

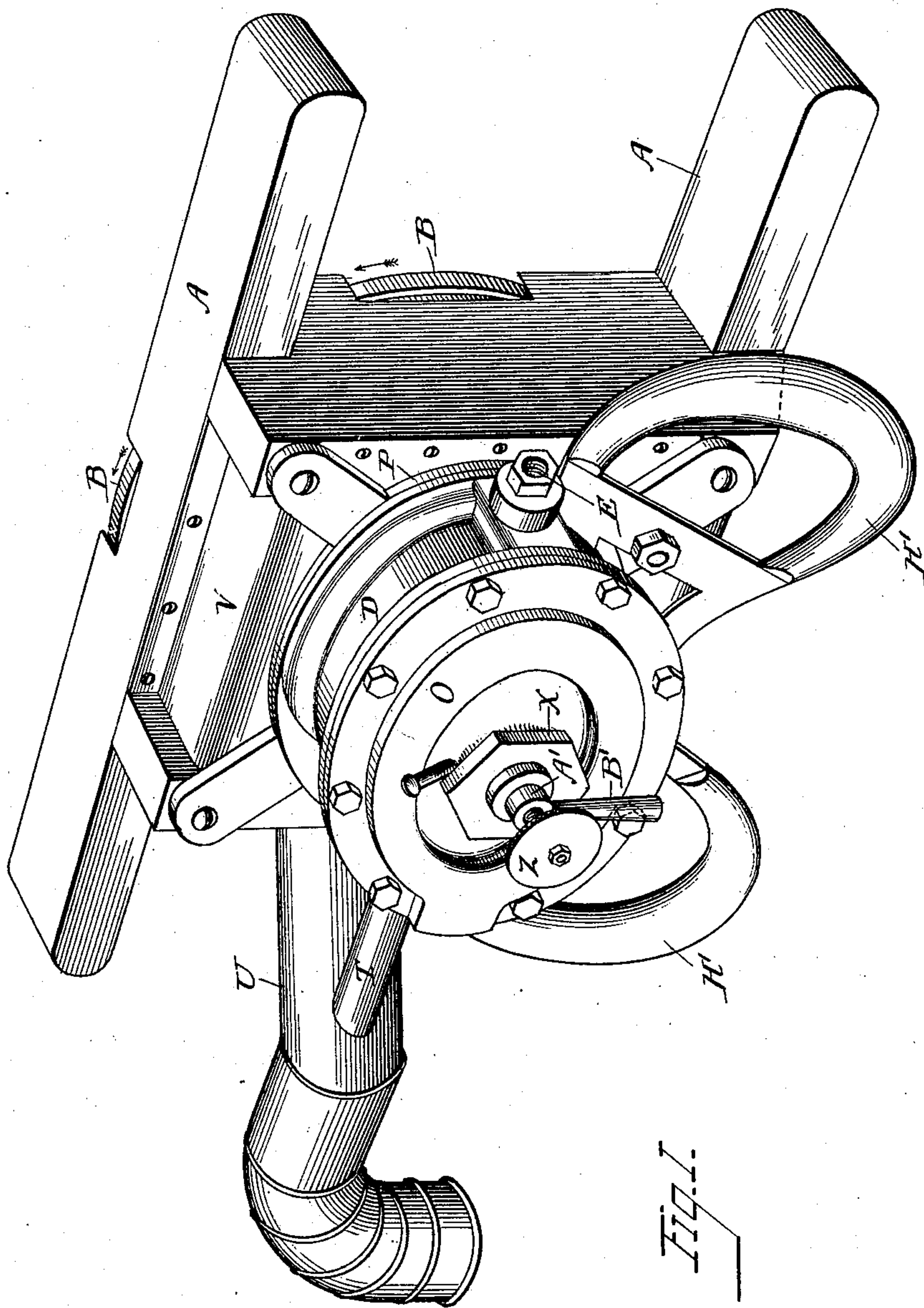
(No Model.)

4 Sheets—Sheet 1.

J. H. MANNING.
SANDPAPERING OR ANALOGOUS MACHINE.

No. 589,006.

Patented Aug. 31, 1897.



Witnesses
Martin A. Olsen.
Leonora Wiseman.

Inventor
James H. Manning
by Edward Rector
his atty

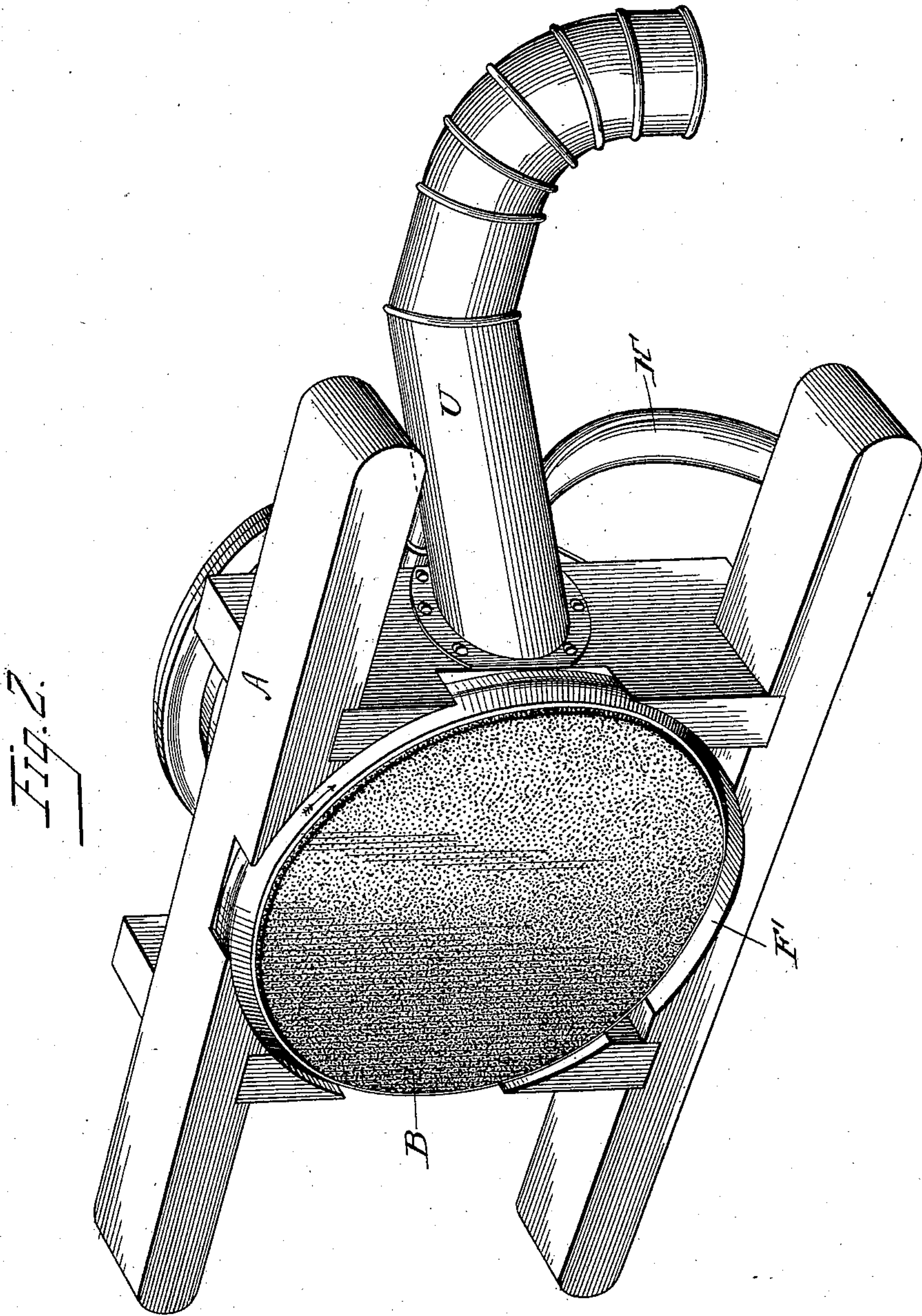
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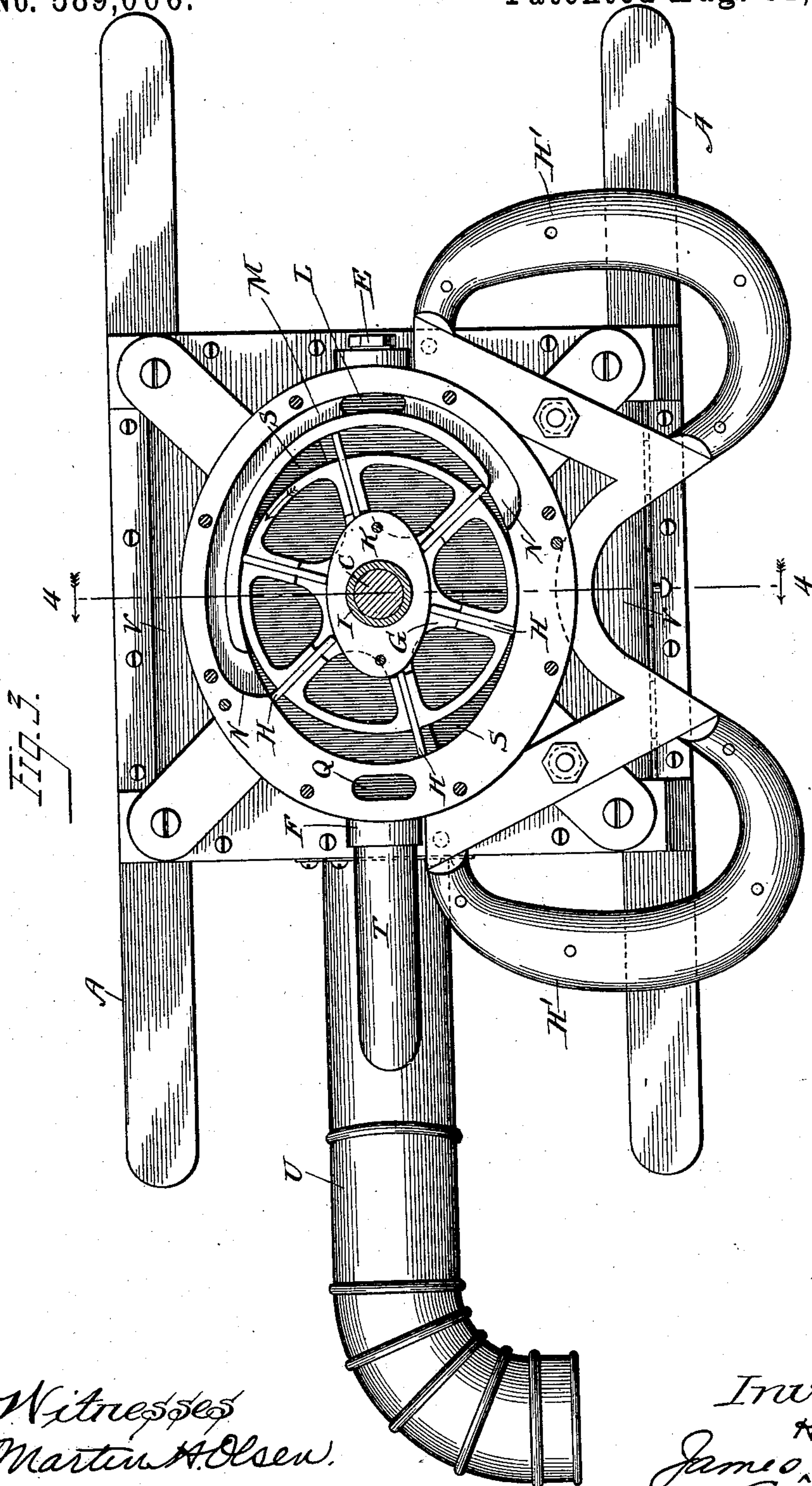
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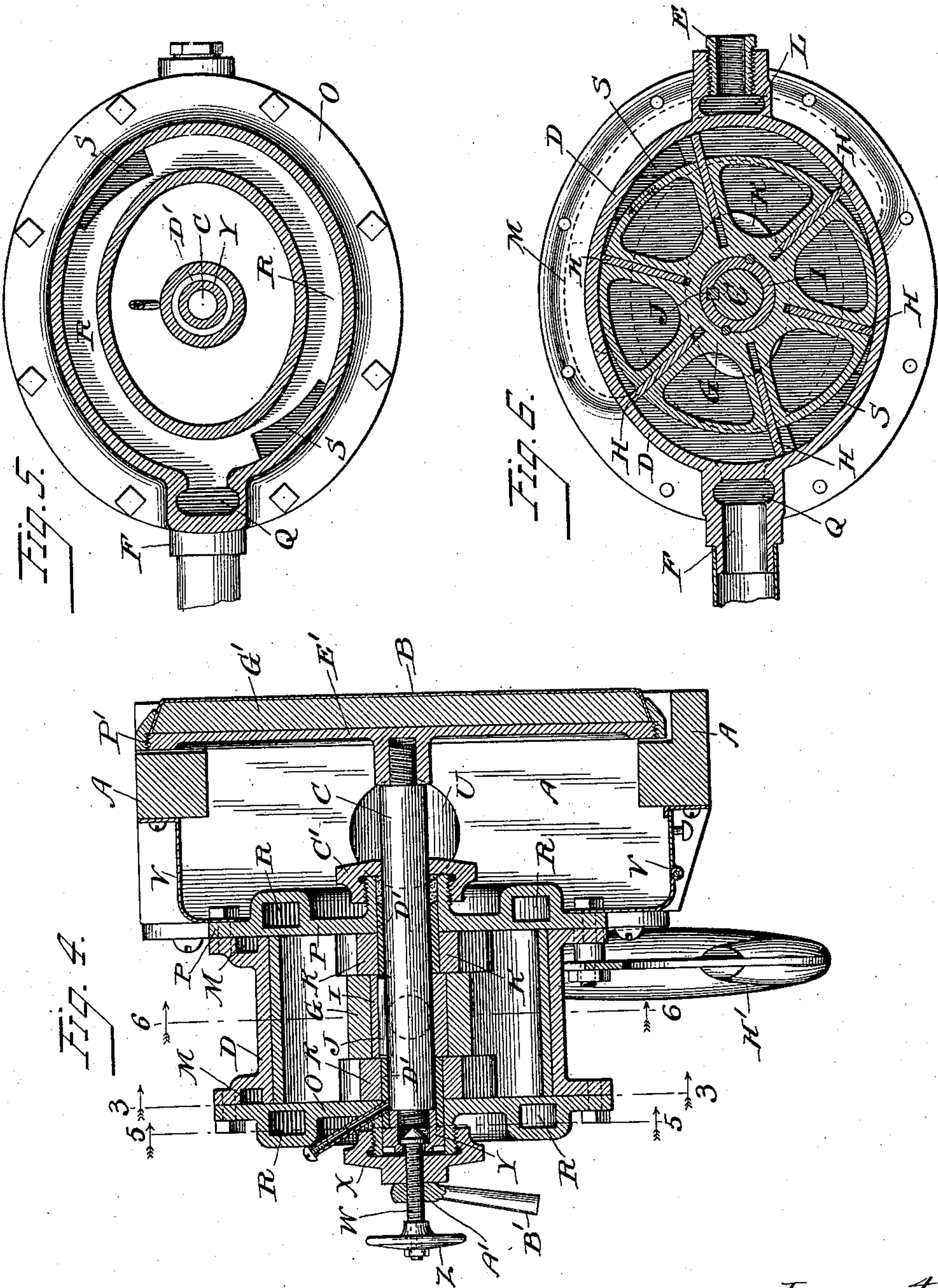
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UNITED STATES PATENT OFFICE.

JAMES H. MANNING, OF OMAHA, NEBRASKA.

SANDPAPERING OR ANALOGOUS MACHINE.

SPECIFICATION forming part of Letters Patent No. 589,006, dated August 31, 1897.

Application filed April 21, 1896. Renewed June 24, 1897. Serial No. 642,161. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. MANNING, a citizen of the United States, residing at Omaha, in the county of Douglas, in the State of Nebraska, have invented a certain new and useful Improvement in Sandpapering or Analogous Machines, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

The chief object of my invention is to provide a light portable power-operated sandpapering-machine which may be employed instead of handwork in dressing off the sides and ends of railway and street cars and other vehicles, though the machine may be used for other purposes than sandpapering, and where used for the latter purpose its utility is not restricted to work upon cars and vehicles, all as will be hereinafter explained.

The machine consists, essentially, of a rotary shaft carrying at one end the sandpaper-disk or other working surface, a rotary motor mounted upon said shaft for turning the same, a suitable guide-frame adapted to bear against the surface being worked upon, and means for adjusting the sandpapering-disk or other working surface to project it more or less beyond the bearing-surface of the guide-frame to thereby regulate the action of such disk upon the surface being worked upon.

The novelty of my invention relates rather to the organization of the machine as a whole than to details in the mechanical construction of its several parts, and it will be understood from the explanation which will be hereinafter given that the machine illustrated in the drawings in respect to the details of its mechanical construction represents but one form of machine in which my invention may be embodied.

Having thus indicated the general nature of the invention, I will now proceed to a further explanation of it by a detailed description of the machine which has been illustrated in the drawings, in which—

Figure 1 represents a perspective view of the complete machine, looking at one of the forward corners thereof; Fig. 2, a corresponding view looking at one of the rear corners thereof; Fig. 3, a vertical section on the line 3 3 of Fig. 4, being substantially a front ele-

vation of the machine with the outer cylinder-head and the parts carried by it removed; Fig. 4, a vertical section on the line 4 4 of Fig. 3; Fig. 5, a vertical section approximately on the line 5 5 of Fig. 4, and Fig. 6 a vertical section approximately on the line 6 6 of Fig. 4.

The same letters of reference are used to indicate identical parts in all the figures.

A represents a suitable frame, preferably of wood, whose rear side, Fig. 2, is adapted to rest against the surface being worked upon and regulate the action of the sandpapering-disk upon such surface in the manner hereinafter explained. The rear side of this frame A is provided with a circular recess to accommodate the sandpapering-disk B, which latter is firmly secured to the rear end of the rotary shaft C, Fig. 4. This shaft C is mounted to rotate in a cylinder D, secured to the forward side of the frame A and containing a rotary piston by which the shaft C is driven. This cylinder or piston-chamber C is elliptical in form and is provided at its right side with an inlet E for the motive fluid, which is preferably compressed air, and at its left side with an exhaust-opening F therefor. The rotary piston consists of a hub G, having radial arms or spokes uniting it with a cylindrical rim, and a series of radial plates or pistons H, mounted in grooves in the arms of said hub.

Under the construction shown in the drawings the hub of the piston is not mounted directly upon the shaft C, though it might be, but has secured within its bore a sleeve or bushing I, which fits upon the shaft. Fitting in a longitudinal groove in the shaft and in a coincident groove in the inner surface of the sleeve I is a key J, which locks the rotary piston to the shaft C to cause the former to drive the latter. The groove in the shaft in which the key J fits is longer than said key, as indicated by the dotted lines, Fig. 4, so that the shaft may be adjusted longitudinally relatively to the piston and cylinder by the means and for the purpose hereinafter described. The piston G is provided upon its front and rear sides with a circular recess, as shown by the solid lines in Fig. 3 and indicated by the dotted lines in Fig. 6, to accommodate two elliptical cams K K, which are secured in fixed position to the front and

rear heads of the cylinder D. These cams K conform in shape to the elliptical interior of the cylinder D and are of such size that the space between their surfaces and the inner surface of the cylinder is approximately equal to the length of the radial plates II. The inner ends of these plates II bear against the surfaces of the cams K, and as the piston rotates the plates II are reciprocated back and forth in their guideways by the contact of their inner ends with the cams K K and of their outer ends with the inner surface of the cylinder.

The inlet-port E communicates at its inner end with a transverse passage L, which opens at its opposite ends into two similar passages M M, (full lines, Fig. 3, and dotted lines, Fig. 6,) each of which passages M opens at its opposite ends into the interior of the cylinder by diametrically opposite ports N N. The passages M M in the present instance consist of grooves formed in the outer surfaces of the opposite ends of the body of the cylinder D, as seen in Fig. 3, which grooves are closed to form the passages by the heads O and P of the cylinder, as seen in Fig. 4.

The exhaust-port F opens at its inner end into a transverse passage Q, which communicates at its opposite ends with elliptical passages R R, formed in the opposite heads of the cylinder, Figs. 4 and 5. Each of these elliptical passages R opens into the piston-chamber or interior of the cylinder by two diametrically opposite ports S S, Figs. 3, 5, and 6. Under this construction and arrangement of the parts the compressed air or other motive fluid admitted at E will pass through the passages M M and enter the piston-chamber by the ports N N and drive the piston in the direction of the arrows, the motive fluid escaping after it has acted upon the plates II of the piston through the exhaust-ports S S, and thence through the passages R R and Q and out the exhaust F. The piston being keyed to the shaft C will carry the latter with it and turn the sandpapering-disk B.

The exhaust-port F is connected by a small pipe T with a large pipe U, projecting to the left of the machine and opening at its right-hand or inner end, Fig. 4, into a chamber formed within the frame A by connecting said frame with the rear side of the cylinder by means of a sheet-metal casing V, the rear head of the cylinder forming the front wall of this chamber and the sandpapering-disk forming its rear or outer wall. The exhaust through the pipe T into the pipe U creates an outward draft through the latter which will exhaust the air through this chamber from the space at the periphery of the disk B and thus serve to carry off much of the dust created by the action of said disk upon the surface being worked upon.

It will be understood from the foregoing that if the shaft C be adjusted longitudinally, so that the surface of the sandpapering-disk

projects very slightly to the rear of the surface of the frame A, only moderate pressure of said disk upon the work can be exerted and only a shallow cut be taken, while if the shaft be adjusted to project the disk farther beyond the rear surface of the frame A a heavier pressure of the disk upon the work may be exerted and a deeper cut taken. At the beginning of work upon a surface to be dressed it is often desired to press the sandpaper more firmly against the work and take a deeper cut and remove the surface more rapidly than after the surface has been given a rough dressing in this manner and is being finished. The means illustrated in the drawings for adjusting the shaft C longitudinally for this purpose consists of an adjusting-screw W, which is passed through a threaded opening in a cap-nut X, screwed upon the front cylinder-head O, and which has upon its inner end a conical head whose point bears against the extreme front end of the shaft C and which is held against said shaft by a collar Y, in which the conical head of the screw W is confined, which collar is screwed upon the reduced threaded front end of the shaft C. The screw W has a hand-wheel or thumb-disk Z fastened upon its outer end by which it may be turned, and fitting upon it against the cap-nut X is a lock-nut A', having a handle B'. When it is desired to adjust the shaft in either direction, the lock-nut A' is loosened and the screw W turned to either draw the shaft forward or force it rearward, as desired, and the lock-nut then tightened up to hold the shaft in this adjusted position. There is a similar cap-nut C' surrounding the shaft at the rear of the cylinder and screwed upon the rear cylinder-head and serving to confine a packing around the shaft at the rear end of a sleeve or bushing D', which surrounds the shaft and extends through the cylinder-head and through the adjacent cam K. A similar sleeve or bushing D' surrounds the front end of the shaft and extends through the forward cam K and forward cylinder-head O.

The particular construction of the sandpapering-disk illustrated in the drawings is as follows: Screwed upon the reduced rear end of the shaft C is a metal disk E', having a threaded periphery adapted to receive a screw-ring F', having an intumed flange at its outer side or edge. Fitted upon the disk E' is a disk G', preferably of wood, having a beveled periphery adapting it to fit within and be confined by the inwardly-projecting flange of the screw-ring F'. In assembling the parts a circular piece of sandpaper is placed upon the disk G'. The screw-ring is then fitted over the disk, so as to press the edge of the sandpaper down upon the beveled periphery of the disk G', and the ring F' is then screwed upon the disk E' to hold the disk G' and the sandpaper in position. When the paper becomes worn, it may be easily and

quickly renewed by loosening the ring F' and removing the disk G' and inserting a fresh piece of paper.

The machine is provided with two handles by which the workman may hold it as he presses its rear side against the surface of the work, the compressed air or other motive fluid being conveyed to the inlet-port E of the machine through a flexible tube leading to the source of supply. In using the machine upon vertical surfaces, such as the sides and ends of cars, for which purposes the machine shown in the drawings was especially designed, the machine may be suspended by a rope or chain from any suitable adjustable supporting and counterbalancing device, so that the workman will be relieved of the weight of the machine and have only to guide it over and press it upon the vertical surface of the work.

The general practice at present in the building of cars is to apply machine-finished lumber to their sides and ends and to then cross-plane and sandpaper it by hand to produce a perfect surface ready for the paint. By the use of my new machine all such handwork is avoided and a more regular and perfectly-finished surface is produced in very much less time and at very much less expense than by the hand method.

As heretofore stated, the chief object of my invention is the provision of a suitable machine for taking the place of handwork in dressing the vertical sides and ends of railway-cars and similar vehicles, and that is the use to which the machines which I have built in accordance with the drawings and description in this case have been extensively put; but it will be evident that any desired working surface may be substituted for the sandpapering-disk in using the machine for other purposes, and I contemplate, among other uses for the machine, the substitution of a wire brush for the sandpapering-disk to be employed for dressing stone, metal castings, and similar purposes.

So far as I am aware I am the first in the art to produce a machine of this general character embodying a rotary shaft carrying at one end the working disk or surface, a motor mounted on the shaft for driving it, and means for regulating the action of the machine upon the work in the manner described, and my invention in its broader aspect is therefore of corresponding scope.

I am aware that various sorts of finishing and polishing machines have heretofore been devised which embodied a rotary shaft carrying at one end a working disk or surface and that in some instances means have been provided for adjusting said shaft longitudinally to project the working surface more or less beyond the frame of the machine; but in such machines the rotary shaft was driven by gearing or belting connecting it with an external and independent driving mechanism,

whereas my machine is entirely self-contained and is driven by its own independent motor carried upon its rotary shaft.

Having thus fully described my invention, I claim—

1. In a machine such as described, the combination of a rotary shaft, a motor mounted thereon for turning it, a working surface secured to one end of said shaft, and means for regulating the action of the machine upon the work in the manner and for the purpose described.

2. In a machine such as described, the combination of a rotary shaft, a motor mounted thereon for turning it, a working surface secured to one end of said shaft, a guide-frame or bearing-surface adjacent said working surface and adapted to rest against the surface of the work, and means for adjusting the working surface to project it more or less beyond such frame or bearing-surface for the purpose described.

3. In a machine such as described, the combination of a rotary shaft, a motor mounted thereon for turning it, a working surface secured to one end of said shaft, a guide-frame or bearing-surface adjacent said working surface and adapted to rest against the surface of the work, and means at the opposite end of the shaft for adjusting the same longitudinally to project said working surface more or less beyond such frame or bearing-surface, for the purpose described.

4. In a machine such as described, the combination of a cylinder, a rotary shaft journaled therein, a rotary piston mounted upon and turning with the shaft within the cylinder, a working surface secured to one end of said shaft, and means for regulating the action of said surface upon the work in the manner and for the purpose described.

5. In a machine such as described, the combination of a cylinder, a rotary shaft journaled therein and movable longitudinally in its bearings, a rotary piston mounted upon said shaft within the cylinder and connected thereto so as to turn the shaft with it but permit independent longitudinal movement of it, a working surface secured to one end of the shaft, a guide-frame secured to the cylinder and adapted to rest against the surface of the work adjacent said working surface, and means for adjusting the rotary shaft longitudinally to project the disk more or less beyond said frame, for the purpose described.

6. In a machine such as described, the combination of the frame A, the rotary shaft C, the disk B secured to the end of said shaft, a rotary motor mounted upon said shaft for turning it, the adjusting-screw W threaded through a fixed support and provided with a head bearing against the end of the shaft C opposite the end which carries the disk B, the collar Y confining the head of said screw against the end of said shaft, and the lock-

nut A' for holding the screw and shaft in their different adjusted positions, substantially as described.

7. In a machine such as described, the combination of the cylinder D having the heads O P, the rotary shaft C journaled in said cylinder, the rotary piston mounted upon said shaft within said cylinder and connected to the shaft by means permitting independent longitudinal adjustment of the shaft, the cap-nut X screwed upon the cylinder-head O, the adjusting-screw W threaded through the nut X and provided with the conical head bearing against the front end of the shaft C, the collar Y screwed upon the front end of the shaft and confining the head of the screw W against the same, and the lock-nut A' mounted on the screw W and coöperating with the cap-nut X, substantially as described.

8. The combination of the cylinder D having the heads O P, the rotary shaft C journaled therein, the rotary piston keyed upon said shaft within the cylinder, the frame A secured to the rear cylinder-head P, the work-

ing disk B secured to the rear end of the shaft C, the adjusting-screw W threaded through the cap-nut X screwed upon the front cylinder-head O and having the conical head bearing against the front end of the shaft C, and the collar Y screwed upon the front end of said shaft and confining the head of the screw W against the same, substantially as described.

9. The combination of the cylinder, the rotary shaft journaled therein, the rotary piston mounted upon said shaft within the cylinder, the working disk upon the front end of the shaft, the frame and casing forming the chamber between said disk and the cylinder, the pipe leading from said chamber, and the exhaust-pipe from the cylinder connected to the first-mentioned pipe, for the purpose described.

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