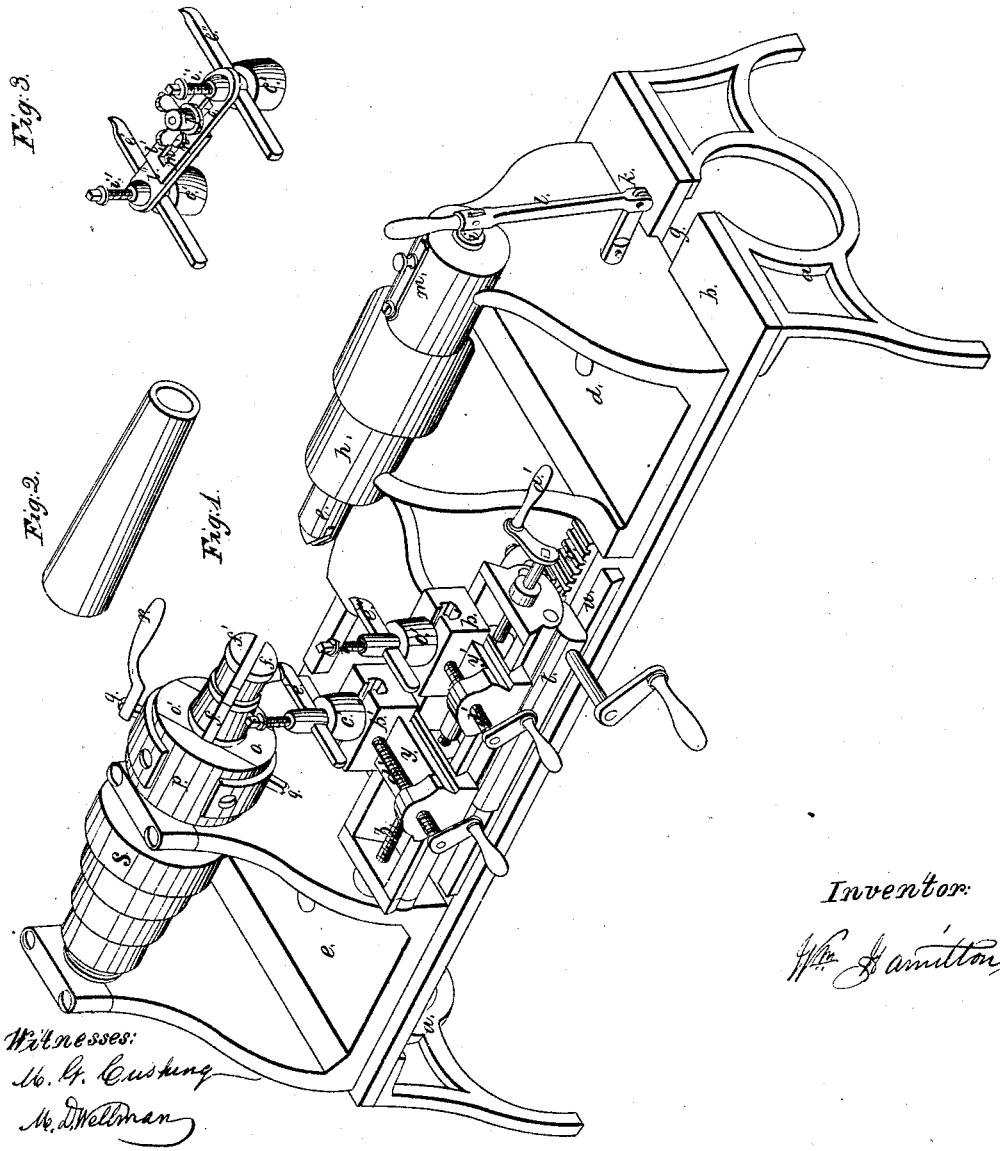
W. Hamilton.

Turning Axle Boxes.

No. 38,385. Patented May 5, 1863.



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WILLIAM HAMILTON, OF ALLEGHENY, PENNSYLVANIA.

IMPROVED MACHINERY FOR DRESSING AXLE-BOXES.

Specification forming part of Letters Patent No. **38,385**, dated May 5, 1863.

To all whom it may concern:

Be it known that I, WILLIAM HAMILTON, of the city of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Machinery for Dressing the Ends of Axle-Boxes. and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is a perspective representation of the machinery which I use for that purpose, and Fig. 2 is a representation of an axle-box. Fig. 3 shows the adjustable gage on the tool-posts to regulate the length to which the axle-boxes are to be dressed.

To enable others skilled in the art to construct and use my improvement, I will proceed to describe its construction and operation.

Axle-boxes are made of iron, hollow, and of the shape of a frustum of a cone, being slightly tapering. They are driven into the center of the nave of wheels to receive the end of the axle. These axle-boxes are usually made of cast-iron, and it is important that each box in a set should be of exactly the same length, and that each end should be dressed or faced off in a plane exactly at right angles to the axis of the axle-box, and consequently that the faces at each end should be parallel.

It has heretofore been usual to face axle-boxes with a tool or cutter in a lathe, by hand, depending entirely on the skill of the workmen to have the two faces of the axle-box parallel and square with the axis of the box, and the boxes of equal length. As this exactness is extremely difficult to attain, I have contrived a machine to accomplish the purpose with precision, which can be operated by the most unpracticed mechanic, and with which axle-boxes can be faced more rapidly than by any other known means, inasmuch as it requires no particular care in its management, and is certain and accurate in its operation.

In the drawings, Fig. 1, *a* is the frame of a lathe. On the bed-plate *b*, at either end, is a sliding puppet-frame, one, *d*, on the right-hand side, for supporting the fixed or fore-center *c* in a horizontal position, and the other puppet-frame, *e*, at the left-hand side, for supporting the spindle of the mandrel *f*. These puppet-frames *d* and *e* slide in a horizontal groove, *g*, running longitudinally in the center of the bed-plate *b*. The axes of the mandrel *f* and fore-center bit *c* are placed in the same horizontal line, as is usual in lathes. The fore-center *c*, which does not revolve on its axis, is placed horizontally in a cylindrical box, *h*, having a cylindrical bore, in which it fits. To the rear end of the fore-center *c* is attached a rod, *i*, which projects from the rear end of the box *h*, and the lever *l*, having its center at *k*, is attached to the extremity of the rod *i*, so that by operating the lever *l* the fore-center may be pushed forward or backward in its box *h*. A spring-catch, *m*, placed on the box *h*, has a point which passes through the side of the box and enters a notch in the fore-center, *c* so as to hold the fore-center *c* in its place when pushed forward. The diameter of the fore-center is larger than the bore of the axle-box at the small end; but its extremity is conical, so as to enter the small end of an axle-box of any ordinary diameter, the edge of the axle-box pressing against the conical end of the fore center, and thus centering itself. There is a groove, *n*, in the conical end of the fore-center, to permit the point of the cutting-tool to pass a little beyond the circumference of the inside diameter of the axle-box at the smaller end. The mandrel *f* at the other end of the machine, which is designed to hold the larger end of the axle-box, is slightly tapering and divided in two pieces through its axis. Each of these pieces *f f'* is attached to a block, *o o'*, which are set in a chuck, *p*. Through the axis of the chuck, and at right angles thereto, passes a right-and-left screw, *q*, the squared ends of which only are seen in the drawings. This screw has its fixed bearing in the chuck *p*, and its threads pass through a female-screw cavity in each of the blocks *o o'*, carrying the half-mandrels *f f'*, the threads passing through the block *o* turning in one direction, and the threads passing through block *o'* turning in the other direction. Thus, when the screw *q* is turned by a key, *r*, the half-mandrels *f f'* open or close, according to the direction in which the screw is turned. The purpose of this divided mandrel is to suit different sizes of axle-boxes, and to enable the mandrel to be tightened inside the axle-box, so as to hold it firmly, and yet keep the axis of the axle-box in the exact line of the axis of the mandrel *f* and fore-center *c*, which is essential to the

true operation of the machine. As the extremity of the mandrel *f* which enters the bore of the axle-box is sufficient to sustain it, the mandrel back of that point is reduced in diameter for some distance, forming a depression all round the mandrel, so as to allow the point of the cutting-tool to cut clear to the inner diameter of the axle-box without scoring the surface of the mandrel.

When it is desired to place an axle-box in the machine, the puppet-frames having been adjusted at such a relative distance apart as to suit the length of axle-boxes to be faced within a range of a few inches, the fore-center *c* is withdrawn by elevating the spring-catch *m* with one hand and drawing back the lever *l* with the other. A key, *r*, is applied to the screw *q*, which is turned so as to bring the two half-mandrels *f f'* together. The larger end of the axle-box is then placed over the mandrel *f*, and the fore-center *c* is then pushed forward. The small end of the axle-box being now pressed against the conical end of the fore-center, the screw is turned in the reverse direction, opening the mandrel by separating the two parts *f f'* until they press so firmly against the inside of the axle-box as to prevent it turning on the mandrel. The mandrel *f* is then caused to revolve on its axis by a belt passing around one of the pulleys *s* on the mandrel-shaft, power being applied in any convenient manner.

In the front of the machine, on the bed-plate *b*, and between the puppet-frames *e d*, is placed a sliding carriage, *t*, which rests on slides *u*, attached to the bed-plate *b* over a horizontal toothed rack, *v*, which gears into a pinion, *w*, in the sliding carriage *t*, worked by a hand-crank, *x*, which serves to move the carriage *t* backward and forward to any required position between the puppet-frames *e* and *d*. On the sliding carriage *t* are placed two slide-rests, *y y'*, which are moved horizontally along the sliding carriage by means of a right-and-left screw, *z*. The screw *z* has its bearings at either end of the sliding carriage *t*, and its screw-threads pass through female-screw cavities in the slide-rests *y y'*, the right screw passing through one and the left screw through the other, so that by turning the screw *z* by the hand crank *a'* the slide-rests are moved either toward or away from each other. On the top of the slide rests *y y'* are placed the blocks *b' b'*, which carry the tool-posts *c' c'*. Each block *b' b'* has a screw, *d' d'*, the end of which is attached to its block *b'*, and the screw-threads of which work in the frame of the slide-rests *y* and *y'*, and thus the tool-posts *c' c'*, carrying the cutters *e' e''*, are pressed forward toward the axle-box, which is faced by them, or drawn back when the operation is finished. The tool-posts *c' c'*, although they may be adjusted laterally in their blocks *b' b'*, have no motion on their axis, but are so constructed as always to present the cutters *e' e''* to the axle-box at right angles to its axis and to the axis of the mandrel *f* and fore-center *c* of the machine. This is important, as it secures an accurately plane surface being cut on the ends of the axle-box. The cutters *e' e''* are inserted through suitable cavities in the tool-posts, and are secured by screws *i' i'* in the top of the tool-posts *c' c'*.

The operation of my machine is as follows: When an axle box has been placed on the mandrel *f* and fore-center *c*, as before described, the sliding carriage *t* is brought into position. The crank *a'* is turned until the cutters *e' e''* are in line with the opposite extremities of the axle-box, and by turning the screw *d' d'* the cutters are advanced until their points extend past the inner diameter of the axle-box, the point of the tool *e''* entering slightly the groove *n* in the fore-center *c*, and the point of the tool *e'* entering slightly the rabbet around the mandrel *f*. The mandrel *f* being then revolved on its axis, and carrying with it the axle-box, the hand-crank *a'* is gradually turned so as to bring the slide-rests *y y'* closer together, pressing the edge of the cutters *e'* and *e''* against the faces of the axle-box at either end, and planing down or facing them. This will continue so long as the slide-rests are caused to approach each other, and the axle-boxes are thus not only faced, but may be cut down to any required length. This length may be adjusted at pleasure by means of a gage (see Fig. 3) placed between the tool-posts *c' c'*, which is so constructed as to admit of the gradual approach of the tool-posts carrying the cutters *e' e''* to within a certain distance, which may be regulated to suit the required length of the axle-boxes. This gage may be conveniently made as follows: *l' l''* are narrow, flat strips of iron, one of which, *l'*, has a slot, *m'*, through which is inserted a pin, *n'*, which is attached to the other strip, the pin *n'*, where it passes through the slot, being squared, so as to prevent the strip *l'* from turning on the pin *n'* as a center. In the slot *m'* is another pin, *o'*, which may be fastened by the screw-nut *p'* at any desired point on the slotted strip *l'*. At the outer end of each strip is a round hole corresponding in diameter with the top of the tool-posts *c' c'*. This gage is attached to the machine by placing it over the tool-posts *c' c'*, as shown in Fig. 3. The stop *o'* is then fastened by the screw-nut *p'* in such a position as to arrest the approach of the tool-posts *c' c'* toward each other by the contact of the end of the strip *l''* with the stop *o'*, when the distance between the inner or cutting edges of the cutters *e' e''* is equal to the exact length to which the axle-boxes are to be cut down or dressed.

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

1. Facing both ends of an axle-box at the same time by means of two cutters placed parallel to each other at right angles to the axis of the axle-box, which is caused to revolve on its axis, the cutters being so operated as

to approach each other as the box is being faced, in the same relative position to each other and to the axis of the axle-box, substantially as described.

2. The combination of cutters for facing the ends of axle-boxes, placed at each end thereof and susceptible of motion toward each other, while preserving a given angle of inclination to the axis of the box, with a mandrel for holding the box from its inside, capable of opening on each side of its center, for the purpose of holding the axle-box with its axis at the proper angle to the cutters, and yet allowing the cutters to pass beyond the point of contact of the exterior surface of the mandrel and the interior circumference of the axle-box, substantially as described.

3. The use of an adjustable gage interposed between the two cutters for the purpose of stopping the operation of the machine when the axle-box has been faced down to the required length.

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