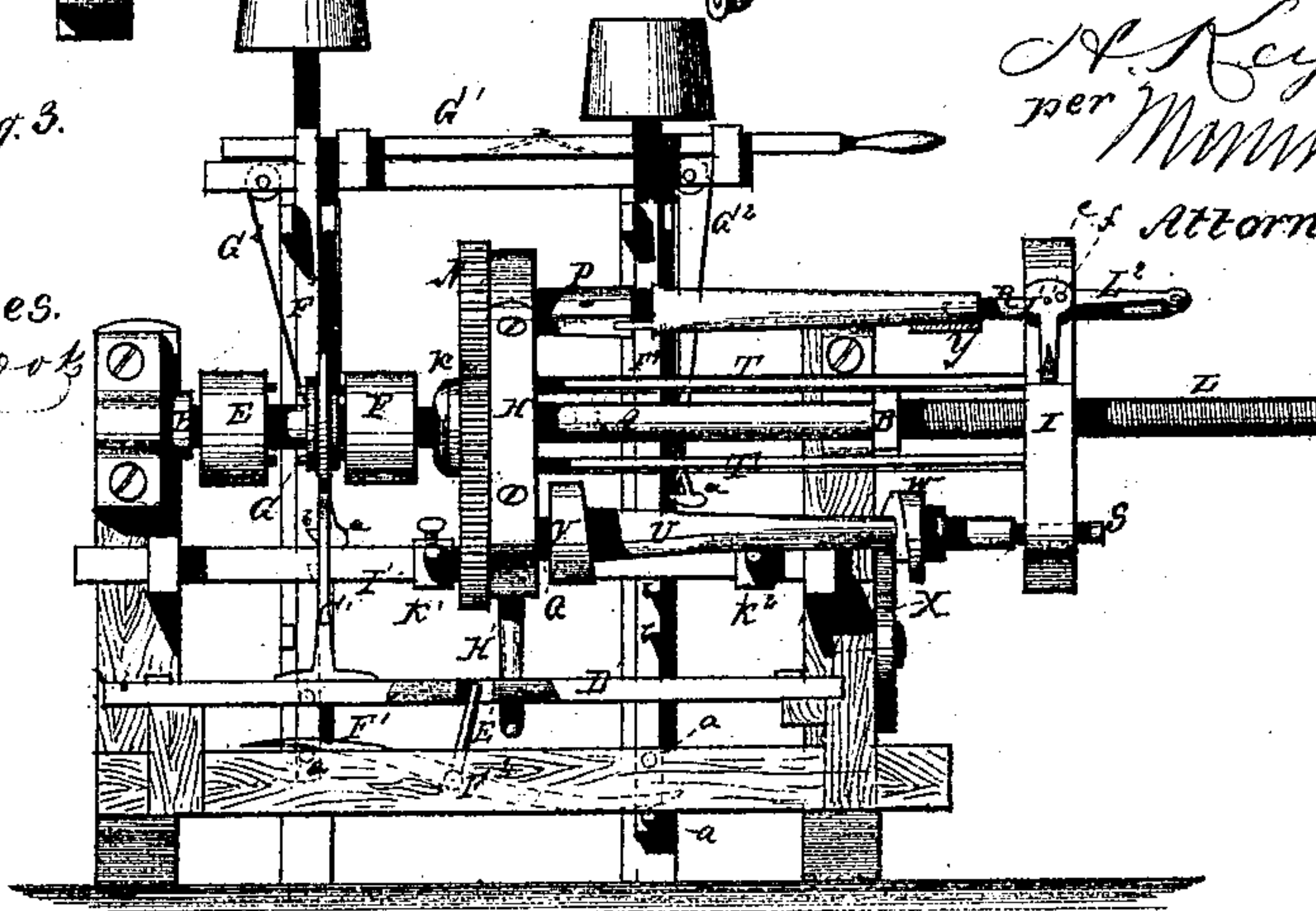
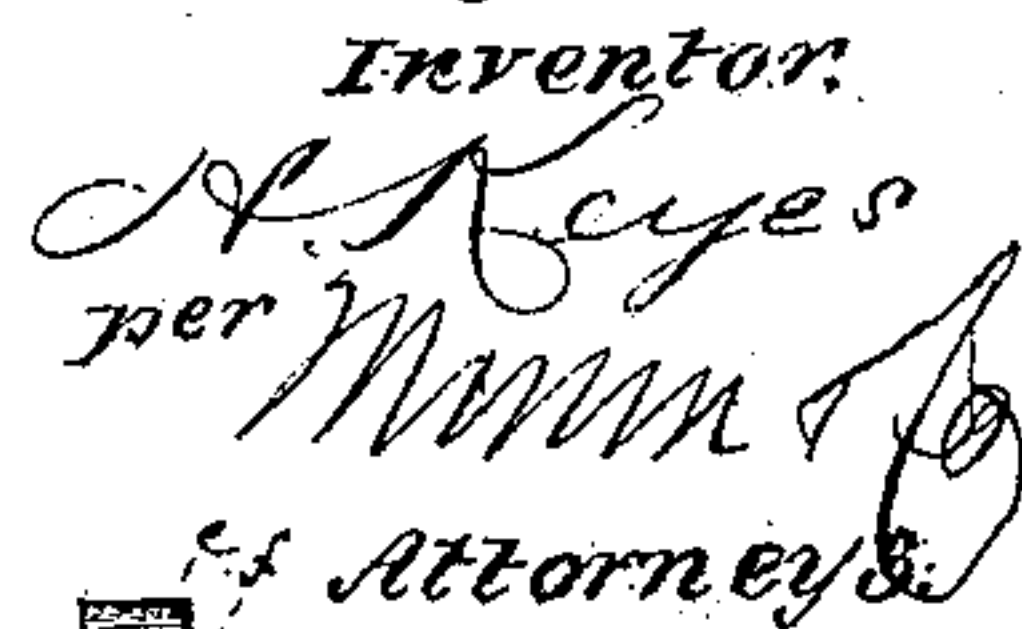


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HORATIO KEYES, OF TERRE HAUTE, INDIANA.

Letters Patent No. 99,913, dated February 15, 1870.

IMPROVEMENT IN MACHINE FOR SMOOTHING SPOKES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HORATIO KEYES, of Terre Haute, in the county of Vigo, and State of Indiana, have invented a new and improved Spoke-Smoothing Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings forming part of this specification.

The object of this invention is to provide a machine for rapidly and economically smoothing spokes for wagon wheels.

The invention consists of an improved arrangement of apparatus for slowly moving the spoke, held in centers at the ends lengthwise, along and turning it in contact with a polishing belt, moving rapidly across it, the said apparatus being guided by a pattern to move the spoke to or from the belt, according to the variations in the shape of the said spokes, so that the pressure against the belt will always be the same, and the effect thereby rendered uniform.

The invention also comprises certain means for reversing the movement of the spoke-carrying devices for moving the spokes longitudinally back and forth, also certain means for throwing the spokes out of contact with the belt at the end of each longitudinal movement, and for automatically stopping the longitudinal movements at the ends of the same in each direction.

Figure 1 represents a sectional elevation of my improved machine, taken on the line *x x* of fig. 2;

Figure 2 represents a top view with some parts partly represented in perspective; and

Figure 3 represents a transverse sectional elevation, taken on the line *y y*, fig. 1.

Similar letters of reference indicate corresponding parts.

A represents a mandrel, arranged in bearings B at the ends of arms C, having bearings at D, whereon they may oscillate.

This mandrel is provided with two loose pulleys E F, a sliding-clutch, G, a sliding-frame composed of parts H I T, a toothed pinion, K, and a screwed end, L.

The clutch slides between the pulleys and is secured to the mandrel, as is also the pinion K, by a feather.

This pinion gears with the toothed wheels N O, which are on spindles P Q, borne by the cross-piece H of the sliding-frame.

The cross-piece I carries tail spindles R S, corresponding to the spindles P Q, and the two cross-pieces are connected by bars T.

The spoke to be smoothed is suspended between the spindles P R, and a pattern, U, having enlargements

V W at or near the ends, is suspended between the spindles Q S. The enlargement W is adjustable.

This enlargement of the pattern rests on the wheel X, which revolves on a stud-pin projecting from the frame of the machine, and supports the mandrel A and its adjuncts, and governs the positions of the spokes relatively to the polishing-belt Y, working over the pulley Z, and having its surface provided with any rough or polishing material.

Rotary motion is imparted to the mandrel A by the belts A¹ A², acting upon the pulleys E F and clutch G, one turning it one way and the other the other way, one belt working direct and the other being crossed. The mandrel imparts motion to the spindles P Q, revolving them and the spoke and pattern slowly, at the same time that they are moved along by the screwed end L of the shaft, screwing through the cross-piece I.

The pattern is so shaped and arranged relatively to the spokes, that, working on the wheel X, it will move the spoke to or from the belt, as required by the varying shape of the spoke, by raising the mandrel and arms *c c'* or lowering the same, whereby the action of the polishing belt on the said spokes will be uniform. When the spokes have arrived at the end of their movements either way it is desirable to move them entirely away from the belt, so that when standing to be removed or set into the return movement, the belt will not act upon them unduly in one place. This is effected by the enlargements V and W of the pattern, which, riding up to the top of the wheel X, as they are arranged to do, will raise the spokes entirely out of the reach of the belt.

Guiding rollers B' are arranged under the belt at each side of the place where it acts on the spoke to hold it up to its work and to prevent sagging.

The crotch C', for shifting the clutch, is placed in a sliding-bar, D', which is worked by the tongue E' of a tilting-lever, F¹, pivoted to the frame at F², the ends of which work between pins *a*, projecting from the vertically-sliding weighted bars F³ and F⁴, which have notches *b* in their sides, into which spring-catches *d*, drop when the said weighted bars are raised, which is done by a sliding hand-lever, G', having cords G¹ and G² connected to it, and working over guide-pulleys in such a manner as to raise one bar while the other is down, and *vice versa*.

When the bar G¹ is drawn out to the right and the bar F³ raised, the clutch will be moved into gear with the pulley F, and the mandrel will be rotated in the direction to move the carrying frame and the spoke to the right, and when moved the other way the clutch will gear into the other pulley, and the opposite movement of the mandrel and spoke will take place.

The said lever G^1 is moved by hand. To prevent the carrying-frame from revolving with the mandrel, a projection, H^1 , from the cross-head H , works in a slot in the bar H^2 . In order to prevent the cross-heads from being moved too far by the screwed mandrel, it is desirable to stop the motion of the said mandrel automatically at the end of each movement.

This I accomplish by means of a sliding-bar, I^1 , having pins I^2 and I^3 , arranged to strike the ends of the spring-catches d , when the bar is moved in the right direction, and disengage them from the bars F^2 or F^3 and allow them to fall, by which they will move the clutch G away from either of the pulleys E or F , with which it may be engaged, but not far enough to engage the other.

This bar I is moved at the proper time by the wheel o coming in contact with the pins K^1 or K^2 projecting into the path of the said wheel.

As represented in the drawing, the machine is in the position to move the carrying-frame to the right, which movement will continue until the wheel o strikes the pin K^2 , and moves the bar I^1 far enough to the right to cause the pin I^3 to disengage the spring d from the bars F^3 , and let it fall, by which the tilting bar F^1 will be carried down far enough to throw the clutch out of gear with the pulley F . This will take place simultaneously with the raising of the enlargement V of the pattern upon the wheel X . The mandrel will then stand still until the slide-bar G^1 is moved again in the opposite direction.

The tail spindle R is required to be moved quickly for the removal of the finished spoke and the insertion of another, for which it is provided with an eccentric lever, L^1 , and connecting-link L^2 , so arranged that when the lever is turned down in the position represented in the drawings, to force the spindle up to the spoke, the connecting piece of the link will fall

slightly below the pivot-pin f of the lever, and be thereby locked in that position.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

1. The combination of the movable frame $H I T T$, carrying-centers $P R Q S$, screw-shaft $A L$, sliding pinion K , spur-wheels $N O$, pattern V , and polishing-belt Y , all arranged and operating in the manner and for the purpose specified.

2. The threaded mandrel A , arranged in bearings $C C'$ of the frame, in combination with loose pulleys $E F$, clutch-sleeve G , gears $K N O$, centers $P Q$, and nut I , the said parts constituting the feeding mechanism, and being constructed and arranged as described.

3. The pattern U , with enlargements V and W thereon, constructed as described, in combination with the wheel X , the said parts operating to remove the spoke away from the belt at the end of each traverse, as set forth.

4. The combination of sliding hand-lever G' , cords $G^1 G^2$, weighted bars $F^3 F^4$, tilting-lever F^1 , tongue E^1 , sliding-bar D' , and-shifter C' , all operating together to ship and unship the clutch in the manner specified.

5. The combination of sliding-bar I^1 , having pins $I^2 I^3$, with wheel O , and pins $K^1 K^2$, and the spring-catches d , to limit the movement of the mandrel by throwing the clutch out of connection with both of the pulleys, as set forth.

6. The combination of the eccentric lever L^1 , connecting-link L^2 , connecting-pin e , and the point-pin f , to operate the tail-spindle R , in the manner described.

HORATIO KEYES.

Witnesses.

S. H. THOMPSON,
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