

J. H. PITKIN & J. S. LANE.
MACHINE FOR GRINDING AND POLISHING METAL.

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Witnesses.
H. W. Mygatt
and Masson.

UNITED STATES PATENT OFFICE.

JULIAN H. PITKIN AND JULIUS S. LANE, OF AKRON, OHIO.

IMPROVEMENT IN MACHINES FOR GRINDING AND POLISHING METAL.

Specification forming part of Letters Patent No. **108,822**, dated November 1, 1870.

To all whom it may concern:

Be it known that we, JULIAN H. PITKIN and JULIUS S. LANE, of Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Machines for Grinding and Polishing Metals and producing plane surfaces; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a perspective view of the machine, with the cover of the grinding-wheel represented as raised up to show what would otherwise be concealed by it. Fig. 2 represents a horizontal section taken through the plane of the grinding and polishing wheel shaft. Fig. 3 represents a vertical section taken through a detached portion of the machine.

Similar letters of reference, where they occur in the separate figures, denote like parts of the machine in all of the drawings.

Our invention relates to a machine for grinding and polishing true surfaces, as distinguished from planing or filing such surfaces, and in which is used a table that has a traversing motion past the side of the grinding and polishing wheel, and at right angles to the axis of said wheel, with suitable appliances for driving, moving, and adjusting the several parts of the machine to adapt them to the work of grinding true surfaces.

To enable others skilled in the art to make and use our invention, we will proceed to describe the same with reference to the drawings.

On a bed or frame, A, in which are made suitable guiding-ways *a a*, is placed a table or sliding holder, B, which is caused to traverse back and forth on the bed by gearing, as will be hereafter described. On this table or sliding holder is placed a slide-rest or other usual device for holding and properly feeding up to the grinding-wheel C the article or piece of metal to be ground or polished, said slide-rest or other device being held or adjusted in under-cut grooves *b b* made in the traversing table B.

The grinding and polishing wheel C is supported and carried upon the end of a shaft, D, which is hollow or tubular, so as to receive within it another shaft, E, both shafts turning

together, but the inner one capable of being shifted longitudinally in the outer one, for a purpose that will be described.

The power to drive the machine is applied to the outer shaft, D, by an endless belt passing over a pulley, F, thereon, because the heaviest work or strain comes upon said shaft.

The shafts are supported upon a substantial frame, H, projecting from the rear of the bed A, upon which frame is placed one permanent bearing-box, I, and one movable one, J, this latter moving in or along guiding-ways *c c* in the rear end of the frame H.

Upon the shaft D is a grooved pulley, K, around which, and around two other grooved pulleys, L L', supported in a down-hanger, M, passes an endless belt, *d*, which is twisted so that both pulleys L and L' shall turn in the same direction always with regard to the main shaft.

The pulleys L and L' are fastened to the shafts N N', respectively, which extend thence toward the front of the machine, and their front ends are supported in bearing-blocks or journal-bearings *e e'* on a sliding plate, *f*, underneath the front of the machine, and which plate is caused to move on its supporting-bed *g* by mechanism that will be described.

In a bearing made on the part O of the bed A is supported the lower end of a vertical shaft, *i*, the upper end thereof being supported in a permanent piece, P, of said bed, and upon this vertical shaft *i* is placed, at or near its lower end, first, a worm-wheel, *h*, above that a hand-wheel, Q, and above that, and at its upper end, a pinion, *j*, which works in a rack, *k*, on the under side of the reciprocating table B, by which said table is traversed.

On the shafts N N', at or near their front ends, are placed, respectively, the worms *m m'*, and so that as the sliding plate *f* is moved it will move one of said worms into gear with the main worm-wheel *h*, and at the same time move the other worm out of gear with it, the two worm-wheels *m m'* being placed on diametrically-opposite sides of the worm-wheel *h*, so that when one worm is in action the worm-wheel *h* and the table B will move in one direction, and when the other worm is in action then the worm-wheel *h* and the table B are moved in an opposite direction.

The slide *f*, that supports the front ends of the worm-wheel shafts *N N'*, is moved automatically, as follows: To the lower end of a vertical shaft, *l*, is attached an arm, *n*, and from this arm a rod, *o*, extends, and is linked to the sliding plate *f*. On the upper end of the vertical shaft *l* an arm, *p*, terminating in a hand-lever, *q*, is fastened. To the arm *p* is fastened a rod, *r*, that is linked to a sliding piece, *s*, arranged on the front of the bed *A*, from which sliding piece projects a stud or dog, *t*.

On the reciprocating table *B* are placed tappets *u u'*, which are made adjustable in a groove or way, *v*, by means of set-screws *w*. When these tappets, or either of them, come against the projection *t* of the slide *s* it carries the slide with it, the slide, through its rod *r*, turns the shaft *l*, the shaft *l*, through its arm *n* and rod *o*, moves the plate *f* and throws the worm-wheel that has been in action out of action and its fellow into action, which changes or reverses the direction of the worm-wheel *h*, and consequently of the traversing table *B*; and to aid the last of the shifting motion of the worms a spring, *x*, which is arranged for the purpose, comes into play, and completes the shifting action with an accelerated motion, which insures its ready action.

If at any time the workman standing at the front of the machine desires to shift the motion of the bed *B* from one direction to an opposite one before the tappets would do so, he can do so any time by means of the lever *q*, and without disarranging any of the operative parts of the machine.

The grinding and polishing wheel is made in two parts, as follows: The exterior portion, *C*, of the wheel is fast on the exterior shaft, *D*, while the interior portion, *C'*, is fastened on the interior shaft, *E*, though, as above stated, both shafts and both portions of the wheel revolve together, while the inner ones can be moved in or out on the outer ones. This is not necessarily so, as the shafts and their disks or wheels may be separately run, and at different velocities, and even in different directions at the same time, if it were necessary to do so; but we have not discovered any such necessity, but could, without the least difficulty, so arrange the two parts if any one desired a machine so made.

The outer part of the wheel, *C*, holds between its concentric rims *y y* an emery-ring, *2*, or ring made of any other suitable abrading material, it being held in position by screws *1*, bearing against thin metal plates or rings next to the emery or other rings *2*, or segments or sections of rings.

The inner portion, *C'*, of the wheel holds between its concentric rims or flanges *3 3* a polishing-ring, *4*, held by screws and plates, as above mentioned. When the machine is used for grinding, the emery-ring *2*, being most prominent, acts on the article, plate, rod, shaft, or whatever is to be ground. When the article is to be polished, the grinding-ring

may be run back and the polishing-ring *4* run out, and then the ring *4* alone acts on the article to polish it. On the outer shaft is a little pin, *5*, on the end of a spring-arm, *6*, and in the inner shaft, *E*, are two holes, *7 8*, into one or the other of which the pin *5* is passed to hold the shaft and its polishing-ring out and active or in and inactive, as the case may be. The emery-ring, or whatever the ring *2* is made of, will of course wear away, and this may be compensated for while actively employed by a shaft, *R*, which has on its end, where or near where the operator stands, a hand-wheel, *S*, and at its rear end a bevel gear or pinion, *T*, that meshes with a similar bevel-gear, *U*, that is placed on a screw-shaft, *V*, Fig. 3, that works through screw-lugs *W* on the shifting bearing *J*, that supports the rear end of the shaft *D*, so that the operator at his stand can move the grinding-wheel to or from the article that is being ground at pleasure.

When the grinding and polishing rings are so worn as to be flush, or nearly so, with their concentric holding rings or flanges, then they are set out farther, and again tightened up by their set-screws and ring-plates, as before. When too much worn to be strongly held, then new rings are substituted for the worn ones.

On the perimeter of the grinding-wheel are oblique blades or vanes *X*, which, when the case or cover *Y* is properly placed, create a current or blast that blows and carries out of the directing-trunk *Z*, and out of the building, if necessary, all the abraded material, dust, &c.

A stud, *9*, fast in the part *C* of the grinding-wheel, passes through the part *C'* thereof, and causes the two parts to turn, or to aid in causing them to turn together, the stud or pin *9* being long enough to admit of the polishing portion *C'* of said wheel to be slipped or slid out and in without disconnecting.

Cross-screws *10 10* are arranged across the face, or partially so, of the grinding and polishing wheel, on which weighted nuts can run for the purpose of balancing said wheel.

Instead of traversing the table it may remain stationary, and the stone or grinding-wheel may be made to traverse and accomplish the same duty; but these are obvious modifications of the same invention of which the machine is susceptible, and need not be referred to.

Having thus fully described our invention, what we claim therein as new, and desire to secure by Letters Patent, is—

1. The combination of the annular wheels or holders *C C'* and the ring or blocks of emery *2*, the mechanism for tightening and advancing the ring or segments when worn, substantially as described and represented.

2. In combination with a grinding and polishing wheel composed of two parts, *C* and *C'*, the two shafts *D E*, for holding and driving said wheel while the part *C'* can be moved

out or in from the face of the other part, C, as and for the purpose described.

3. In combination with the grinding-wheel and the two shafts, one of which is adjustable longitudinally in the other, the rod, gears, and sliding bearing, so that the grinding-wheel as a whole and both shafts may be moved in and out, as and for the purpose described.

4. In combination with a grinding-wheel and a cover or case in which it revolves, a

series of vanes on the wheel and an air-trunk, for the purpose of making a blast or current of air, and a conveyer for carrying it loaded with the abraded dust out of the way of the operator, as described and represented.

JULIAN H. PITKIN.
JULIUS S. LANE.

Witnesses:

F. S. HANFORD,
N. D. TIBBALS.