(No Model.) 2 Sheets—Sheet 1.

J. M. NASH.

MACHINE FOR SMOOTHING CURVED SURFACES.

No. 430,398. Patented June 17, 1890.

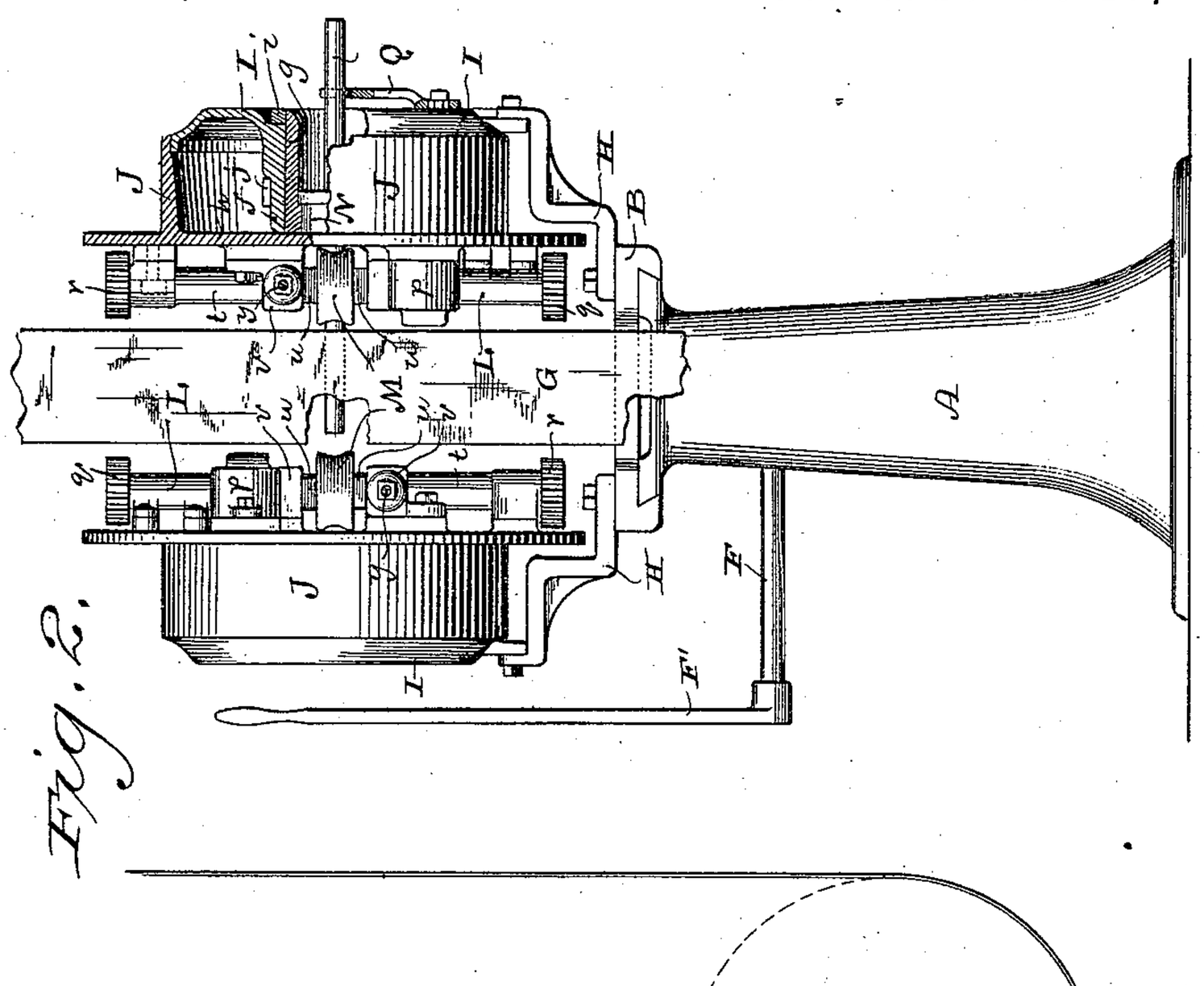

Fig. 2.

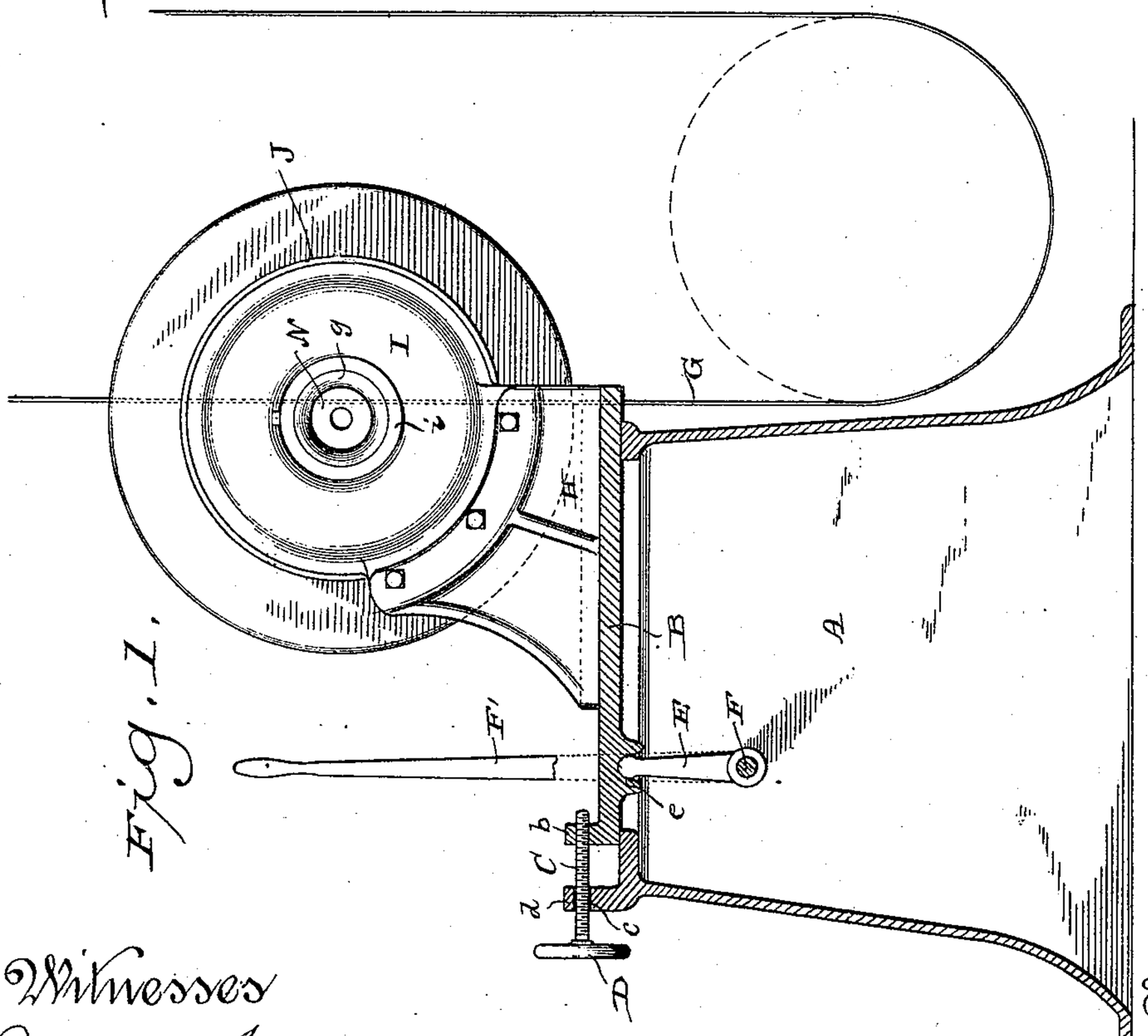

Fig. 1.

Witnesses
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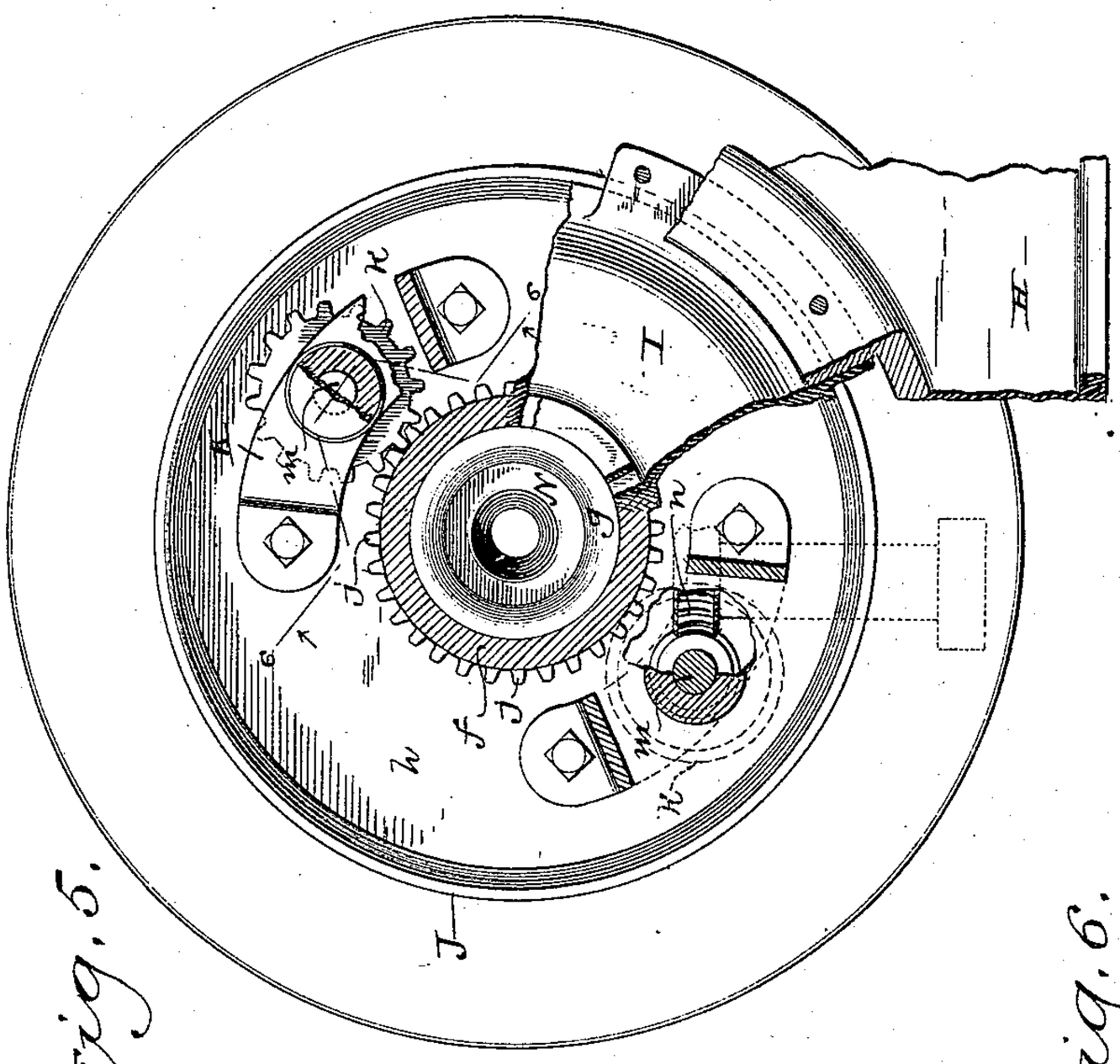

Fig. 5.

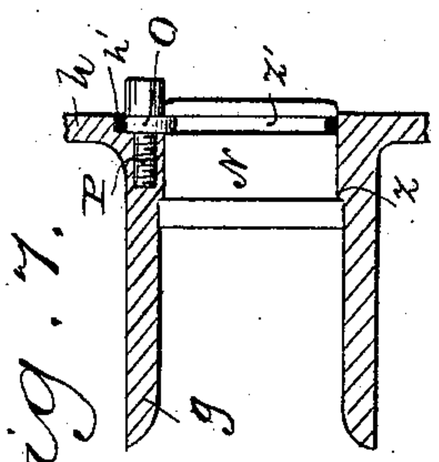

Fig. 7.

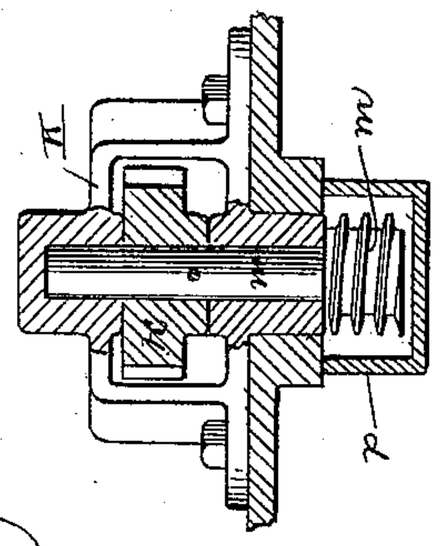

Fig. 6.

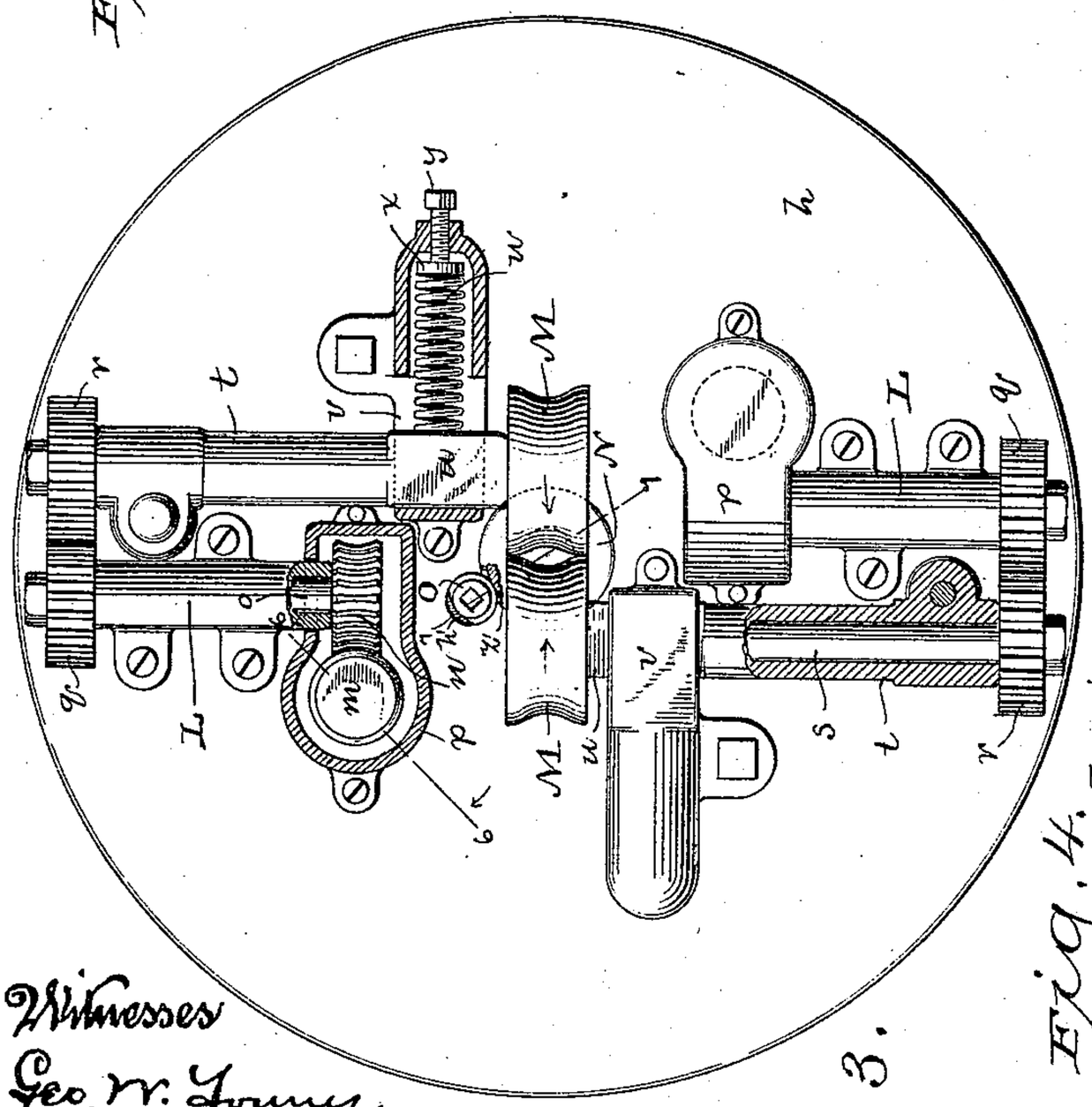

Fig. 3.

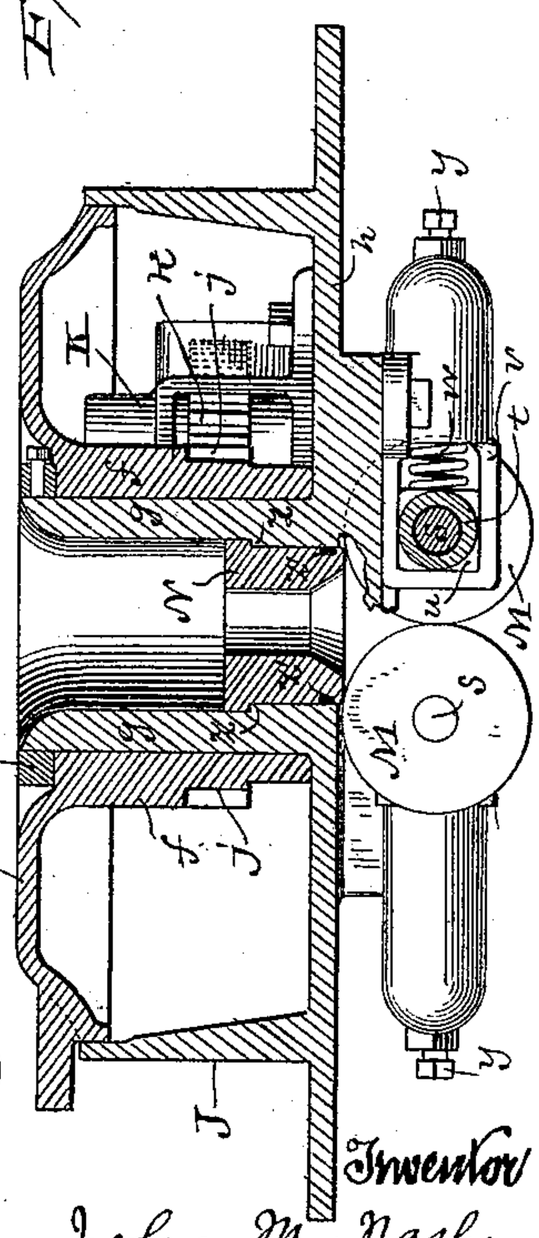

Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN M. NASH, OF HUDSON, WISCONSIN.

MACHINE FOR SMOOTHING CURVED SURFACES.

SPECIFICATION forming part of Letters Patent No. 430,398, dated June 17, 1890.

Application filed July 22, 1889. Serial No. 318,210. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. NASH, of Hudson, in the county of St. Croix, and in the State of Wisconsin, have invented certain new and useful Improvements in Machines for Smoothing Curved Surfaces; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to machines for smoothing curved surfaces; and it consists in certain peculiarities of construction and combination of parts to be hereinafter described with reference to the accompanying drawings and subsequently claimed.

In the drawings, Figure 1 represents a side elevation of my machine partly in vertical transverse section; Fig. 2, a front elevation partly in section; Fig. 3, a detail elevation, partly in section, illustrating one side of a rotary drum and system of gearing carried thereby to actuate a pair of feed-rolls; Fig. 4, a detail plan view of the drum in horizontal section to illustrate its connection with a stationary head; Fig. 5, a detail elevation illustrating the drum and its gear-connection with the stationary head; Fig. 6, a detail sectional view on line 6 6, Figs. 3 and 5; and Fig. 7, a similar view on line 7 7, Fig. 3.

Referring by letter to the drawings, A represents a standard that constitutes the base of my machine, and B a table arranged to slide on the top of the standard. As illustrated in Fig. 2, the table B is dovetailed to the standard A; but this construction is not absolutely essential.

The rear of the table B is provided with a vertical lug *b*, having a screw-threaded perforation therein for engagement with a screw C, that passes through a non-threaded perforation *c* in a vertical flange or lug *d* on the standard A, and is provided with a hand-wheel D, by which it may be adjusted to regulate the throw of said table, the latter being shown as provided upon its under side with a socket *e* for engagement with an arm E, that is fast on a shaft F, actuated by a lever F′, having its bearings in the standard A, this construction being best illustrated in Fig. 1.

By means of the lever mechanism the table B is moved to or from a sand-belt G or other suitable abrading surface; but, while I have shown and described said lever mechanism, it is obvious that the same result can be attained by means of rack-and-pinion gear or other mechanical equivalents, and therefore I do not wish to be understood as limiting myself to said lever mechanism.

In Fig. 1 the arm E is shown on center ready to move either to the right or left, accordingly as the lever F′ is actuated. If the arm E is moved to the right, the table B will move therewith until the hub of the hand-wheel D comes against the lug *d* on standard A; but if said arm be moved to the left, the corresponding movement of the table is checked when the lug *b* on said table comes against the one on said standard, the amount of throw in either direction being regulated by the adjustment of the screw C, above described.

Bolted or otherwise rigidly secured to the table B are two opposing brackets H, and connected to each bracket in a like manner is a head I, having an inwardly-extended sleeve *f*, that fits upon a tubular hub *g*, extending outward from the face-plate *h* of a flanged drum J, the latter being held in its relation with said head by means of a collar *i*, fast on the outer end of the hub *g*, as is best illustrated in Figs. 1 and 4.

The sleeves *f* of the heads I are provided with gear-teeth *j*, that mesh with pinions *k* on worm-shafts *m*, journaled in brackets K, bolted or otherwise rigidly secured to the inner sides of the face-plates *h* of the drums J. The worm-shafts *m* mesh with worm-wheels *n* on shafts *o*, that have their bearings in brackets L, rigidly secured to the outer sides of the face-plates *h* of the drums J, and the worm-gear just described is covered by housings *p*, also secured to the outer sides of said face-plates.

The shafts *o* carry pinions *q*, that mesh with pinions *r* on other shafts *s*, the latter being parallel to the former and having their bearings in brackets *t*, pivoted to the outer sides of the face-plates *h* of the drums J, as best illustrated in Fig. 3. Fast to the shafts *s* are opposing concave feed-rollers M, and the squared ends *u* of the pivoted brackets *t*, that form the bearings for said shafts, are passed through housings *v*, that inclose spiral springs *w*, the latter being adjustable as to tension by means of followers *x*, actuated by screws

y, the latter having their bearings in said housings, this construction being also best illustrated in Fig. 3.

The feed-rollers M are arranged in pairs adjacent to the inner ends of the hubs *g*, that extend from the face-plates *h* of the drums J, and said hubs are interiorly provided with annular shoulders *z*, that form stops for bushings N, each of the latter being provided at its outer end with an annular groove *z'* for engagement with a cam O on a screw P, that has its bearing in the adjacent face-plate *h*, the latter being provided with a recess *h'* for the cam. By the construction just described the bushings N are detachably retained in position, it being designed that each machine shall be accompanied by a number of bushings having bores of various diameters to accommodate stuff of varying thickness, and I prefer to have the mouth of each bushing funnel-shaped, in order that the material may not be impeded in its travel.

The drums J are to be driven by suitable belts or otherwise, and by their rotation cause the pinions *k* to travel around the sleeves *f* of the stationary heads I and derive rotary motion from the fact of their being in mesh with the gear-teeth *j* on said hubs, this rotary motion being communicated to the feed-rollers M by means of the shafts and gearing above described. By the above description it will be readily seen that the feed-rollers have both a planetary movement and a rotation on their axes, whereby the stuff to be smoothed is kept continually turning and at the same time carried along in a longitudinal direction.

In the operation of my machine a chair-leg, hoe-handle, or other device having a curved surface is pushed through the bushing N belonging to that drum J on the lever side of the machine and caught between the adjacent pair of feed-rollers M, the latter being held in frictional contact with said device by the power of the springs *w*, that impinge against the pivoted sleeves *t*, in which the roller-carrying shafts *s* have their bearings. By having the sleeves *t* pivoted the feed-rollers M will automatically adjust themselves to varying thickness of the stuff to be smoothed.

The device to be smoothed having been caught by a pair of the feed-rollers M, the operator actuates the lever F to impart a forward movement to the table B, whereby said device is brought into frictional contact with the sand-belt G or other abrading-surface and rotates against the latter while traveling in a longitudinal direction. The next pair of feed-rollers grip the device in the process of smoothing and feed it along through the bushing in that drum opposite the one at which the operation began, and said device is thus carried its entire length against the sand-belt, a fork Q being preferably secured to the stationary head I on the finishing side of the machine to aid in supporting the device after it has passed out of contact with the first pair of feed-rollers.

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

1. The combination, with an abrading device, of spring-controlled bearings, shafts arranged in the bearings, opposing feed-rollers carried on the shafts adjacent to the abrading device, and suitable mechanism for imparting a planetary and rotary movement to the feed-rollers, substantially as set forth.

2. The combination, with an abrading device, of a sliding table carrying feed-rollers arranged in pairs to come adjacent to the abrading device and having a planetary movement simultaneous with a rotation on their axes, substantially as set forth.

3. The combination, with an abrading device, of a sliding table adjustable as to throw and carrying feed-rollers arranged in pairs to come adjacent to the abrading device and having a planetary movement simultaneous with a rotation on their axes, substantially as set forth.

4. The combination, with an abrading device, of a revoluble drum having a tubular hub, a pair of feed-rollers carried on shafts arranged in bearings on the drum, pinions fast on these shafts, counter-shafts having their bearings on the drum and provided with pinions that mesh with those on the feed-roller shafts, worm-wheels carried by the counter-shafts, worm-shafts also having their bearings on said drum and arranged to mesh with the worm-wheels, pinions carried by the worm-shafts, and a stationary circle of gear-teeth arranged to mesh with the latter pinions, substantially as set forth.

5. The combination, with an abrading device, of a revoluble drum having a tubular hub, a bushing detachably secured in the hubs, a pair of feed-rollers carried on shafts arranged in bearings on the drum, pinions fast on these shafts, counter-shafts having their bearings on the drum and provided with pinions that mesh with those on the feed-roller shafts, worm-wheels carried by the counter-shafts, worm-shafts also having their bearings on said drum and arranged to mesh with the worm-wheels, pinions carried by the worm-shafts, and a stationary circle of gear-teeth arranged to mesh with the latter pinions, substantially as set forth.

6. The combination, with an abrading device, of a sliding table, a head rigidly secured to the table and having a sleeve provided with a circle of gear-teeth thereon, a revoluble drum having a tubular hub arranged within said sleeve, a pair of feed-rollers carried on shafts arranged in bearings on the drum, pinions fast on these shafts, counter-shafts having their bearings on the drum and provided with pinions that mesh with those on the feed-roller shafts, worm-wheels carried by the counter-shafts, worm-shafts also

having their bearings on said drum and arranged to mesh with the worm-wheels, and pinions carried by the worm-shafts to mesh with the gear-teeth on the stationary head, substantially as set forth.

7. The combination, with an abrading device, of a base, a table arranged to slide on the base, a screw extended through a guide on the base to engage the table, a head rigidly secured to the table and having a sleeve provided with a circle of gear-teeth thereon, a revoluble drum having a tubular hub arranged within said sleeve, a pair of feed-rollers carried on shafts arranged in bearings on the drum, pinions fast on these shafts, counter-shafts having their bearings on the drum and provided with pinions that mesh with those on the feed-roller shafts, worm-wheels carried by the counter-shafts, worm-shafts also having their bearings on said drum and arranged to mesh with the worm-wheels, and pinions carried by the worm-shafts to mesh with the gear-teeth on the stationary head, substantially as set forth.

8. The combination, with an abrading device, of a base, a table arranged to slide on the base and having its under side provided with a socket, a lever-actuated shaft having its bearings in said base and provided with an arm that engages said socket, a head rigidly secured to the table and having a sleeve provided with a circle of gear-teeth thereon, a revoluble drum having a tubular hub arranged within said sleeve, a pair of feed-rollers carried on shafts arranged in bearings on the drum, pinions fast on these shafts, counter-shafts having their bearings on the drum and provided with pinions that mesh with those on the feed-roller shafts, worm-wheels carried by the counter-shafts, worm-shafts also having their bearings on said drum and arranged to mesh with the worm-wheels, and pinions carried by the worm-shafts to mesh with the gear-teeth on the stationary head, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

JOHN M. NASH.

Witnesses:
S. S. STOUT,
H. G. UNDERWOOD.