(No Model.) 3 Sheets—Sheet 1.

# A. JOHNSTON.

## MACHINE FOR POLISHING SHEET METAL.

No. 392,036. Patented Oct. 30, 1888.

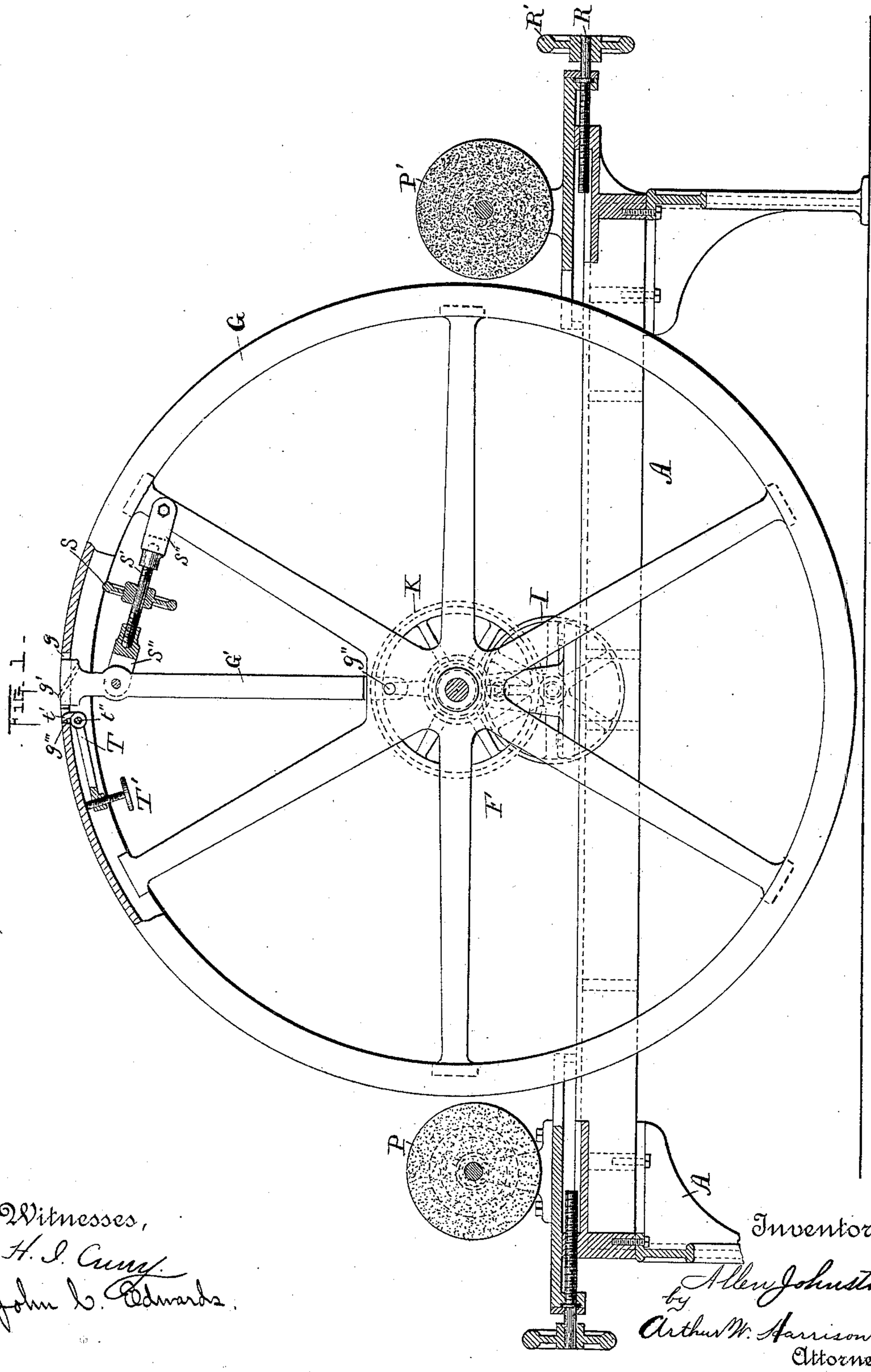


FIG. 1.

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Inventor,
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(No Model.) 3 Sheets—Sheet 2.

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## MACHINE FOR POLISHING SHEET METAL.

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FIG. 3.

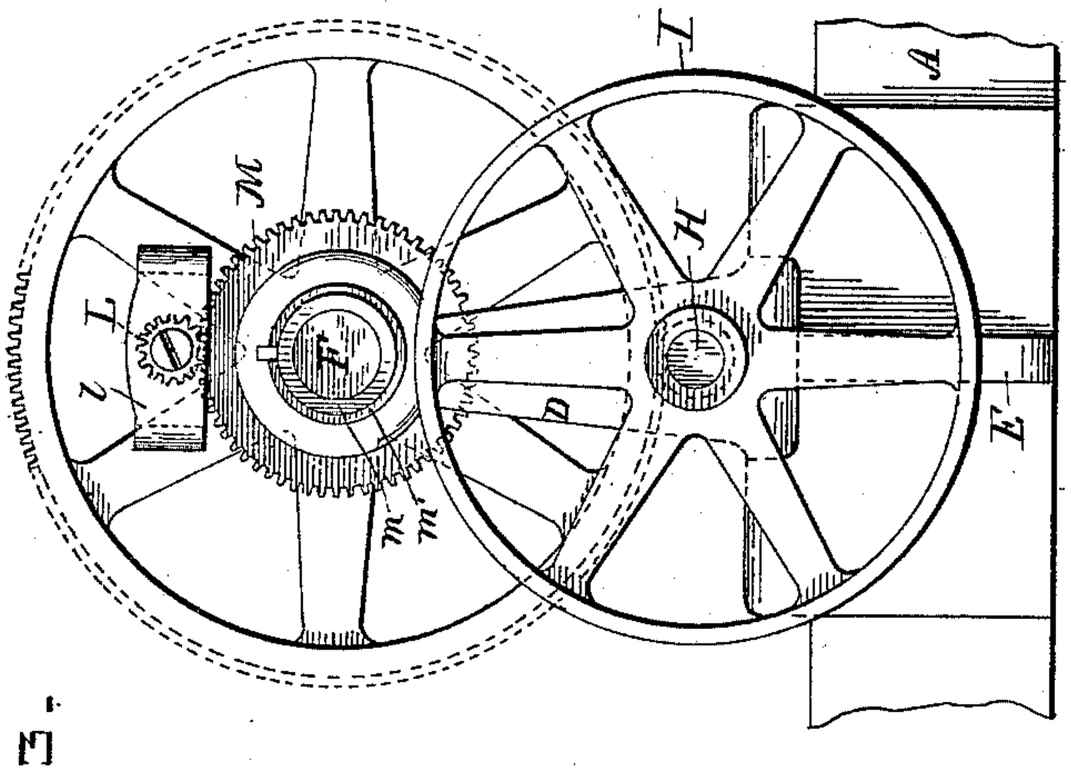
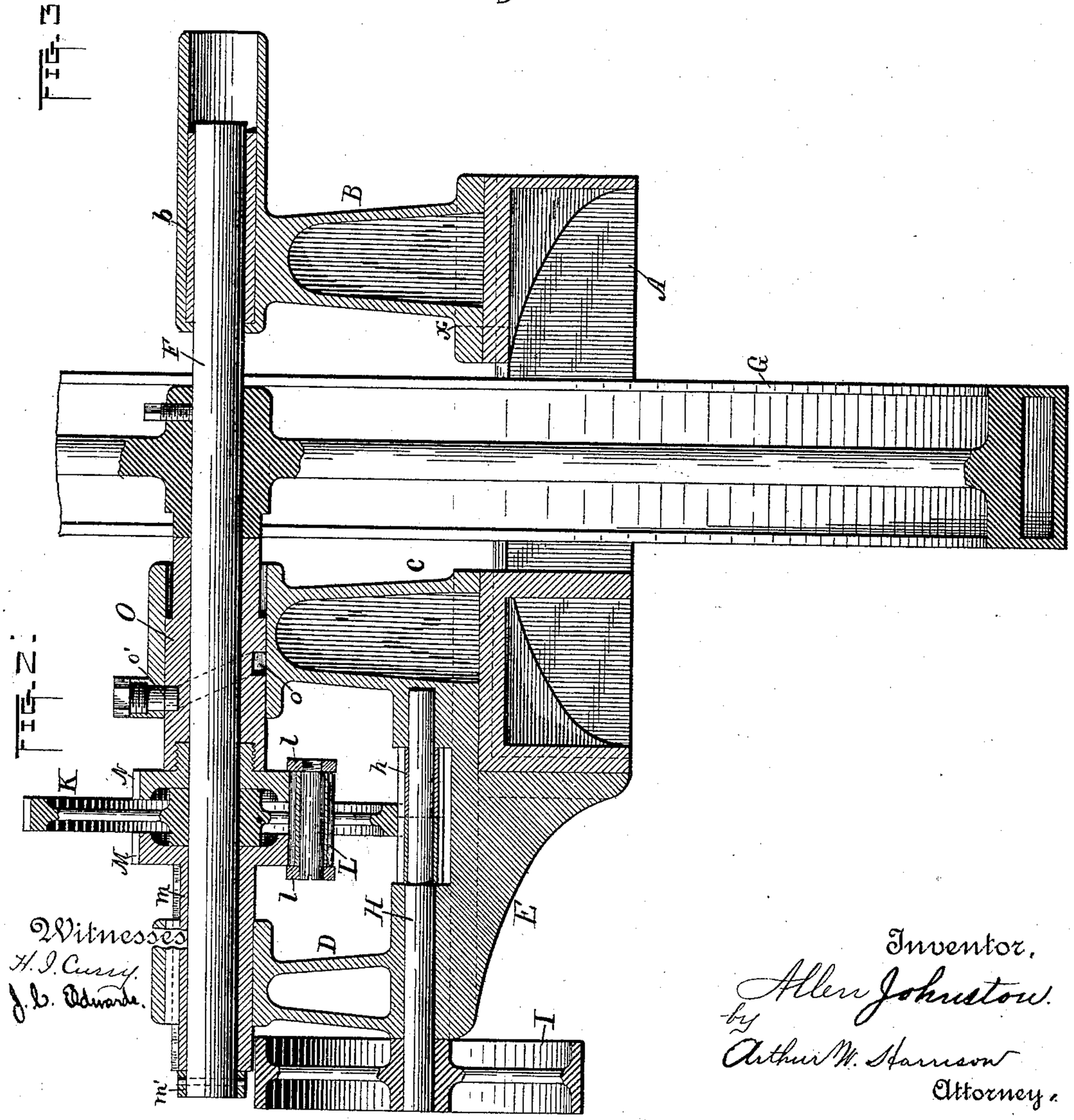



FIG. 2.

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(No Model.) 3 Sheets—Sheet 3.

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## MACHINE FOR POLISHING SHEET METAL.

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FIG. 4.

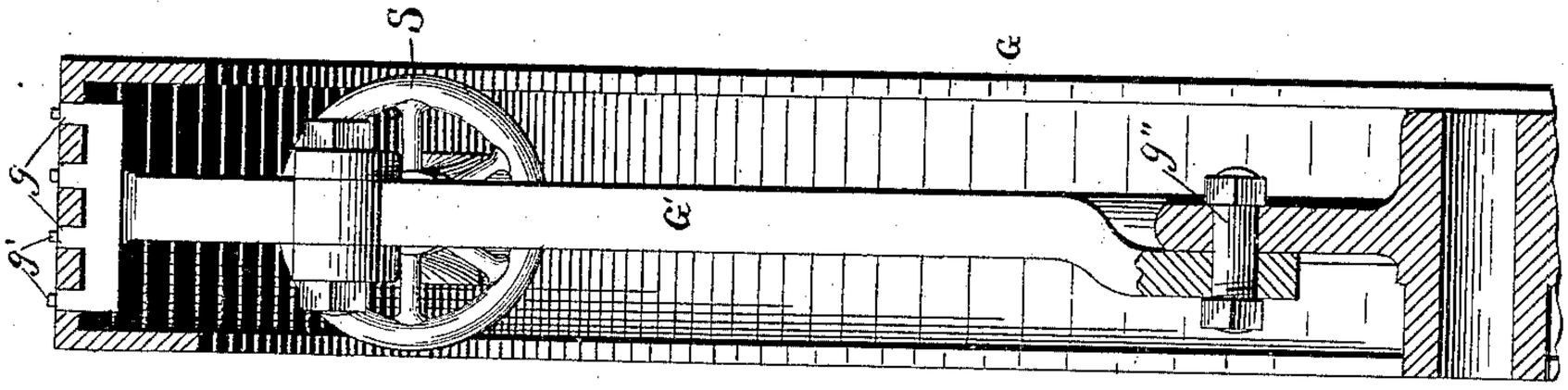
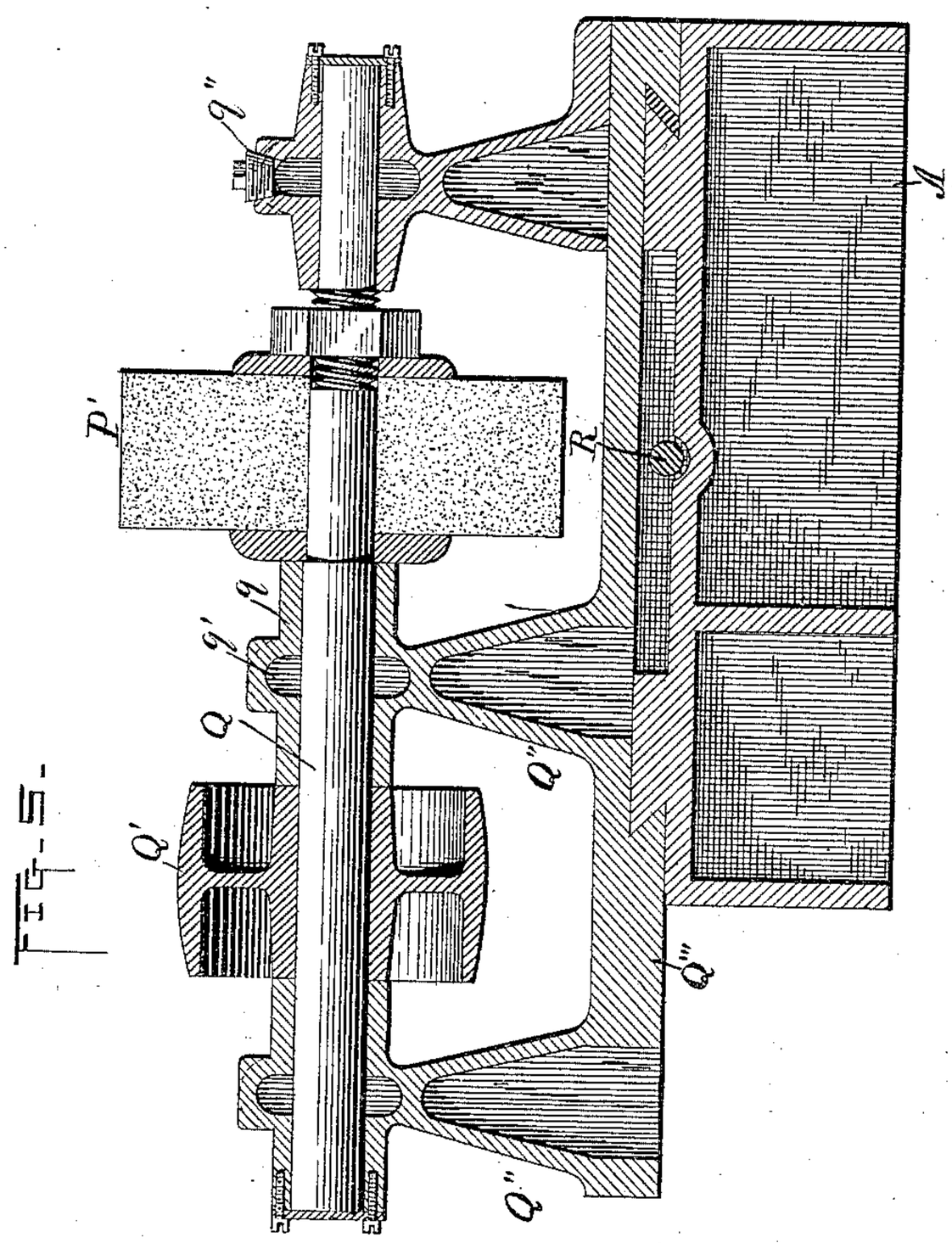



FIG. 5.




Witnesses.
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John B. Edwards.

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# UNITED STATES PATENT OFFICE.

ALLEN JOHNSTON, OF OTTUMWA, IOWA.

## MACHINE FOR POLISHING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 392,036, dated October 30, 1888.

Application filed March 12, 1888. Serial No. 267,004. (No model.)

*To all whom it may concern:*

Be it known that I, ALLEN JOHNSTON, of Ottumwa, in the county of Wapello and State of Iowa, have invented new and useful Improvements in Machines for Polishing Sheet Metal; and I do hereby declare the following to be a full, clear, and exact description of said invention, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to machines for polishing sheet metal. The means commonly employed in this operation consists of a polishing device suitably supported with relation to a flat table or surface over which the sheet metal is fed in contact with such polishing device. By such means it is impracticable without the use of expensive and complicated machinery to move the sheet of material laterally while being fed to the grinding or polishing devices; and, furthermore, if it is desired to grind or polish the material more than once it is necessary either to reverse the motion of the machine or to remove the sheet after one operation and convey it again to the feed end of the machine. My invention obviates these disadvantages in that it feeds the sheet of material laterally as well as longitudinally, thereby enabling all parts of the material to be presented to the grinding or polishing devices, and also preventing unequal polish of the material or wear of the said grinding or polishing devices, and it also allows the material to be repeatedly operated upon without removing it from its position or reversing the machine.

To this end my invention consists, broadly and primarily, in the combination, with a grinding or polishing device, of a rotary cylinder or drum for carrying the sheet metal wrapped around it; and my invention further consists of the construction and combination of parts, as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a side elevation of my machine, parts being shown in section and parts being broken away. Fig. 2 is a cross-sectional view of the machine on a larger scale than Fig. 1 and with the upper portion of the carrying-cylinder broken away. Fig. 3 is a detail side elevation of the shafts and driving-gear. Fig. 4 is a detail of a portion of the carrying-cylinder, showing the sheet-metal stretcher; and Fig. 5 is a cross-sectional view of the grinding-wheel and its supporting parts on a larger scale than Fig. 1, and this figure also represents the means of mounting the buffing-wheel, as the means in both cases are identical.

The supporting-frame A, of suitable construction, is provided with uprights B and C and an extension, E, which has an upright, D. The three uprights B, C, and D are bored to provide journal-boxes at their upper ends for the shaft F, upon which the drum or cylinder G is secured to rotate therewith. The uprights B and C are placed a sufficient distance apart to allow for the lateral movement of the cylinder, as hereinafter described, and surrounding the shaft F in the journal-box of the upright B is a bushing, *b*. The dotted line *x* in Fig. 2 indicates the point to which the frame of the machine is cut away beyond the section-line to allow for said lateral movement.

Below the shaft F and mounted in bearings near the bases of uprights C and D is a counter-shaft, H, upon one end of which is secured the driving-pulley I. The counter-shaft H between its bearings is provided with long gear-teeth, as shown at *h*, which mesh with the large gear K, secured on shaft F.

At L is shown an elongated gear suitably mounted on a spindle which is supported between two spokes of the gear K, as by means of two arched bridge-pieces, *l l*. This elongated gear meshes with two gears, M and N, the latter of which has one more tooth than the former and is loosely mounted on the shaft F. The gear M is secured to or is integral with a sleeve, *m*, which is splined to the journal-box of upright D, so it can move freely longitudinally therein, but cannot revolve. The gear N is secured as by means of screw-threads to a sleeve, O, mounted in the bearing in upright C, which sleeve in turn forms a bearing for the shaft F. The sleeve O is provided with a cam-groove, *o*, which receives the friction-roller on the end of pin *o'*, rigidly secured in the journal-box of upright C. The cam-groove *o*, instead of being in the sleeve O, may be in a second sleeve or collar rigidly secured to

sleeve O. The gear K and drum G being secured to the shaft F and the gear N with its sleeve O being fitted between the hubs of said gear K and drum, it follows that the gear N and sleeve O can have no longitudinal movement independently of the shaft F, although free to revolve thereon. The sleeve *m* is also prevented from having any longitudinal movement independently of the shaft F by means of a collar, *m'*, which is secured to the end of the shaft.

The operation of this portion of the machine is as follows: Power is applied to the belt-wheel I from any suitable source, and through the medium of gear-teeth *h* on shaft H and the large gear K on shaft F the drum or cylinder G, carrying the sheet of steel to be ground or polished, is revolved. The elongated gear L, being supported by the gear K, is carried around by it. Said elongated gear is revolved on its spindle by reason of its meshing with the gear M, which does not revolve, and since the elongated gear also meshes with gear N, which has one more tooth than gear M, it follows that during every complete revolution of large gear K the gear N has moved a distance of one tooth forward and will make one revolution when the gear K has made as many revolutions as there are teeth in gear N. The sleeve O, being secured to gear N, therefore, rotates slower than the shaft F and in the same direction, and by reason of cam-groove *o* and pin or stud *o'* is caused to move longitudinally in the bearing in upright C and carries with it the shaft F and drum or cylinder G. Said cylinder G is therefore slowly traversed laterally across the face of the grinding or polishing devices shown in Figs. 1 and 5 and now to be described.

At P and P' are shown, respectively, an emery-wheel and a buffing-wheel, it being obvious that more grinding or polishing wheels can be similarly mounted opposite other portions of the periphery of the drum or cylinder G, and it being understood that emery or other grinding wheels of different degrees of fineness can be used, and that buffing-wheels of any preferred construction can also be used.

It is necessary in finishing sheet-steel suitable, for instance, for plating to first cut the surface down with an emery-wheel to a sufficiently smooth surface to be afterward polished by a buffing-wheel with crocus or some fine polishing-powder, and whether it is best to use more than one emery-wheel—as, for instance, one coarse and one fine emery-wheel—before the buffing-wheel is used, depends upon the surface of the steel to be polished. If it is rough, it would be best to use first a coarse emery-wheel to partially cut the surface down, then a finer one to give a smoother surface. The wheels being similarly mounted and operated, one only will now be described.

Reference being had to Fig. 5 and to the right-hand portion of Fig. 1, it will be seen that at P' is represented a buffing-wheel of any suitable or preferred construction. This is mounted on a shaft, Q, having a belt-wheel, Q', and supported in bearings *q* in standards Q'', which bearings are provided with annular oil-packing receptacles *q'*, having supply-openings provided with screw-plugs *q''*. The platform Q''', carrying the standards Q'', is fitted to slide on ways formed on the frame A in a line at right angles to the shaft F, and the wheel P' is moved to and from the periphery of the cylinder G by means of a screw, R, having a hand-wheel, R', said screw R being fitted to operate the platform back and forth in an ordinary manner, as shown.

Referring now to Figs. 1 and 4, it will be seen that the cylinder G is provided with a series of short slots, *g*, across one portion of its periphery. Through these the small studs *g'* project at an angle from the lever G', which is pivoted at *g''* to a projection from the hub of the cylinder.

At S is shown a hand-wheel secured to a right and left hand screw, S', which is fitted to corresponding threads in bosses projecting from the links S'', one of which is pivoted to the lever G' and the other to the adjoining spoke of the cylinder or drum.

At T is shown a lever having lugs *t'*, which project into a transverse slot, *g'''*, which connects with the slots *g*, and at the end of the lever, inside of the cylinder, is a screw, T', which bears against the inner surface of the periphery of said cylinder. The lever T is mounted on a pin, *t''*, near the slot *g'''*.

The sheet metal to be finished is wrapped around the cylinder G and secured thereto by having one end clamped between the side of the transverse slot *g'''* and the lugs *t'* of lever T, the screw T' being turned to operate the clamping-lever and lugs, and the other end of the sheet is caught over the studs *g'*, said sheet having holes punched or cut in it for that purpose. By operating the hand-wheel S and screw S' the lever G', carrying the studs *g'*, is moved to the left, as shown in Fig. 1, thereby stretching the sheet and giving it sufficient tension to make it rest evenly on the outside surface of the cylinder and hold it in position while being ground or polished. The cylinder is first prepared by turning or grinding it, or both, to a very true and even surface, so that it shall press the metal which it carries evenly against the grinding or polishing wheels. By the construction above described the cylinder will be carried back and forth across the emery or buffing wheels, which are rapidly revolved by means of belts applied to the pulleys Q' while the sheet metal is being ground or polished, one or the other of the grinding or polishing wheels, as desired, being brought into operative contact with the sheet by means of the screw R.

In finishing brass or other finer sheet metal a finer grade of emery-wheel will be used in connection with the buffing or polishing wheel, and in case the metal to be finished has a very smooth and even surface it will only be necessary to use the buffing-wheel. The wheels are

designed to be used successively—first the coarser, then the finer, and lastly the polishing wheel. Sometimes it will not be necessary to use the buffing-wheel—that is, where a very fine surface is not desired. One, two, or more wheels are to be used, according to the surface of the sheet metal when it is started, and also depending upon the surface required for the work when done. It is manifest that either the grinding-wheels or the cylinder carrying the sheet metal may have the lateral motion.

Any suitable means for fastening the sheet metal to the carrier may be used—as, for instance, both ends of the sheet metal may have holes for pins to pass through, or both ends may be clamped, or the ends might be pressed down inside and be wrapped around a drum or reel carried by the cylinder. This last would be convenient when longer strips are to be polished than the length of outside surface of the cylinder. Parts of the invention may be used without the whole—as, for instance, in polishing narrow strips of metal there need be no lateral motion of wheels or cylinder, because the entire strip might be covered by the polishing-wheel; also, the cylinder carrying the sheet metal or the polishing-wheel may either of them be fed across by hand, or other suitable and well-known feeding mechanism may be used to give the lateral motion.

Having now fully described my said invention and the manner of carrying out the same, what I claim is—

1. In a finishing or polishing machine for finishing sheet metal, a rotary cylinder for carrying the sheet of metal to be finished or polished, in combination with a grinder or polisher, substantially as described.

2. In a machine for finishing or polishing sheet metal, the combination of a rotary sheet-metal-carrying cylinder with a finishing-wheel, one of which is laterally movable with relation to the other, substantially as set forth.

3. In a sheet-metal-finishing machine, the finishing or polishing wheel, in combination with a sheet-metal carrier, one of which is laterally movable back and forth across the other, the said wheel being adjustable to and from the carrier, substantially as described.

4. In a sheet-metal-finishing machine, a revolving cylinder for carrying the metal to be finished, in combination with a plurality of finishing-wheels of different degrees of fineness, one of which may be used for cutting down the surface of the metal rapidly and the other for polishing it, substantially as described.

5. In a sheet-metal-finishing machine, a revolving cylinder for carrying the metal to be finished and provided with a stretcher, whereby the sheet may be stretched out smooth and held while it is being finished, in combination with a grinder or polisher, substantially as described.

6. In a sheet-metal-finishing machine, a revolving cylinder for carrying the metal to be finished and provided with a stretcher, whereby the sheet may be stretched out smooth and held while it is being finished, in combination with a polishing or finishing wheel, the cylinder being laterally movable, substantially as described.

7. In a sheet-metal-finishing machine, the combination, with the cylindrical sheet-metal carrier mounted upon a shaft, of a sleeve on said shaft having a cam-groove, a fixed stud entering said groove, and a gear for operating the said sleeve independently of the shaft, substantially as described.

8. In a sheet-metal-finishing machine, the combination of a cylindrical sheet-metal carrier mounted upon a rotary shaft which is free to move longitudinally in its bearings, a large wheel, also fixed to said shaft for giving rotation thereto, a gear and cam-grooved sleeve fitted loosely on said shaft between the said wheel and cylinder, a fixed stud entering the said cam-groove, a gear on the other side of the large wheel and carried by a sleeve which is splined to its bearing, and an elongated gear carried by said large wheel and meshing with the two sleeved gears, substantially as described.

9. The cylindrical sheet-metal carrier provided with a clamp for holding one end of the sheet of metal and an arm having a series of projections through the periphery of the cylinder, and means for moving said arm toward and from the clamp and holding it in its adjusted position, substantially as described.

10. The combination, with the cylindrical sheet-metal carrier G, provided with slots $g$ and $g'''$, of the lever T, having lugs $t'$, the lever G′, having studs $g'$, and the links S″, connected by the right and left hand screw S′, substantially as described.

In testimony whereof I affix my signature in presence of two subscribing witnesses.

ALLEN JOHNSTON.

Witnesses:

J. T. HACKWORTH,

GEO. F. HALL.