(No Model.) 3 Sheets—Sheet 1.

# G. A. KNOX.

## HEEL BURNISHING MACHINE.

No. 486,229. Patented Nov. 15, 1892.

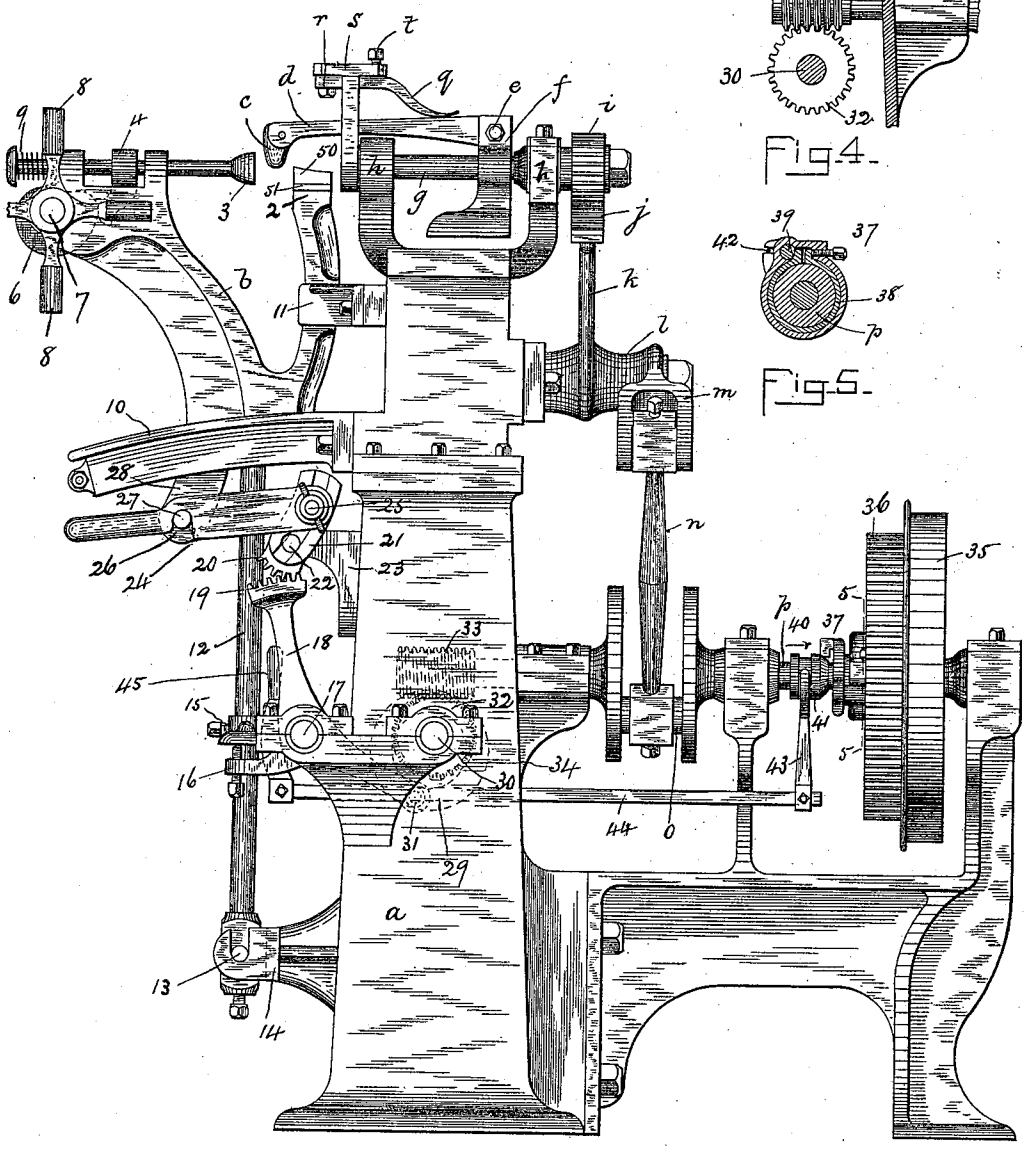

Fig. 1.

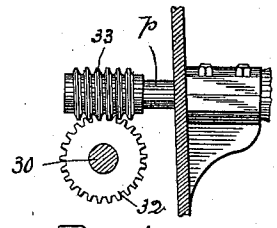

Fig. 4.



Fig. 5.

WITNESSES:
A. D. Harrison.
Howard W. Steenken.

INVENTOR:
George A. Knox.
by Wright Brown Quinby & Atty's

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

# G. A. KNOX.

## HEEL BURNISHING MACHINE.

No. 486,229. Patented Nov. 15, 1892.

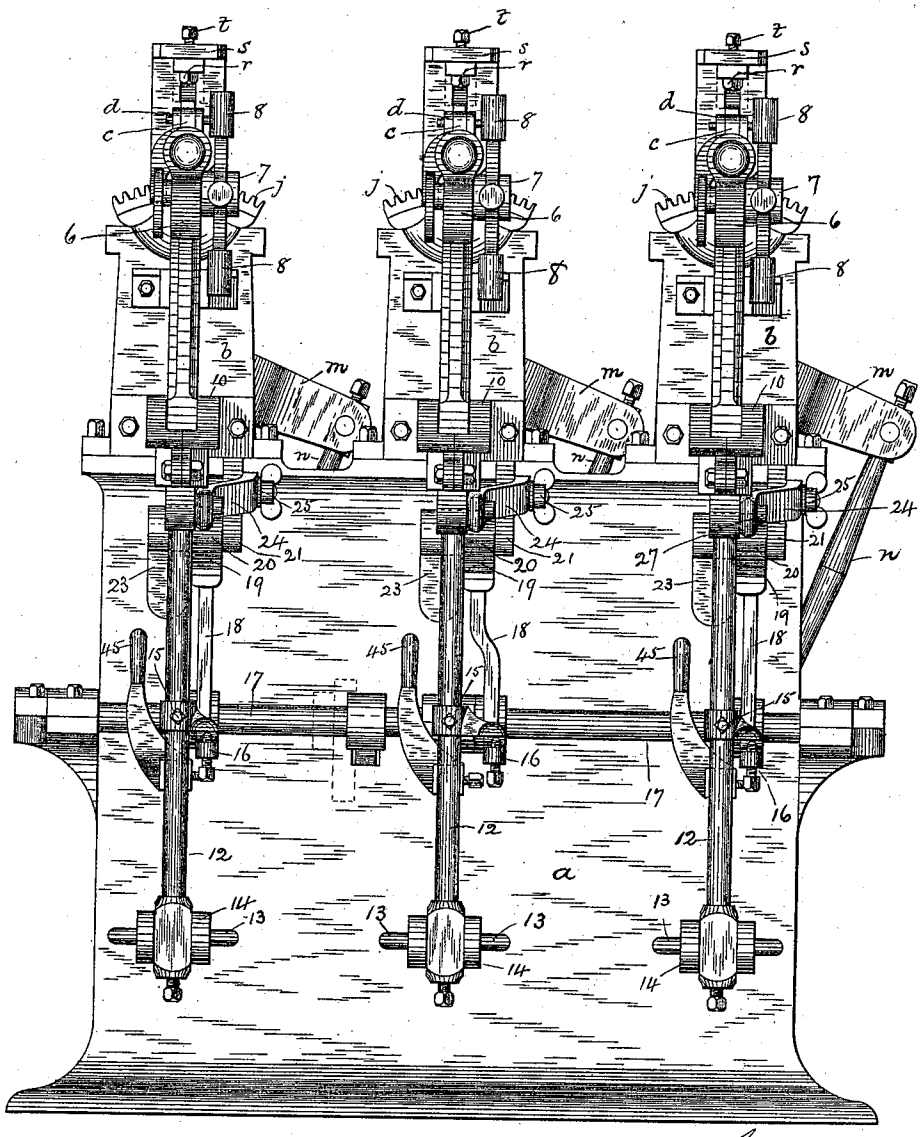


Fig. 2.

WITNESSES:
A. D. Harrison.
Edward W. Knowles.

George A. Knox
INVENTOR:
by Wright Brown Quinby & Atty's.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

# G. A. KNOX.

## HEEL BURNISHING MACHINE.

No. 486,229. Patented Nov. 15, 1892.

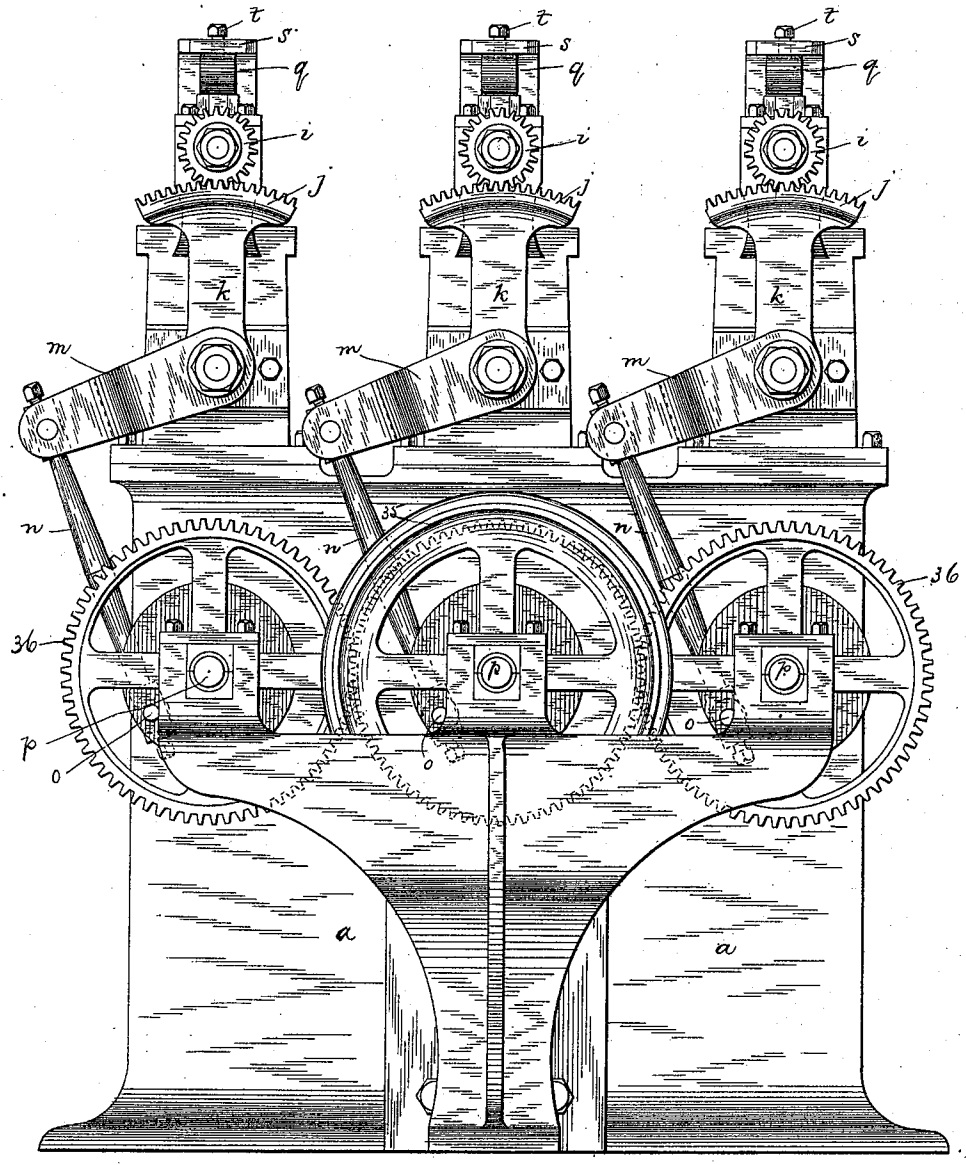


Fig. 3.

WITNESSES:
A. D. Harrison.
Thomas W. Keasbey

George A. Knox
INVENTOR:
by Wright Brown Quinby & Keasbey
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

GEORGE ALFRED KNOX, OF LYNN, MASSACHUSETTS.

## HEEL-BURNISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 486,229, dated November 15, 1892.

Application filed August 6, 1890. Serial No. 361,177. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE ALFRED KNOX, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Heel-Burnishing Machines, of which the following is a specification.

This invention relates to multiple-heel-burnishing machines, or those having a series of burnishing instrumentalities adapted to operate simultaneously on a number of boot-heels, each burnishing instrumentality including a jack or holder for the boot or shoe and a rocking burnishing-tool yieldingly supported and adapted to rock or oscillate through a path, which carries it along the curved margin of the heel from breast to breast, the jack being automatically moved during the operation, so as to cause the burnishing action to progress from one edge of the heel to the other, or, in other words, to commence at the heel-seat and progress to the top lift, or vice versa.

The invention has for its object to provide an improved multiple machine of this class of simple construction and in which one of the burnishing instrumentalities may be operated alone or independently of the others, and in which any number less than the whole may be operated without operating the whole of the machine, the machine being, also, adapted to be operated as a whole, all its burnishing instrumentalities operating simultaneously when desirable.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents an end elevation of a heel-burnishing machine embodying my invention. Figs. 2 and 3 represent elevations of said machine, taken from opposite sides of the same. Fig. 4 represents a side elevation of a portion of the machine. Fig. 5 represents a section on line 5 5, Fig. 1.

In the drawings, *a* represents a supporting-frame, which supports a series of burnishing instrumentalities, each including a jack *b*, adapted to hold a boot or shoe, and an oscillating burnishing-tool *c*, adapted to rock or oscillate and follow the curvature of the margin of the heel from breast to breast thereof, as in the well-known Tapley burnisher.

The burnishing-tool *c* is mounted on the swinging end of an arm *d*, which is pivoted at *e* to a carrier *f*, which is rigidly attached to a rock-shaft *g*, said shaft being journaled in bearings *h h* on the supporting-frame and provided with a pinion *i*, which meshes with an oscillating rack-segment *j*. Said rack-segment is attached to an arm *k*, projecting from a rocking sleeve *l*, which is mounted on a fixed stud or bearing attached to the supporting-frame and is provided with an arm *m*, which is connected by a rod *n* with a crank *o* on a crank-shaft *p*, which is journaled in fixed bearings supported by the supporting-frame. The shaft *p* being rotated by suitable means, as presently described, its crank *o* imparts an oscillating motion to the rack-segment *j* through the intermediate connections above described, and the latter oscillates the rock-shaft *g* and causes the burnishing-tool to vibrate about the heel held by the jack *b*. The arm *d*, which carries the burnishing-tool, is pressed inwardly to cause the burnishing-tool to bear with a yielding pressure on the heel by means of a spring *q*, attached by a bolt *r* to a bracket or arm *s*, affixed to the rock-shaft *g*, said spring bearing on the arm *d* at a point near the pivot *e* of said arm. A set-screw *t* in the bracket *s* bears on the spring *q* between its attached and free ends and enables the pressure of the spring to be varied. The described arrangement of the spring, so that it bears upon the tool-supporting arm *d* near the pivoted end of the latter, enables said spring to act without material variation of its pressure or force by reason of the swinging movements of the arm *d*, caused by the varying curvatures of the heel, the arm being required to swing upwardly to a greater extent when acting on the heel-seat portion of the heel than when acting on the portion adjacent to the top lift. The close proximity of the spring to the pivoted end of the arm *d* reduces the displacement of the spring caused by the described movements of the arm *d* to the minimum, the variation of the pressure of the spring being, therefore, correspondingly reduced.

The jack *b* is a frame having a rest or support 2 for the top lift of the heel and a mov-

able stud or spindle 3, adapted to enter the boot or shoe and bear upon the inner sole to hold the heel against the rest 2. Said spindle has an arm 4, which bears upon the perimeter of a cam 6, which is attached to a shaft 7, journaled in the jack-frame *b*. Said shaft is provided with arms 8, whereby it may be rotated, its rotation in one direction causing the cam 6 to force the spindle 3 toward the rest 2, while its rotation in the opposite direction permits a spring 9 to force the spindle 3 away from said rest.

The arm 4 projects downwardly from the spindle 3 and is arranged so that its point of contact with the cam is about on a level with the axis of the shaft 7. Hence the pressure of the arm against the cam cannot rotate the latter. The arm and spindle are therefore positively held by the cam at any point to which the latter may be rotated, the spindle being, therefore, quickly adjusted to a position to hold a heel of any height and securely hold it at the position to which it is adjusted.

The jack-frame *b* is guided by a slotted guide or bracket 10, which is attached to the supporting-frame, the jack being movable in said guide, so as to present different parts of the heel to the oscillating burnishing-tool, as in the well-known Tapley machine.

I have provided improved mechanism for moving the jack, which I will now describe.

12 represents a standard affixed to the lower part of the jack-frame and projecting downwardly therefrom, its lower portion being provided with trunnions 13, which are journaled in bearings in a fixed bracket 14 on the supporting-frame. The standard 12 has an ear or lug 15, which is supported by an arm 16 on a rock-shaft 17, which is journaled in bearings in the supporting-frame. Said rock-shaft is rocked or oscillated by mechanism hereinafter described and is caused by said movements to alternately raise and lower the standard 12 and the jack supported thereby, the jack being lowered when the burnishing-tool is acting on the higher or heel-seat portions of the heel and raised when the tool is acting on the lower portion at and above the top lift. The jack-frame is prevented from lateral displacement during its movements by the guide 10 and by another slotted fixed guide 11, located above the guide 10.

The rock-shaft 17 is provided with a series of arms 18, one for each jack. Said arms have gear-segments 19 on their outer ends, meshing with like segments 20 on a corresponding series of levers 21. Said levers are pivoted at 22 to ears or brackets 23 on the supporting-frame and each has pivoted to it at 25 a link or bar 24, which is provided with a notch or recess 26, engaging a stud 27 on an ear 28, affixed to the corresponding jack-frame *b*. The oscillation of the rock-shaft causes the arms 18 to oscillate the levers 21, the latter being thus caused through the link or bar 24 to move the jack-frames back and forth in the direction required to cause the jack to move the heel across the path in which the burnisher travels. The described movements are timed so that the jack moves slowly first in one direction until the burnishing action has progressed from the top lift to the heal-seat, or vice versa, and then in the opposite direction an equal distance. The length of the movements of the jack may be regulated to conform to the height of the heel by adjusting the pivot 25 on the lever 21 toward or from the pivot 22.

The foregoing description relates to one of the burnishing organizations, of which there are two or more, preferably three, as shown in Figs. 2 and 3, each being a duplicate of the mechanism above described, the general features of which are similar to those of the well-known Addy machines, and all being operated by the rock-shaft 17, which is common to all the burnishers, said rock-shaft having as many arms 16 and gear-segments 19 as there are burnishers. The rock-shaft 17 is rocked or oscillated by means of a cam-groove 29 in a disk 34 on a continuously-rotating shaft 30, journaled in bearings in the supporting-frame, said cam-groove engaging a trundle-roll 31 on the arm or lever 18, so that the said lever is oscillated by the rotation of the shaft 30.

There are as many crank-shafts *p* as there are burnishers, each burnishing-tool being oscillated by its own crank-shaft. One of said crank-shafts has a loose pulley 35 and receives power through a belt running on said pulley 35. Each of the shafts *p* is provided with a gear 36, the gear on the central or driven shaft being fastened to the driving-pulley and meshing with the gears on the other shafts and imparting power thereto from the central shaft. Said gears are normally loose on the shafts *p* and are provided with clutches 37, whereby they may be made fast to the shafts. Said clutches may be of any suitable construction, and each is adapted to be independently operated. The preferred form of clutch is shown in Figs. 1 and 5, the hub of the gear containing a friction-band 38, which bears at one end on a shoulder in the hub and at its other end on a cam 39, adapted to be turned in the hub. An arm 40 is attached to said cam and is arranged to be moved by the beveled end of a collar 41 on the shaft *p* when said collar is moved in the direction indicated by the arrow in Fig. 1. The movement thus given the arm 40 causes it to turn the cam in such manner as to cause the latter to compress the band 38 upon the shaft *p*, and thus make the gear 36 fast to said shaft. When the collar 41 is moved in the opposite direction, a spring 42 turns the cam 39 and causes it to release the band 38. This construction of clutch is common and forms no part of my invention. I may use any other suitable clutch, if preferred. Each collar 41 is connected by an arm 43 with a slide 44, which is movable in a guide in the supporting-frame, and has at its outer end a handle

45, which is located in convenient reach of the operator, so that by grasping the said handle and moving the slide 44 in or out the operator may connect the gear 36 of the corresponding shaft to said shaft or make it loose thereon. It will be seen, therefore, that the operator is enabled to operate one of the burnishing instrumentalities or all of them simultaneously or any number less than the entire number. It will also be seen that the mechanism is simple, considering the capacity of the machine, and that the machine is durable and not liable to be easily deranged. It will also be seen that the working parts are conveniently arranged, so that easy access may be had to them to adjust and keep them in order.

The jack is shown in Fig. 1 as provided with a metallic seat 50, which is separated from the body of the jack by a block or piece 51 of a material which is a non-conductor of heat, (vulcanized fiber being a suitable material.) The seat is formed to support the working tool *c* when the jack is at the end of its movement, in which it is left after the removal of the boot or shoe. The seat has a smooth polished surface, and when the tool is in rubbing contact with it sufficient friction is exerted to heat the tool, and thus prepare it for the next burnishing operation, the heat thus afforded being a substitute for that afforded by the gas flame usually employed to heat the burnishing-tool in a hot-kit machine. It will be seen, therefore, that during the period that elapses between the burnishing of one heel and the next the tool is heated by friction, the heating being facilitated by the non-conducting block 51, supporting the seat 50.

I claim—

1. In a heel-burnishing machine, the combination, with an oscillating burnishing-tool, of a jack, a friction-seat thereon adapted to support the rocking tool when the machine is not in operation, and a support of non-conducting material between said seat and the body of the jack, as set forth.

2. In a heel-burnishing machine, the combination of a plurality of burnishing instrumentalities or burnishers, each including an oscillating burnishing-tool and a jack, said jack and tool being relatively movable, as described, a series of driving-shafts, one for each burnishing-tool, connections between said driving-shafts and tools, whereby the tools are independently oscillated, normally-loose intermeshing gears on said shaft, clutches adapted to connect the gears with and disconnect them from the shafts, and a supporting-frame common to all the parts recited, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 1st day of August, A. D. 1890.

GEORGE ALFRED KNOX.

Witnesses:
A. D. HARRISON,
ARTHUR W. CROSSLEY.