

H. M. Du BOIS.
POLISHING-MACHINE.

No. 179,167.

Patented June 27, 1876.

Fig. 1.

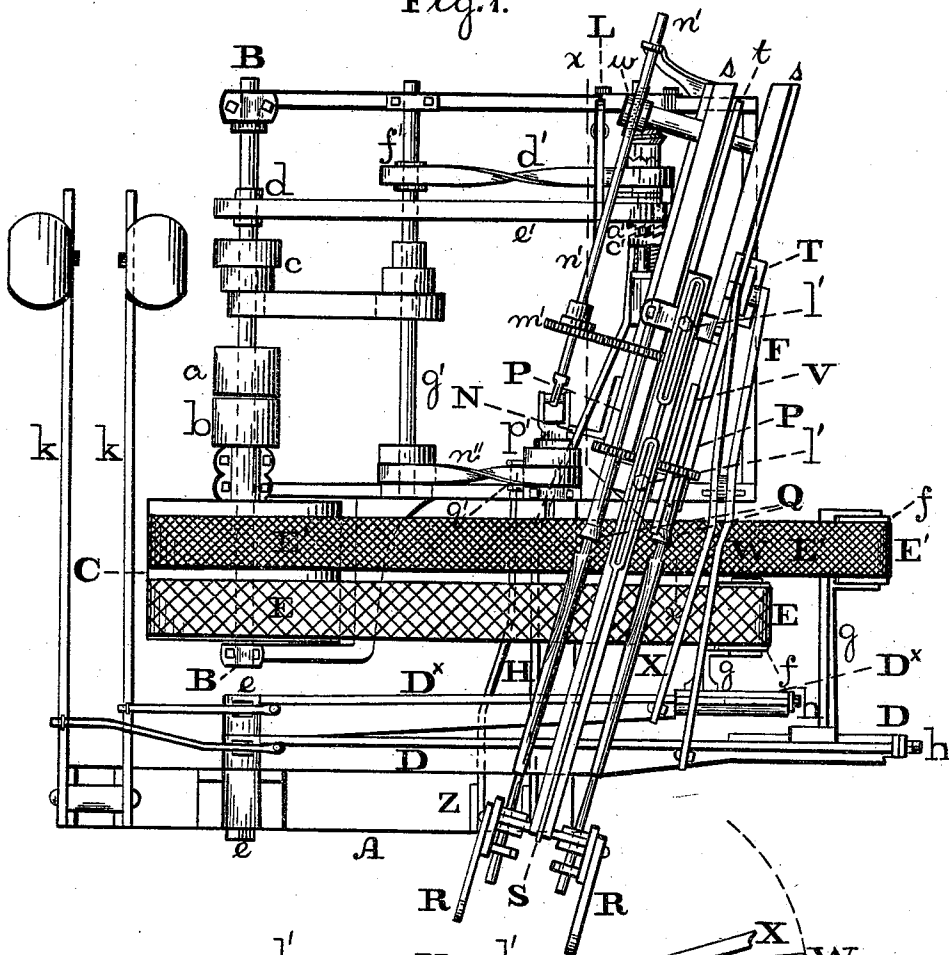
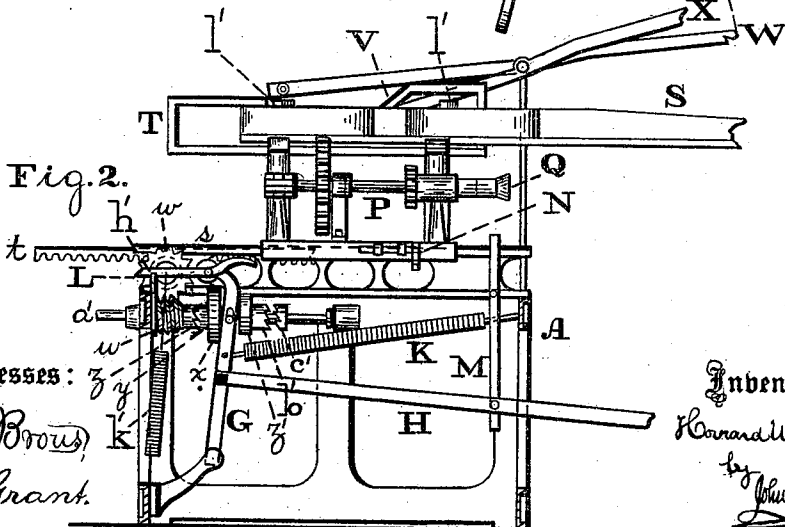


Fig. 2.



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Fig.3.

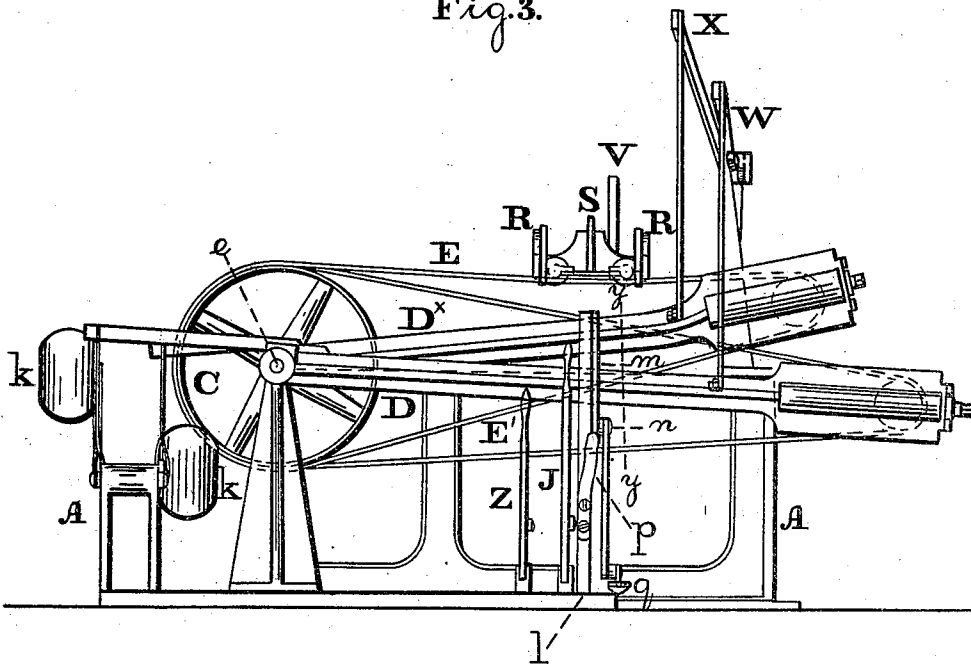
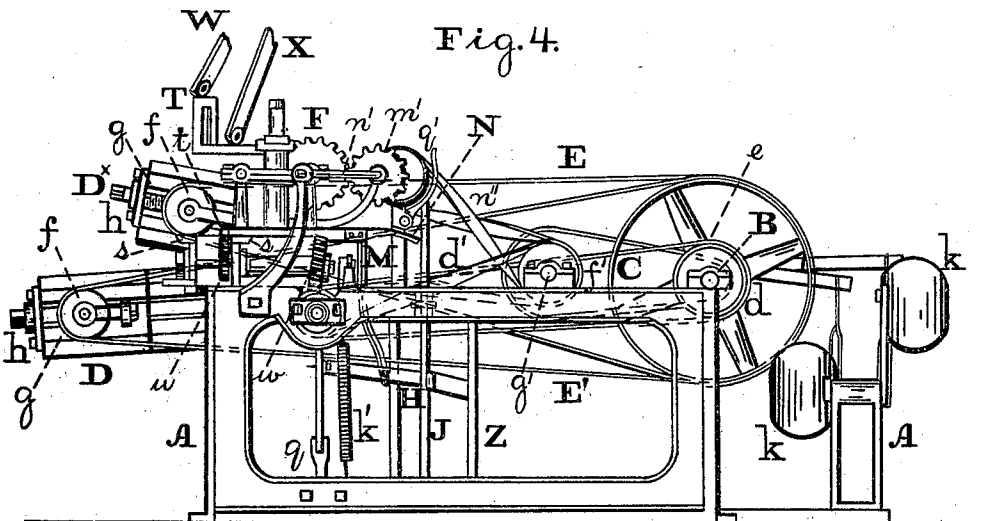


Fig.4.



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Fig. 5.

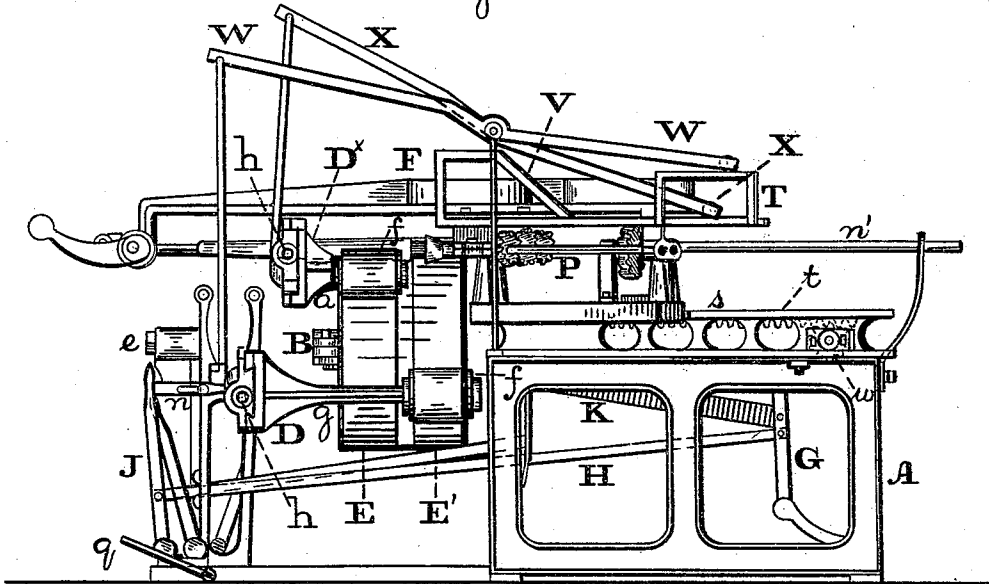
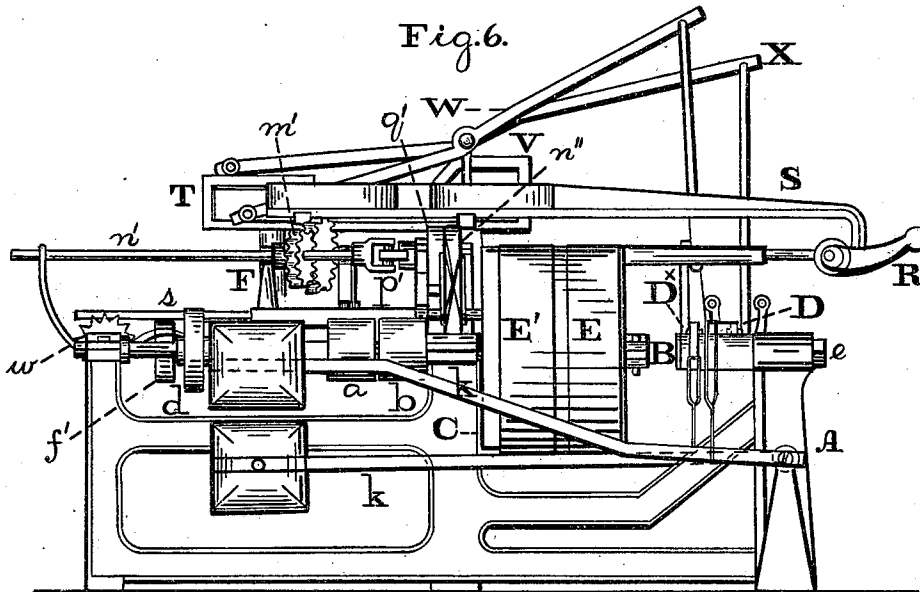


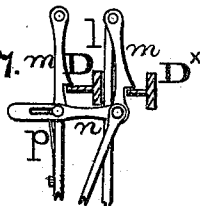
Fig. 6.



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Fig. 7.



Inventor:

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UNITED STATES PATENT OFFICE.

HOWARD M. DU BOIS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS HIS RIGHT TO JOHN G. DAVIS & SON, OF SAME PLACE.

IMPROVEMENT IN POLISHING-MACHINES.

Specification forming part of Letters Patent No. **179,167**, dated June 27, 1876; application filed July 31, 1875.

To all whom it may concern:

Be it known that I, HOWARD M. DU BOIS, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Machine for Grinding and Polishing Spokes, Handles, and other Materials; and I do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which my invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a top or plan view of the machine embodying my invention. Fig. 2 is a transverse section of a portion of the same in line *xx*, Fig. 1. Figs. 3 and 4 are, respectively, views of the front and rear of the same. Figs. 5 and 6 are views of the opposite sides of the same. Fig. 7 is a transverse section in line *yy*, Fig. 3.

Similar letters of reference indicate corresponding parts in the several figures.

My invention has for its object the convenient, speedy, and uniform grinding and polishing of spokes, handles, and other materials.

It consists in a grinding-belt having a rising and falling motion, so as to be properly presented to and cleared from the spokes, handles, or other materials, in combination with a transversely-operating carriage, which brings the articles to be ground and polished gradually across the face of the belt, similar to the advantageous method of hand-work. It also consists in the grinding and polishing belts working in conjunction, both having a rising and falling motion, and in being presented to and cleared from the spokes, handles, and other materials at the proper time, the grinding-belt first acting on the material, and the polishing-belt being brought successively and automatically into operation, so as to finish the work. It further consists in a novel arrangement for advancing and automatically returning the carriage upon which the spokes, handles, or other materials are mounted. It also consists in an arrangement for automatically stopping the carriage. It also consists in a treadle connected with levers operated by springs, for the release of the

swinging arms or levers carrying the grinding and polishing belts, so that the grinding-belt is presented to the work, while the polishing-belt is held in readiness, and presented at the proper time. It also consists in an arrangement for automatically bringing the polishing-belt into service at the proper time. It also consists in an arrangement for automatically clearing the grinding-belt from the spoke when its work is accomplished. It also consists in an arrangement for tightening the belts. It also consists in so mounting the belts that their tension is not changed during their rising and falling motions. It further consists in an adjustable arrangement whereby spokes, handles, and other materials of different lengths may be ground and polished.

Referring to the drawings, A represents the frame or support for the working parts of the machine. B represents the main shaft, on which are fixed the driving-pulley *a* and loose pulley *b*, pulleys *c* *d*, and pulley C. D D* represent two swinging arms or levers, having a common axis, *e*, which extends transversely in line or coincident with the main shaft B. These swinging arms or levers carry pulleys *f*, which are mounted on frames *g*, that project laterally from said swinging arms or levers, to which they are fitted by a dovetailed gibbed slide, so that by means of screw-bolts *h* the belts passing around pulleys *f* and *c* may have their tension increased or diminished, as desired. At the axial ends of the swinging arms or levers there are connected compound levers *k*, whose weights operate to elevate the free end of said swinging arms or levers.

In order to hold the swinging arms or levers in a depressed or lowered position there are pivoted to the uprights *l* of the frame A two notched latches or levers, *m*, which engage and hold the swinging arms or levers D D* by the pressure of the spring *p*. These two latches or levers are connected, by a sliding bar, *n*, to the treadle *q*, by whose operation the swinging arms or levers D D* are cleared from the latches or levers *m*, the weighted compound levers *k* causing them to rise. F represents a carriage, which is mounted on ways *s*, bolted to the frame A diagonally. Secured to the carriage is a rack-bar,

t, with which meshes a pinion, *w*, whose shaft has its bearings in the sides of the ways *s*, receiving motion from a worm-wheel and worm, *u*, on whose shaft *a'* is a loosely-fitted pulley, *x*, to the other side of which is secured a toothed clutch, *y*, which is adapted to engage with a corresponding toothed clutch, *z*, rigidly secured to the worm shaft *a'*.

On the other side of the pulley *x* is another loosely-fitting pulley, *z'*. The adjacent ends of said pulleys are connected or held together by a yoke, which shifts the pulleys laterally on the shaft *a'*, but allows them to revolve in opposite directions. To this yoke is secured by a bolt the lever *G*. The side of the pulley *z'* carries a toothed clutch, *b'*, that engages with a corresponding toothed clutch, *c'*, which is also rigidly fixed to the shaft *a'*.

The lever *G* is the shifter for the pulleys *x* *z'*, whereby the pulley *x* may be made to engage with the toothed clutch *z*, or the pulley *z'* with the toothed clutch *c'*; and owing to the arrangement of the teeth in the several clutches, the shaft *a'* will receive motion in opposite directions by the belts *d'* and *e'*, respectively, the belt *d'* being crossed and passing around the pulley *f'* on a shaft, *g'*, which is operated by belts from the main shaft, the belt *e'* passing around the pulley *d* on the main shaft.

The operation of the worm and worm-wheel *u*, due to the direction of rotation of the shaft *a'*, will impart motion to pinion *w* and rack-bar *t*, and consequently advance or return the carriage *F*. The shifting-lever *G* will be moved in one direction by a lever, *H*, operated by the hand-lever *J* at the front of the machine, and in the other direction by a spring, *K*, which is connected to said lever *G* and frame *A*.

To the shifting-lever *G* there is pivoted a trigger, *L*, which is toothed or notched, so as to engage with a post, *h'*, rising from the frame *A*, and to the lever *H* there is pivoted a stopping-lever, *M*, which is also pivoted to the supports of the ways *s*, or portion of the frame below the carriage *F*. Projecting from the carriage *F*, in the direction toward the main shaft, is a tripping-arm, *N*, whose position is such that at the forward motion of the carriage said arm will strike the trigger *L* and disengage it from the post *h'*, and cause the return of the carriage, when the arm will strike the lever *M* and stop the carriage, as will be hereinafter more fully stated.

When the trigger *L* is engaged with the post *h'* a suitably-applied spring, *k'*, will hold it in position.

On the carriage *F* there are bearings for shafts *P*, on the ends of which are movable chucks *Q*, to which one end of the spokes, handles, or other materials will be fitted, the opposite ends being held by centers or eccentric levers *R*, whose bearings are on arm *S*, which extends from the carriage in a direction over the belts *E* *E'*. The distance between the movable heads *Q* and the centers

or eccentric levers *R* may be varied to suit different lengths, the arm *S* being slotted, through which are passed bolts *U*, which are screwed into the carriage.

The shafts *P* are geared together, so that the spokes, handles, or other materials will rotate in the same direction. Power is communicated to the shafts by means of a gear-wheel, *m'*, which is fitted on a rotating shaft, *n'*, so as to rotate therewith, and likewise slide in the direction of the length of said shaft, said shaft being slotted. This shaft *n'* is connected, by a tumbler-joint, *p'*, to the shaft of a pulley, *q'*, which receives power by a belt, *n''*, passing around a pulley on the shaft *g'*. From the upper side and at one end of the carriage *F* rises the frame *T*. At the opposite end of the carriage, and on the same side, rises the inclined way *V*.

W and *X* represent two levers, which are pivoted to an upright rising from the frame *A*. One end of the lever *W* is connected with the swinging arm or lever *D*, its other end being adapted to rest on the frame *T*. The lever *X* is connected at one end with the swinging arm or lever *D**, and its other end is adapted to come in contact with the inclined way *V*. *Z* represents a lever for shifting the belt *n''* of the pulley *q'* to and from the loose pulley thereof.

The grinding-belt *E* will be coated with rough sand or quartz, emery, or other material suitable for the purpose. The polishing-belt *E'* will be coated with polishing-sand or quartz, emery, or other material suitable for the purpose.

The operation is as follows: The belts *E* *E'* being held in a lowered or depressed position by the arms *D* *D** engaging with the notched latches *m*, the spokes (in the present case two in number) are now fitted to the movable heads *Q* of the shafts *P*, and secured by the centers or eccentric levers *R*. The lever *Z* is moved so as to shift the belt *n''* to the pulley *q'*, whereby the shafts *P*, and, consequently, the spokes, receive rotary motion, both in the same direction; then the treadle *q* is operated, so as to release the swinging arms or levers *D* *D**, whereby the swinging arm or lever *D**, carrying the grinding-belt, immediately comes in contact with the spokes. The swinging arm or lever *D* is held by the free end of the lever *W*, resting on the frame *T*.

When the grinding-belt has sufficiently acted on the spokes, the operator forces in the lever *J*, so that the sliding pulley *x* engages with the toothed clutch *z* on the shaft *a'* of the worm *u*, and thus imparts motion to the worm-wheel thereof, and to the pinion *w*, whereby the latter, engaging with the rack *t*, causes the carriage *F* to advance, and with it the rotating spokes.

When the pulley *x* is forced against the clutch *z*, the trigger *L* engages with the post *h'*, and is held firmly in place by the spring *k'*. (See Fig. 2.) As the carriage advances the frame *T* moves under and clears the free end

of the lever W, allowing the swinging arm or lever D to rise, bringing the polishing belt E' in contact with the rotating spokes, which are uniformly polished.

The inclined frame V now reaches the free end of the lever X, which it forces up, thereby depressing the swinging arm or lever D*, clearing the belt E from the spokes. The notched latch *m* now engages the swinging arm or lever D*, and holds the latter in its depressed position.

Simultaneous with these movements the arm N, projecting from the carriage F, reaches the trigger L, forces down the inner end thereof, and causes the liberation of the other end from post *h'*. The spring K immediately acts upon the lever G, and shifts the pulley *x* out of gear from the toothed clutch *z*, and draws the pulley *z'* against and in gear with the toothed clutch *c'* on the shaft *a'*. As the pulley *z'*, owing to the belt *e'*, runs in reverse order to the pulley *x*, the shaft *a'* receives motion in reverse order to that in which it had been running, whereby the worm and worm-wheel and the pinion *u* reverse their motion, and thus the carriage is returned to its normal position. The swinging arm or lever D and the belt E' may then be lowered by hand, and said arm will engage with the notched latch *m*, both arms now being lowered or depressed and prevented from rising. (See Fig. 7.)

As soon as the projecting arm N, moving with the carriage F, reaches the lever M, it forces the latter with it, and thus operates the lever H and the shifting-lever G, so that the pulley *z'* will be disengaged from the toothed clutch *c'*. The pulley *z'* and the pulley *x* will then stand between the clutches *c'* and *z* without being in contact with either of them, whereby the worm and worm-wheel *u*, and the rack *t* and pinion *w*, are deprived of motion and the carriage is stopped. Then the lever Z is moved by the operator, so as to shift the belt *n''* from the pulley *g'* to the loose pulley aside thereof, and the rotation of the spokes thus ceases. The polished spokes may then be removed, and the machine is in condition to repeat the operation, as before stated.

When the carriage has returned to its normal position the lever X is clear of the inclined frame V, and thus prepared to permit the rising of the grinding-belt E, and the lever W has its free end resting on the frame T, so as to prevent the rising of the belt E' until the proper time, as stated.

The carriage is set diagonally, so that the spokes, handles, or other materials are presented in a similar line to the grinding and polishing belts, as is necessary to perform properly the grinding and polishing operations.

Owing to the axis of the swinging arms or levers D D* being coincident with the axis of the belt-wheel C, the belts E E' always retain their tension during the rising and falling motion of said swinging arms or levers D D*.

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

1. A grinding-belt mounted on a rising and falling arm, in combination with a transversely-moving carriage, substantially as and for the purpose set forth.
2. A grinding-belt, in combination with a finishing-belt automatically and successively brought into operation, substantially as and for the purpose set forth.
3. A grinding-belt and an automatically-rising polishing-belt, in combination with a transversely-moving carriage, substantially as and for the purpose set forth.
4. The shifting-lever G, carrying the trigger L, and connected with the shifting-pulleys *x* *z'*, in combination with the post *h'* and spring K, and with the carriage F and its tripping-arm N, substantially as and for the purpose set forth.
5. The stopping-lever M, in combination with the lever H and the shifting-lever G, and with the carriage F and its tripping-arm N, substantially as and for the purpose set forth.
6. The inclined frame V, in combination with the lever X and grinding-belt E, substantially as and for the purpose set forth.
7. The frame T, in combination with the lever W and the polishing-belt E', substantially as and for the purpose set forth.
8. The swinging arms or levers D D*, in combination with the pulley-arms *g* *g*, adjustably connected thereto, substantially as and for the purpose set forth.
9. The swinging arms or levers D D*, having an axis coincident with the belt-supporting pulley C, substantially as and for the purpose set forth.
10. The carrying-arm S, adjustably fitted to the carriage F, substantially as and for the purpose set forth.

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Witnesses:

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