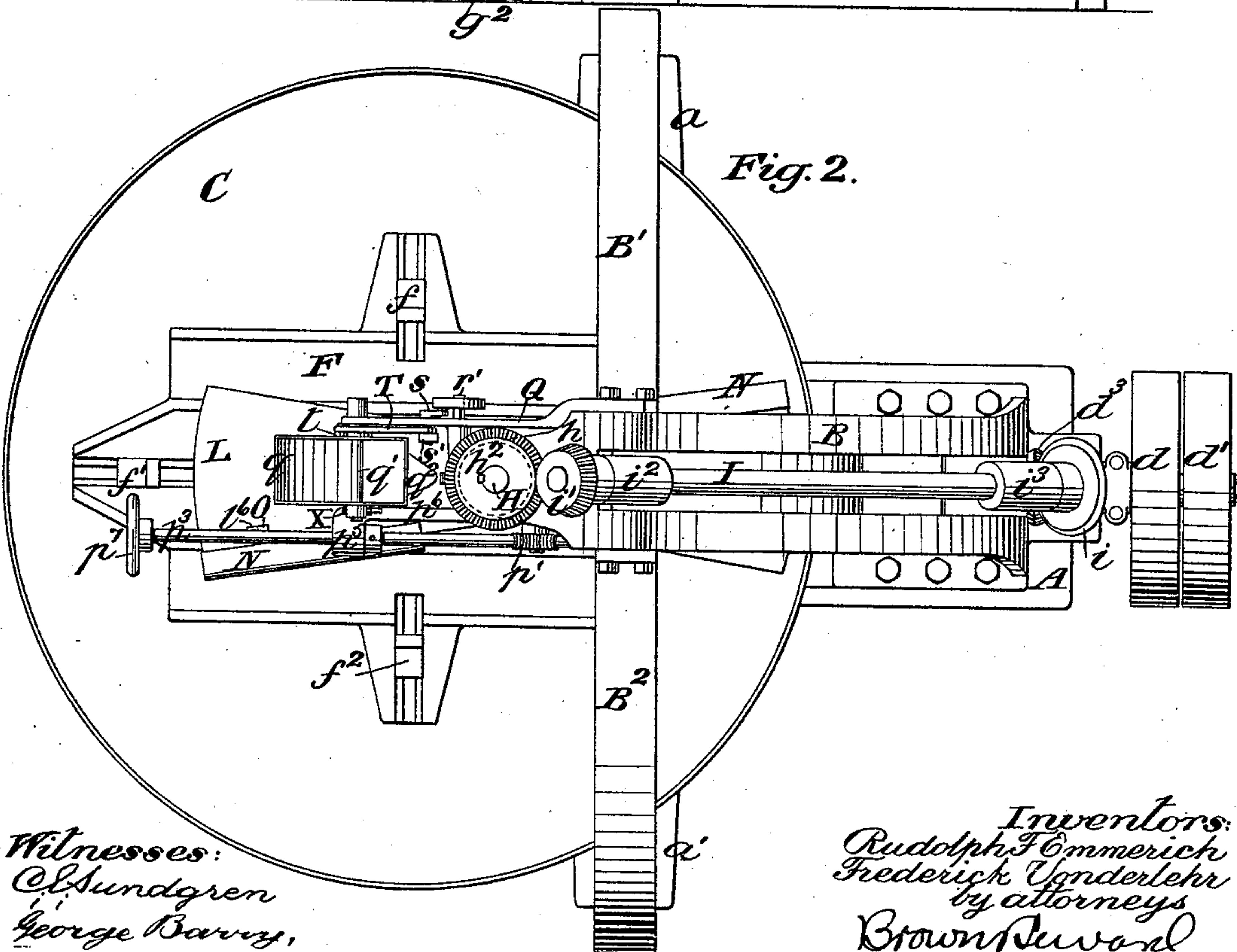
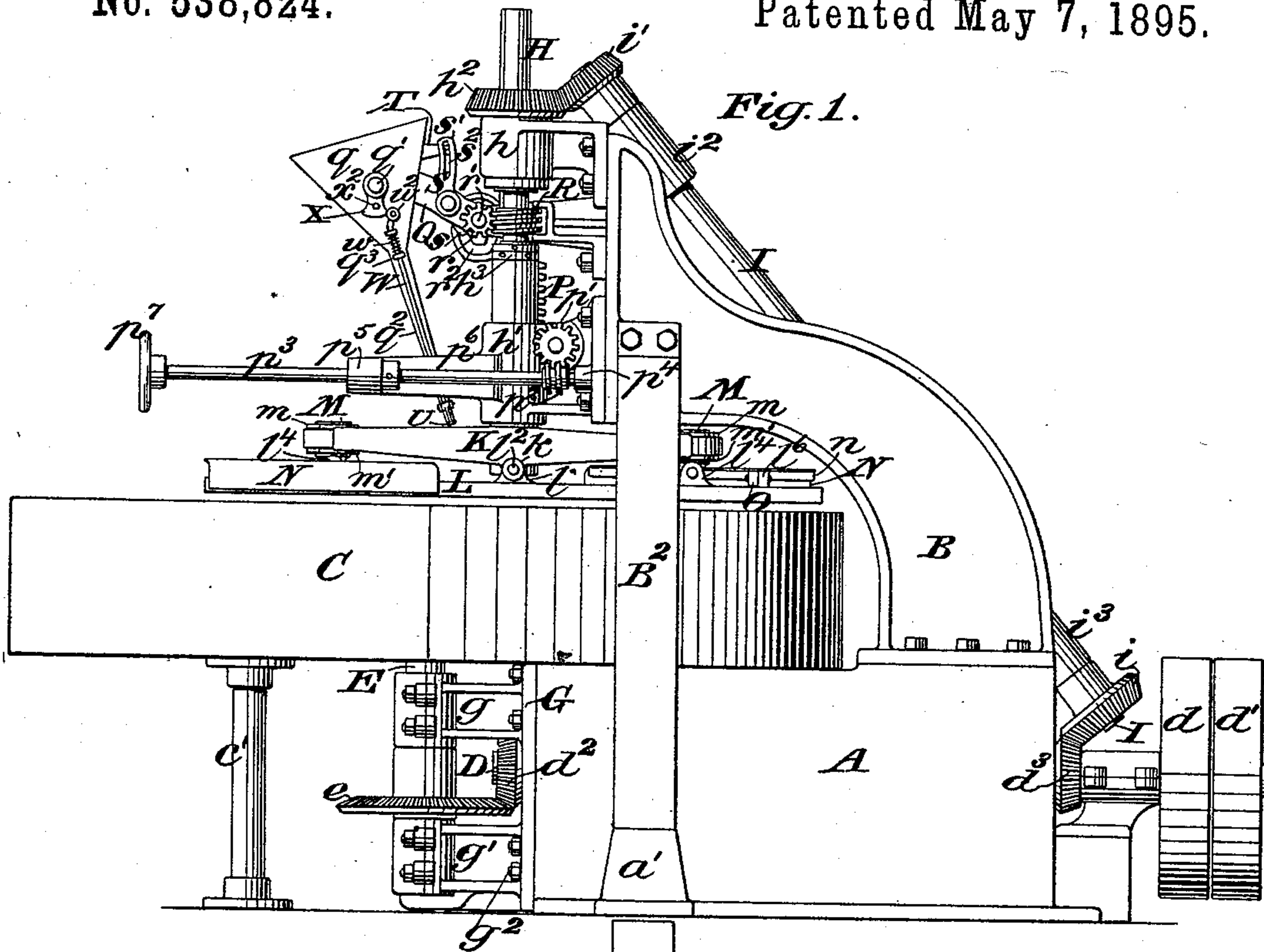
(No Model.)

4 Sheets—Sheet 1.

R. F. EMMERICH & F. VONDERLEHR.
STONE GRINDING MACHINE.

No. 538,824.

Patented May 7, 1895.



Witnesses:
O. Sundgren
George Barry,

Inventors:
Rudolph F. Emmerich
Frederick Vonderlehr
by attorneys
Brown & Howard

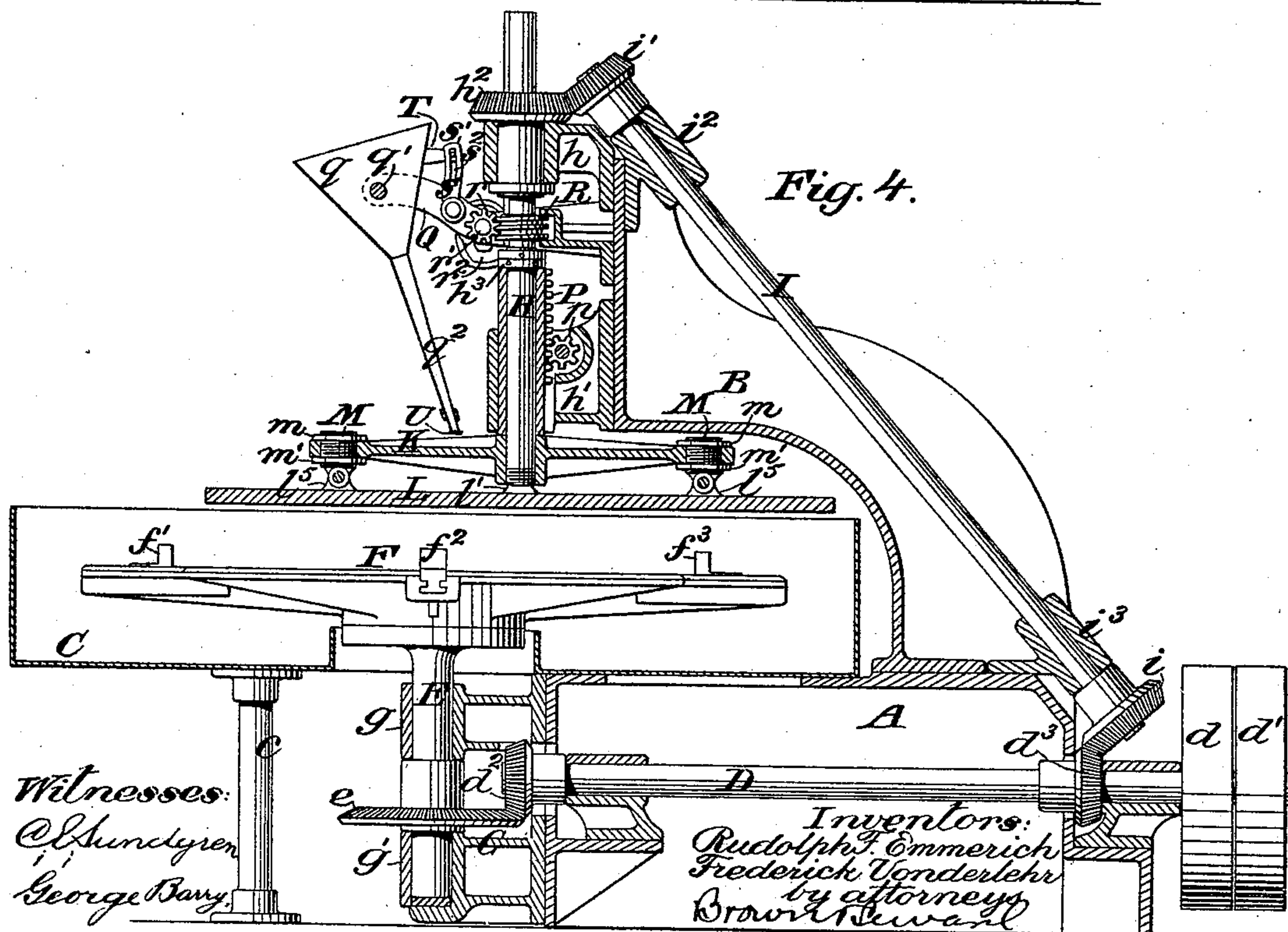
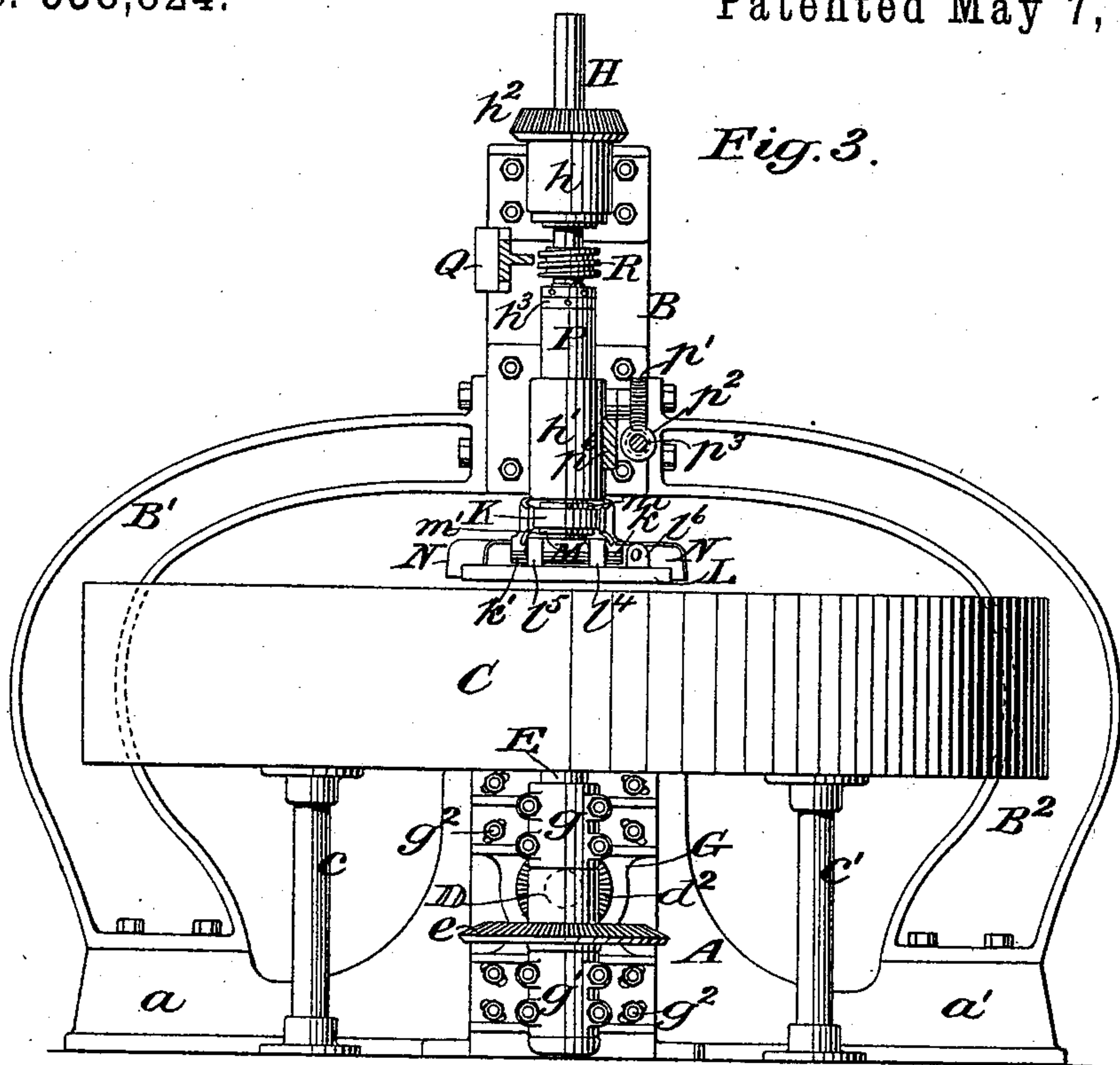
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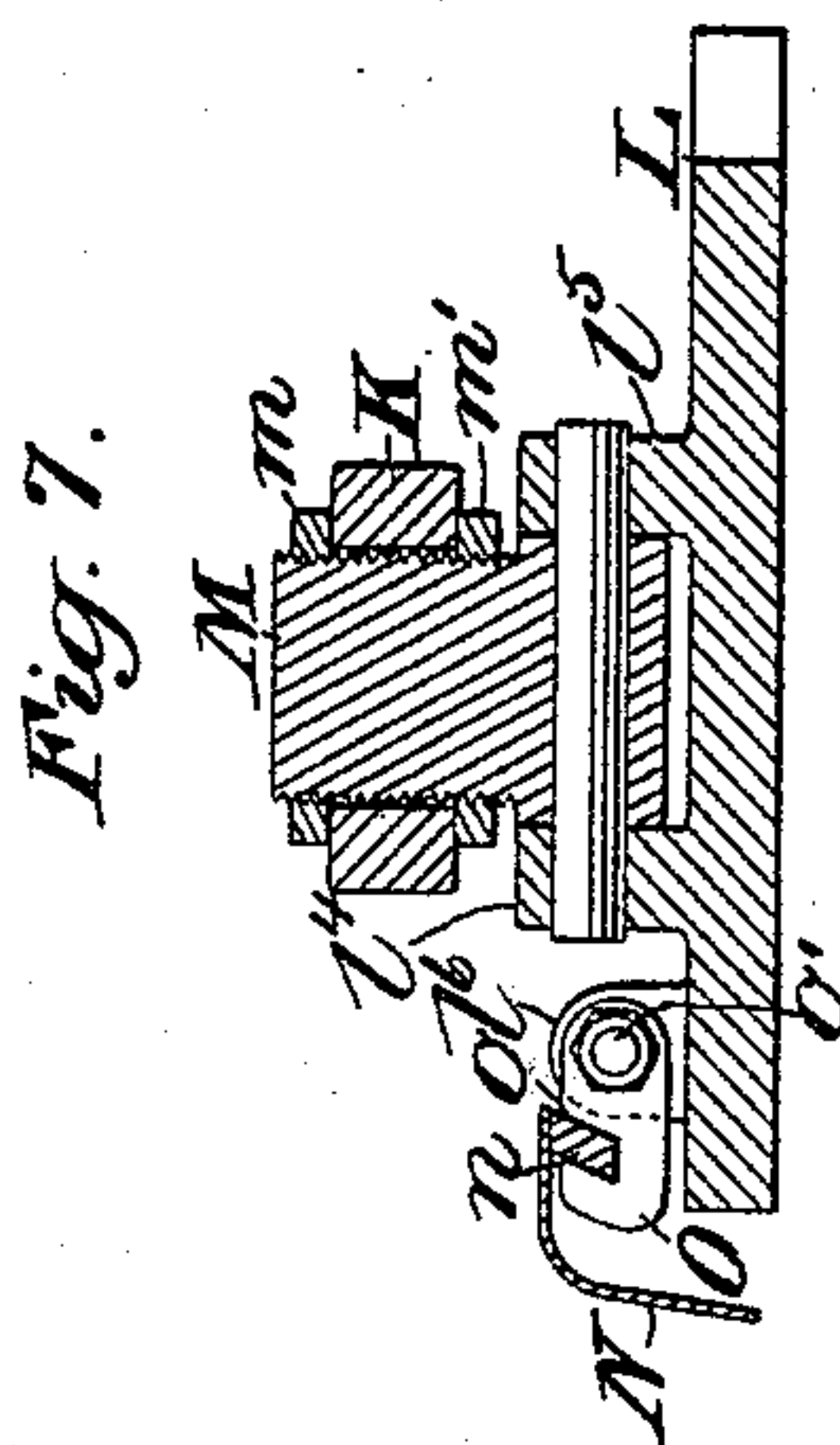
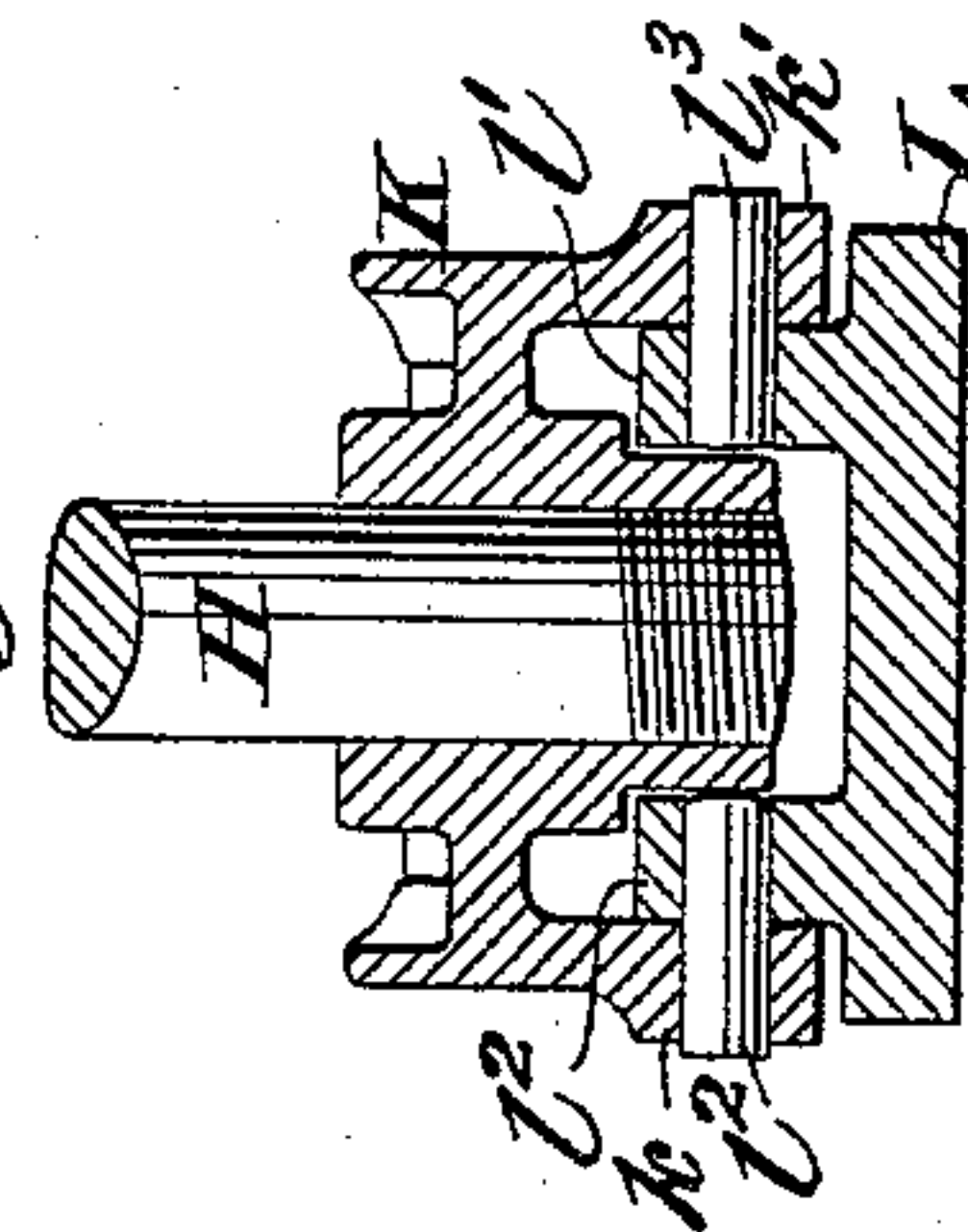
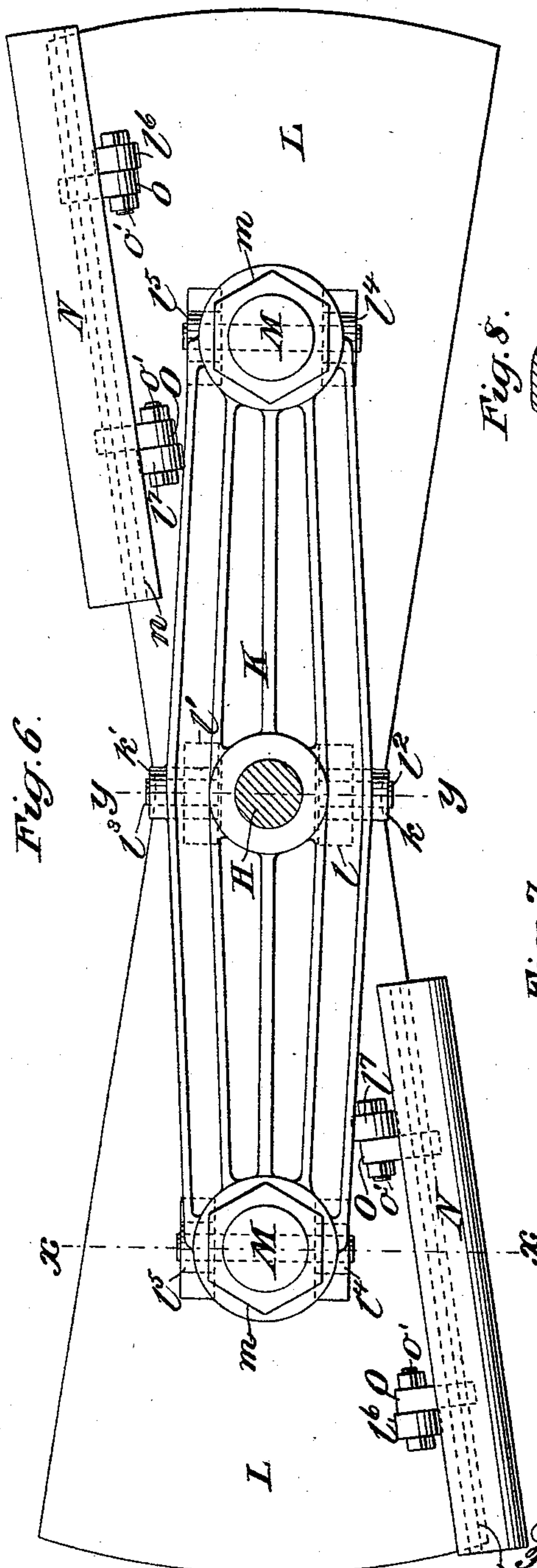
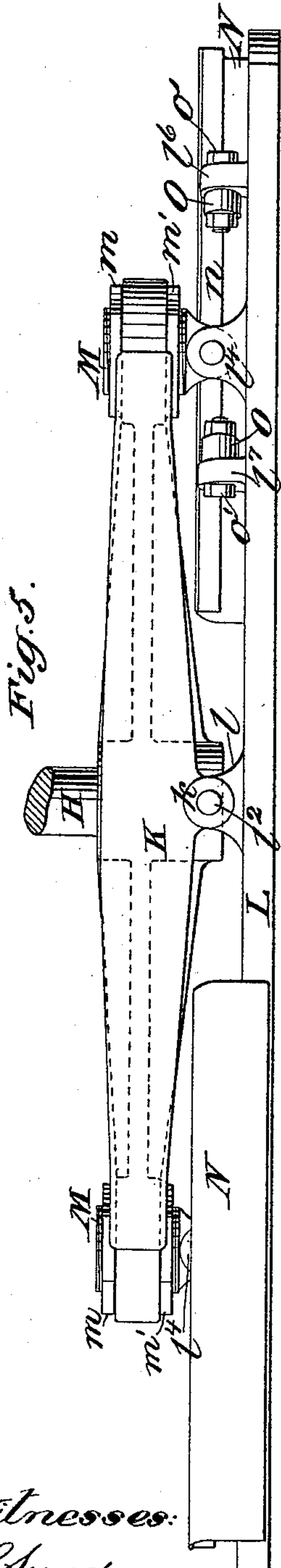
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4 Sheets—Sheet 3.

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4 Sheets—Sheet 4.

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Fig. 10.

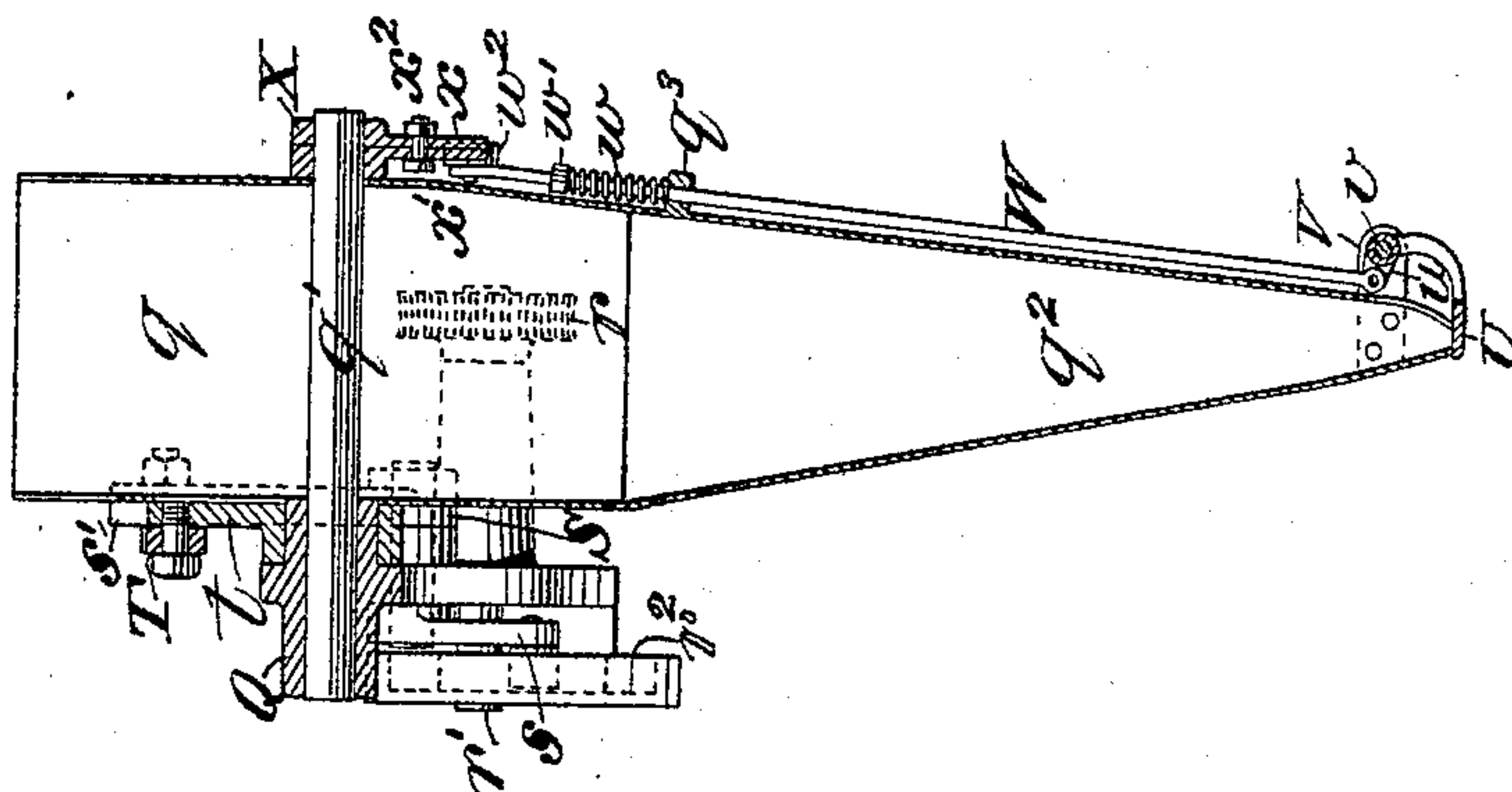
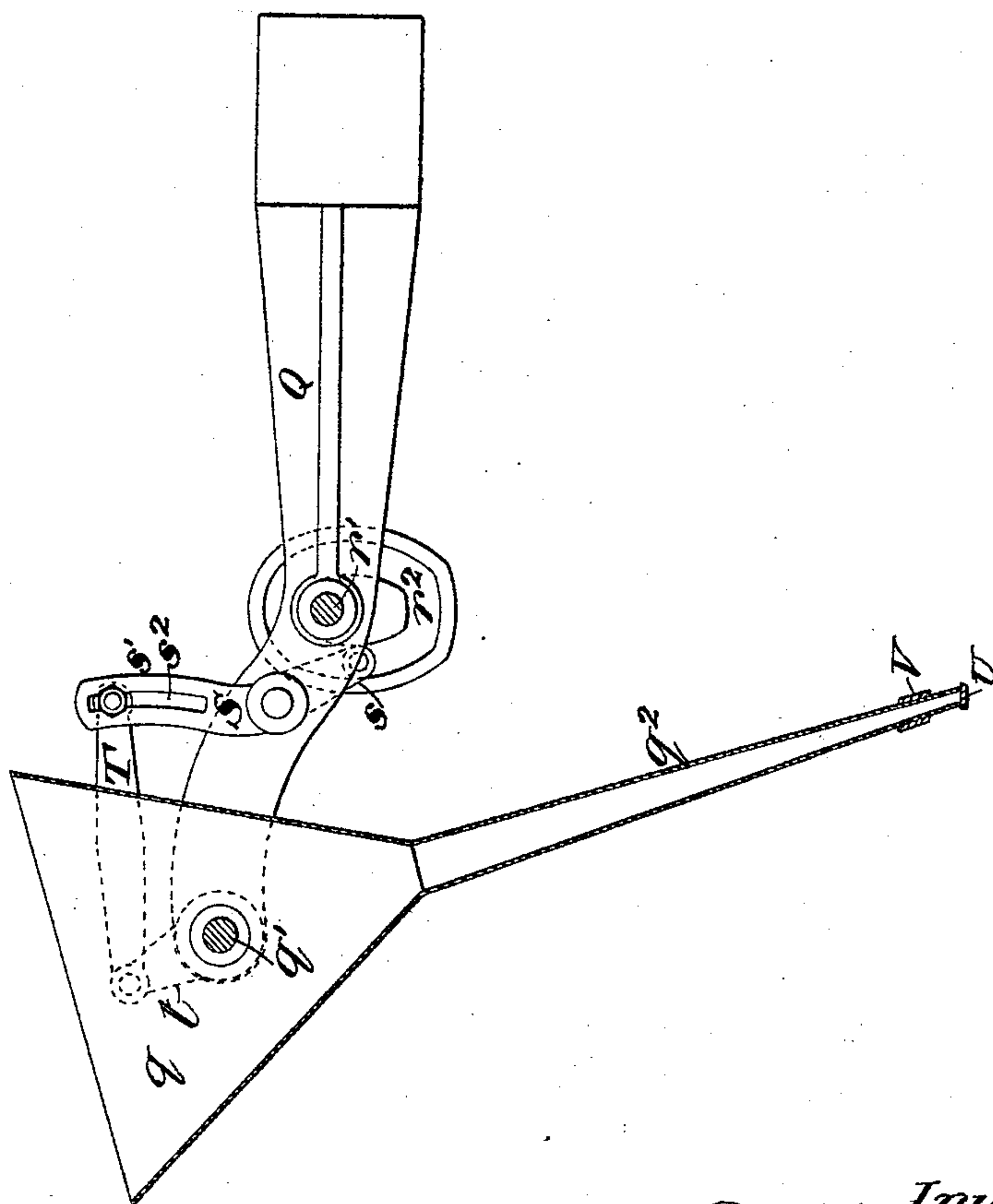


Fig. 9.



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UNITED STATES PATENT OFFICE.

RUDOLPH F. EMMERICH AND FREDERICK VONDERLEHR, OF NEW YORK, N. Y.

STONE-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 538,824, dated May 7, 1895.

Application filed December 1, 1894. Serial No. 530,598. (No model.)

To all whom it may concern:

Be it known that we, RUDOLPH F. EMMERICH and FREDERICK VONDERLEHR, both of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Stone-Grinding Machines, of which the following is a specification.

Our invention consists of an improvement in stone grinding machines and relates more particularly to machines for grinding the faces of lithographic stones.

The object of our invention is to provide a machine which shall be very simple in construction, yet positive in action and in which the several parts may be quickly and accurately adjusted.

A further object is to provide a sand feeding device for supplying sand in the desired quantity at intervals onto the face of the stone that is being ground.

A practical embodiment of our invention is represented in the accompanying drawings, in which—

Figure 1 is a view in side elevation of the machine. Fig. 2 is a top plan view of the same. Fig. 3 is a front view with the sand feeding device removed. Fig. 4 is a vertical central section through the machine from front to rear. Fig. 5 is an enlarged side view of the grinding-plate and its holder. Fig. 6 is a top plan view of the same. Fig. 7 is a cross-section on the line xx of Fig. 6. Fig. 8 is a cross-section on the line yy of Fig. 6. Fig. 9 is a vertical central section through the sand-feeding hopper, showing some of the operating parts in side elevation; and Fig. 10 is a transverse vertical section through the sand-feeding device.

The frame work of the machine is constructed as follows: A designates the base and from its rear portion a back support B extends upwardly and is brought forward a sufficient distance to form a suitable support for the upper working parts of the machine. This back support B is reinforced, to strengthen it, by two arched side supports B' , B^2 which are secured at their upper ends to the back support and at their lower ends to laterally extended portions a , a' of the base A. This arrangement makes a very strong construction and one which is out of the way of the operating parts.

The basin in which the stone supporting table is located is denoted by C and it rests at its rear upon the base A and its forwardly extending portion is supported upon suitable uprights c , c' . Any suitable means may be used to convey the surplus water out of the basin C.

D designates the main driving shaft which extends horizontally through the base A of the machine and is provided at its rear end with suitable driving and loose pulleys d , d' for imparting motion thereto. The drive shaft is further provided at its forward end outside the base A with a bevel gear d^2 which meshes with a gear e on the table supporting shaft E. This table supporting shaft E is provided at its upper portion with a stone supporting table F, which is located within the basin C and is provided with suitable clamping pieces f , f' , &c., for fastening the stone securely thereon.

The shaft E is mounted in an adjustable bearing G having upper and lower branches g , g' . These branches support the shaft above and below the angle gear e . The base of the bearing G is provided with elongated slots, curved concentrically with the main drive shaft D through which pass locking bolts g^2 . By this arrangement the bearing, and thereby the table shaft and table, can be adjusted so as to get the stone on the table perfectly horizontal.

The shaft which supports the grinding plate or rubber is denoted by H and it is mounted in suitable bearings h , h' which are secured to the face of the back support B. The shaft H is rotated in an opposite direction from the table supporting shaft E in the following manner: The main drive shaft D is provided with a bevel gear d^3 which meshes with a bevel gear i on the lower end of an oblique shaft I. The upper end of the oblique shaft I is provided with a bevel gear i' , which meshes with a gear h^2 on the vertical shaft H. This gear h^2 has a feather and groove connection with the shaft H so that the said shaft may be raised and lowered without raising and lowering the said gear.

The shaft H is mounted so that its longitudinal axis is out of alignment with the table supporting shaft E, preferably to the rear of said table supporting shaft, so that the table in its rotary movement presents constantly a

new surface to the rotary grinding plate in a path around the axial line of the table supporting shaft.

The oblique shaft I is mounted on the back support B in suitable bearings i^2, i^3 which are secured to the back support. The relative size of the different bevel gears heretofore mentioned may be varied to obtain the desired speed of rotation of the different shafts.

The grinding plate holder K is secured firmly to the lower end of the shaft H so as to rotate therewith. It is preferably screwed onto the lower end of the shaft.

L designates the grinding plate or rubber and it is secured to the holder K in the following manner: The grinding plate at its central portion is provided with a pair of lugs l, l' which coincide with a pair of lugs k, k' on the grinding plate holder K. Pins l^2, l^3 secure the lugs l and k and l' and k' together, so that the grinding plate is pivoted to the holder at this point. The grinding plate is further secured to the holder so that its outer ends may be depressed or raised, as may be desired, in the following manner: The grinding plate is provided with lugs or ears l^4, l^5 to which is pivotally attached the head of a screw bolt M, the screw threaded portion of the said bolt extending upwardly through suitable openings in the opposite ends of the holder K. Adjusting nuts m, m' have a screw threaded engagement with the bolt M upon opposite sides of the holder K, so that as the adjusting nuts are screwed downwardly the end of the grinding plate is drawn upwardly toward the holder K and as the adjusting nuts are unscrewed, the end of the grinding plate is forced downwardly away from the said holder. The grinding plate is widest at its ends and is made gradually narrower as it approaches its operating shaft, so that the portion of the lithographic stone which is in proximity to the central part of the grinding plate will not be ground more than the portions of the stone which are toward the end of the grinding plate.

We provide the following device for preventing the sand and water which is directed onto the surface of the stone being ground from being thrown off the stone by the advance edge of the grinding plate. The grinding plate is provided with two uprising ears l^6, l^7 uprising from the grinding plate near its edge and spaced some distance apart. To these ears we secure a guard or shield N, which preferably extends from the outer end of the grinding plate a considerable distance toward its center and laps over the edge of the grinding plate and extends downwardly into close proximity to the face of the stone being treated. This guard N is provided with a longitudinal strip n which is secured to its inner edge, which strip enters suitable sockets o in adjustable arms O which are clamped, at their inner ends, to the ears l^6, l^7 by means of bolts o' . By this means the free ends of the arms O are raised and lowered, thereby regulating

the distance between the lower edge of the guard N and the face of the stone being ground. We preferably provide two of these guards N along the advancing edges of the grinding plate and they will cause the sand and water to be thrown back onto the face of the stone, instead of being thrown away from it.

The grinding plate is raised from and lowered onto the face of the stone in the following manner: We locate a rack bar P upon the shaft H, the top of said rack bar engaging the shoulder h^3 thereon, so that as the rack bar P is raised, the shaft will be raised also. Within the lower bearing h' , we secure a pinion p which engages the teeth on the rack P. This pinion is operated by a pinion wheel p' upon the exterior of the bearing which engages a worm p^2 upon the inner end of a rod p^3 . This rod p^3 is mounted at its inner end in a suitable bearing piece p^4 and is further supported by a bearing p^5 , at the end of an arm p^6 , extending outwardly from the bearing h' . The rod p^3 has a suitable handle p^7 at its outer end for convenience in turning the said rod, whereby the shaft H and its grinding plate L is raised and lowered.

The mechanism for feeding sand onto the face of the stone is constructed as follows: A bracket Q extends outwardly from the back support B and, at its outer end, is provided a sand hopper q upon a suitable shaft q' which extends transversely through the hopper. This shaft is secure in the bracket Q against rotation.

The hopper q is operated in the following manner: We secure a worm R by a feather and groove connection upon the shaft H between the rack P and the upper bearing h . This worm engages a pinion r , which is mounted upon a cross shaft r' which, in turn, is mounted to rotate in the bracket Q. This shaft is further provided with a cam having a groove r^2 in which runs a guide roller upon the lower arm s of a two armed lever S, which is pivoted upon the bracket Q. The upper arm s' of this lever is provided with an elongated slot s^2 therein and one end of a connecting rod T is secured to the arm s' at any required point along the said elongated slot, so as to adjust the throw of the said connecting rod. The other end of the rod T is connected to a crank arm t which rotates upon the shaft q' as a pivot and is secured to swing with the hopper q . As thus constructed, the rotation of the shaft H, by means of its worm and gear connection, will rotate the cam and thereby vibrate the two armed lever S which will, in turn, by means of its connecting rod T, swing the hopper to and fro upon its pivotal shaft q' , causing its spout q^2 to pass back and forth from the outer end of the stone being treated to a point near its center. The worm and gear connection may be so timed that the hopper will be swung back and forth over the face of the stone every third time that the shaft H revolves, or at any desired number of revolutions; also

the swing of the hopper may be adjusted for larger or smaller stones, by means of the elongated slot in the lever S, as before described.

The sand is allowed to escape only while the hopper is being caused to swing across the face of the stone being treated in the following manner: A door U is fitted to close the open end of the spout q^2 of the hopper. This door is pivoted to swing toward and away from the mouth of the spout at v in a suitable lug or bracket V secured to the spout near its lower end. The door U has an arm u extended laterally therefrom and to the free end of the said arm is secured the lower end of a rod W, which extends upwardly to a point near the pivotal shaft q' and is supported in sliding adjustment in a suitable bearing q^3 on the hopper q . The rod W is normally held raised and the door U closed by means of a coil spring w which extends between the bearing q^3 and a shoulder w' on the rod, the spring having an upward pressure. The upper end of the rod is provided with a roller w^2 which engages a stationary cam X, secured against rotation onto the end of the pivotal shaft q' , in such a manner that, as the hopper is swung to and fro, the cam engages and depresses the roller and thereby the rod and opens the door U, allowing the sand to escape onto the face of the stone being ground. This cam is arranged so that the door is closed, while the mouth of the hopper is at or near the limits of its stroke, so that the sand escapes only when the hopper is being caused to swing. The cam is preferably made in two sections x, x' , which may be adjusted to lengthen or diminish the time the roller is depressed. After the two sections are adjusted to lengthen or shorten the face of the cam they are secured by a suitable clamp X^2 , which extends through slots in the two sections.

We supply water to the face of the stone being ground in the desired quantities in any well known or approved manner.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts, without departing from the spirit and scope of our invention. Hence we do not wish to limit ourselves strictly to the structure herein set forth, but

What we claim is—

1. In a grinding machine, a grinding plate supporting shaft, means for rotating it, a holder secured to rotate with the said shaft, a grinding plate pivoted at its center to the holder, and connections between the holder and grinding plate on opposite sides of the pivot for adjusting the ends of the grinding plate, substantially as set forth.

2. In a grinding machine, a grinding plate

supporting shaft, means for rotating it, a holder secured to the shaft, a grinding plate secured to the holder to rotate with the shaft, the said grinding plate being widest at its opposite ends and gradually decreasing in width as it approaches its axis of rotation, as and for the purpose set forth.

3. In a grinding machine, a grinding plate, means for rotating it and a guard secured to the advancing edge of the grinding plate in position to direct the sand and water beneath it, substantially as set forth.

4. In a grinding machine, a grinding plate, means for rotating it, and a guard removably secured to the advancing edge of the grinding plate in position to direct the sand and water beneath it, substantially as set forth.

5. In a grinding machine, a grinding plate, means for rotating it, a guard secured thereto and extending over the edge thereof, and means for adjusting the lower edge of the guard toward and away from the surface of the stone being treated, substantially as set forth.

6. The combination with the grinding plate operating mechanism, of a vibrating sanding device under the control of the said grinding plate operating mechanism, substantially as set forth.

7. The combination with the grinding plate operating mechanism, of a sanding device, and means for intermittently opening and closing the sanding device, substantially as set forth.

8. A sanding device, comprising a suitable support, a hopper mounted to swing in the said support, and means for swinging the said hopper at intervals across the face of the stone being treated, substantially as set forth.

9. A sanding device, comprising a suitable support, a hopper having a discharge spout, said hopper mounted to swing on said support, and means for regulating the length of throw of the mouth of said spout, substantially as set forth.

10. A sanding device, comprising a suitable support, a shaft secured to the support, a hopper mounted to swing on the said shaft, a discharge spout extending from the hopper, means for swinging the hopper to and fro, and a device for opening the mouth of the discharge spout during its swinging movement and holding it closed at the limits of its stroke, substantially as set forth.

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Witnesses:

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