Sheet 1-3 Sheets.

L. Hull,

Gage Lathe,

No. 53,003, Patented Mar. 6, 1866.

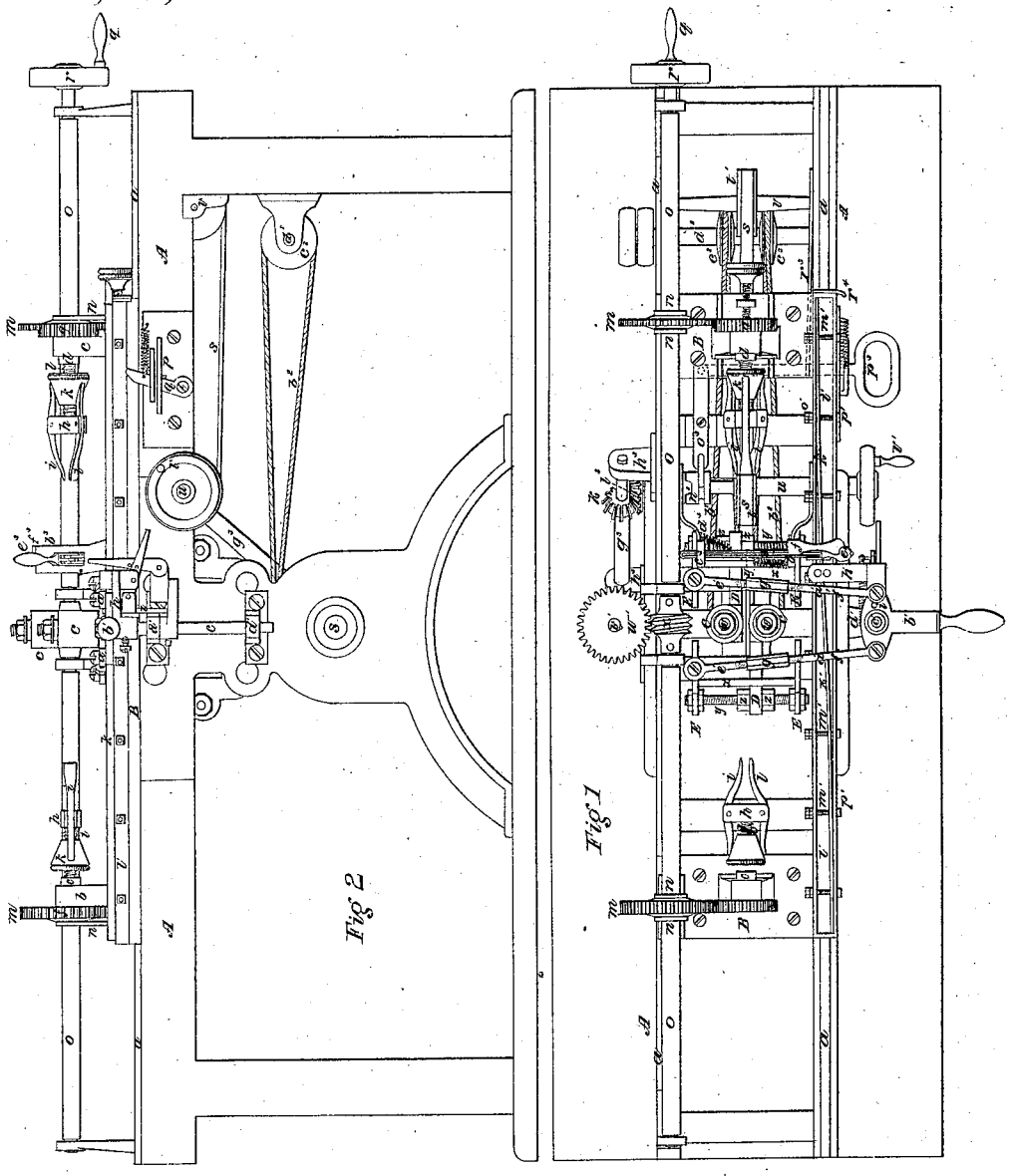

Fig. 1

Fig. 2

Witnesses:

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Liveras Hull

by his attorney.

R. H. Eddy.

Sheet 2 - 3 Sheets.

L. Hull,

Gage Lathe,

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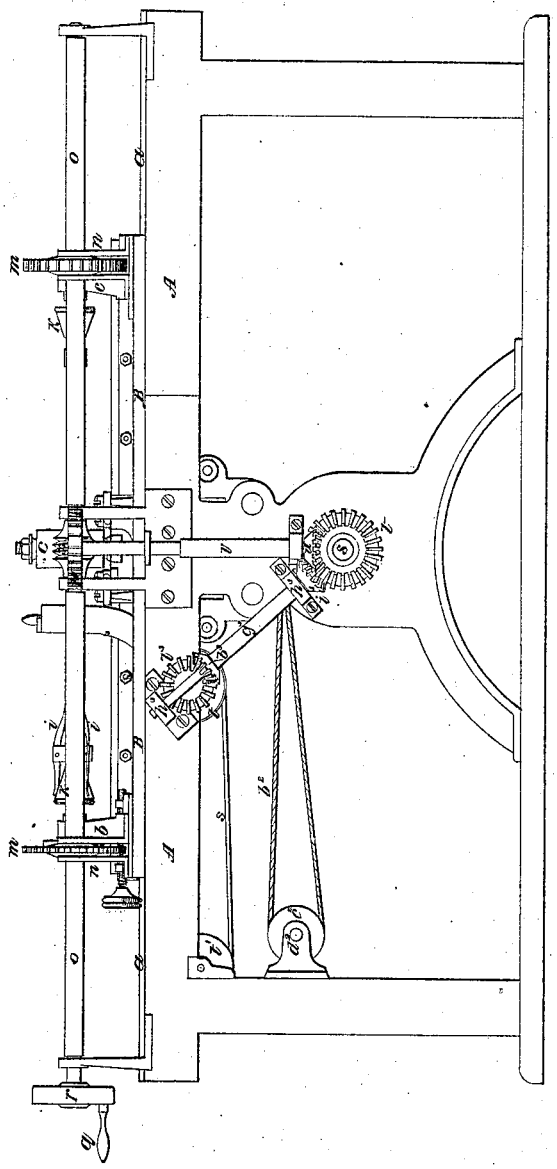
Fig. 3



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Sheet 3. 3 Sheets.

L. Hull,

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No. 53,003, Patented Mar. 6, 1866.

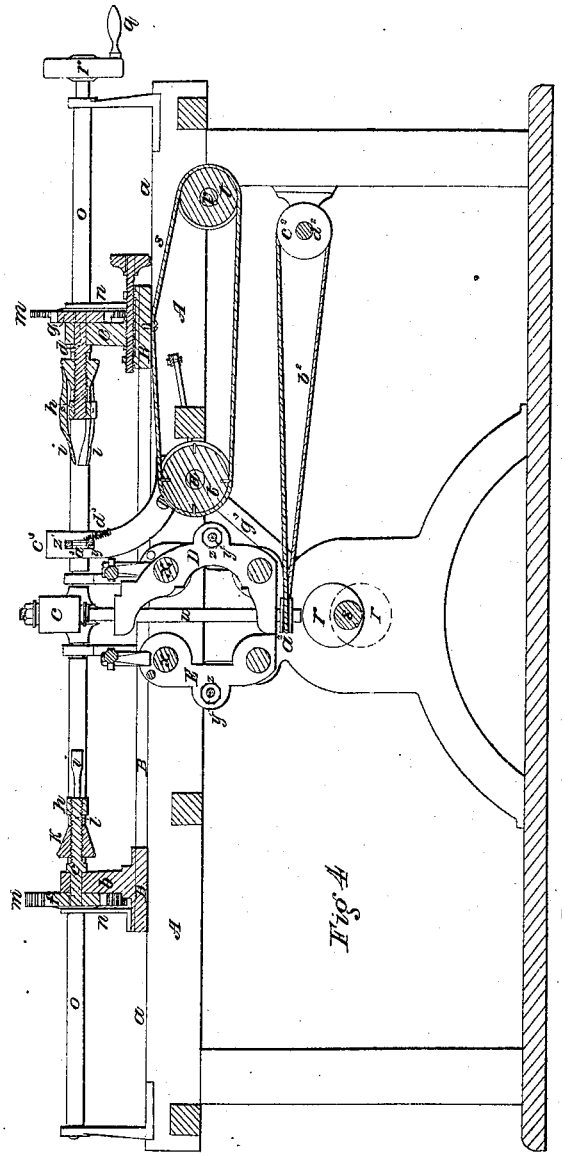

Fig. 4

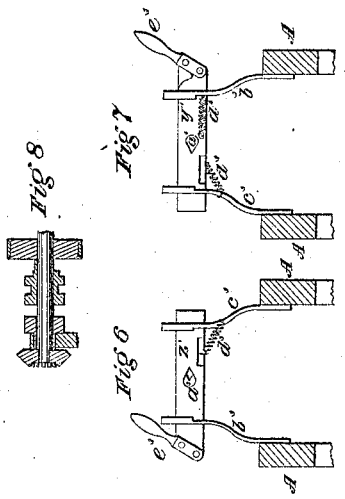

Fig. 7

Fig. 6

Fig. 8

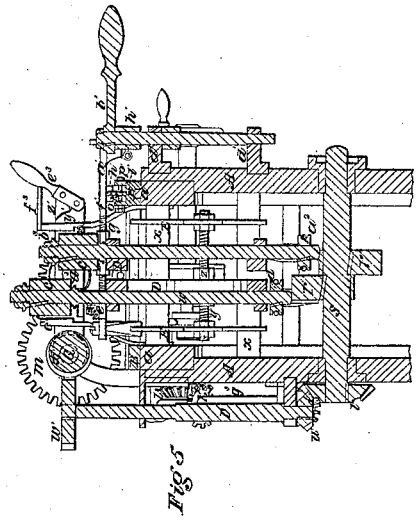

Fig. 5

Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

LIVERAS HULL, OF CHARLESTOWN, MASSACHUSETTS.

IMPROVEMENT IN TURNING-LATHES FOR WOOD.

Specification forming part of Letters Patent No. **53,003**, dated March 6, 1866.

To all whom it may concern:

Be it known that I, LIVERAS HULL, of Charlestown, in the county of Middlesex and State of Massachusetts, have invented a new and useful Machine for Dressing Whip Handles or Stock or other Articles of Like Nature; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 denotes a top view, Fig. 2 a front elevation, Fig. 3 a rear elevation, Fig. 4 a longitudinal section, and Fig. 5 a transverse section, of it.

The object of my invention is to reduce a whip-stock to a desirable form or taper lengthwise, and at the same time to impart to such a circular form in section.

The machine containing the said invention consists, principally, as follows: First, machinery for holding the blank or whip-stock, revolving it transversely, and moving it lengthwise between its cutters; second, two cylindrical burrs or cutters and mechanism for revolving them; third, a pattern or guide-rail and other mechanism, whereby such burrs or cutters while being revolved are either moved toward or apart from one another, as circumstances may require, in order to enable them to produce a diametric variation of the whip-stock that may be required; fourth, a mechanism for moving the two cutters vertically relatively to one another while they may be in revolution; fifth, mechanism for supporting the whip-stock near to the cutters.

In this machine the whip-stock is held at its two ends by suitable devices carried by two mandrels arranged with their axes in one straight line. These mandrels are provided with mechanism for synchronously revolving them. Furthermore, one of them is furnished with a straining-screw or means by which it may be moved either toward or away from the other, in order not only to adapt the two sets of holding-jaws of the two mandrels to a proper distance apart for reception of a whip-stock, but to enable one mandrel, after the whip-stock may have been grasped by the jaws of the two, to be so moved or drawn away from the other as to strain the whip-stock more or less in longitudinal direction. With the said devices two cylindrical burrs or cutters are employed, one being arranged so as to be on one and the other on the other side of the axis of the whip-stock, when such stock is supported by the jaws of the mandrels. The arrangement of these burrs is such as to cause the strain produced by each of them on the whip-stock during its reduction to be in the direction of its length. When these cutters or burrs are revolved in opposite directions the strain of one on the whip-stock will be nearly or quite counterbalanced by the strain of the other thereon. Thus it will be seen that by this machine a whip-stock may be dressed to a very small diameter or fine taper and with great perfection.

In the drawings, A denotes the frame of the machine, which may be made like that of an ordinary turning-lathe, and is to support on parallel rails *a a* a long carriage, B. This carriage sustains two standards or puppets, *b c*, each of which carries a mandrel, *c'* or *d*, provided with a driving-gear, *f* or *g*, the whole being arranged as shown in the drawings. On its inner end each mandrel has a head, *h*, which supports the fulcra of a set of jaw-levers, *i i*, between whose tails there is arranged a cone, *k*, which, by being screwed on a screw, *l*, formed on the mandrel, serves when revolved to so actuate the jaw-levers as to enable a person to close them upon the whip-stock when inserted between the jaws. These sets of jaw-levers thus serve to hold a whip-stock at its two extremities in order that it may be revolved by the mandrels having a synchronous movement. For revolving the mandrels there are two gears, *m m*, each of which engages with one of the gears *f g*, and is arranged between two posts, *n n*, which project upward from the carriage B and closely against the gears *m*. A long shaft, *o*, extends through both the gears, *m m*, and has with them a feather-connection—that is, a projection from each gear extends into a long grooved formed lengthwise in the shaft—the same being in order that the gear may be moved on the shaft and with and by the carriage B, and at the same time be revolved by such shaft, which may be revolved by manual power applied to a crank, *q*, or by a belt running around a pulley, *r*, fixed on the shaft.

The puppet *c* is supported on slide-rails projecting from the carriage B by a screw, a^5,

which should be so applied to it and the carriage as to enable the puppet, by the revolution of such screw, to be moved in a direction either toward or away from the other puppet, the same being for the purpose not only of adjusting the two sets of jaws at a proper distance asunder to receive a whip-stock, but of straining the whip-stock lengthwise, as may be required.

The carriage B is moved longitudinally by a belt, *s*, which is attached to it and plays around two wheels, *t t'*, carried by transverse shafts *u v*. By revolving the shaft *u* by a crank, *v'*, affixed to it, the carriage B may be moved in either direction longitudinally.

The next part of my machine to be described is the cylindrical cutters or burrs and the mechanism for revolving them. These burrs are represented at C C, each of them being a cylinder having its circumference rendered rough, like the surface of a file, or so as to cut or grind away the whip-stock when between them, and they are against it and in revolution. These cutters or burrs are supported on and by two upright shafts, *w w*, that are sustained by two carriages, or, in other words, by two sliding frames, D D, supported, with two other frames, E E, on cross-bars *x x x x* of the frame A, such bars being arranged as shown in Fig. 4. A pulley, a^2, is fixed on each shaft *w*. An endless band, b^2, extending around the said pulley, and one of two pulleys, c^2 c^2, fixed on a driving-shaft, d^2, arranged as shown in the drawings, serves to put the burr or cutter C of such shaft *w* in revolution. Thus we have described the burrs or cutters and the machinery for revolving them.

The next part of the machine is the pattern or guide-rail and other mechanism, whereby the burrs or cutters C C, while being revolved, are either moved toward or apart from one another, as and for the purpose as herein specified.

Each of the auxiliary frames E E has a screw, *y*, extending across it and through the frame D, arranged within it, there being nuts *z z* on the screw and on opposite sides of the frame D. The said screw and nuts are for the purpose of adjusting the frame D within its frame E, and so as to vary the position of the cutter or burr C relatively to the axis of the whip-stock.

To each of the frames E one end of one of two connecting-rods, *a' a'*, is jointed, the opposite ends of such rods being jointed to the shorter arms of a tri-armed lever, *b'*, whose fulcrum is an upright shaft, *c'*, arranged and supported in bearings *d' d'*, as shown in Figs. 1, 2, and 5. Each of the said connecting-rods *a'* is so made as to enable it to be lengthened or shortened—that is to say, it is formed in two parts, *e' f'*, which are connected together by a sleeve or long nut, *g'*, which revolves on one and has the other of such parts screwed into it.

A bent lever, *h'*, having the shaft *c'* for its fulcrum, has a bolt, *i'*, by which it may be connected to or disconnected from the tri-armed lever *b'*. This lever *h'* clasps a pattern or curved bar, *k'*, which is arranged within and projects out of a long box, *l'*, making part of the carriage B. Sundry screws *m' m'*, &c., go through the sides of the said box and screw into the pattern-bar *k'* and have screw-nuts *o'* and heads *p'*, such devices serving to vary the curve of the pattern and hold such pattern firmly in position on the carriage.

The pattern moves with or is moved by the carriage, and consequently when the two levers *b'* and *h'* are bolted together they will be turned more or less on the shaft *c'* by the action of the said pattern. By reason of this movement of the said levers the two burrs or cutters C C will be moved either toward or away from each other. Thus by means of the pattern or guide-bar *k'* the depth of penetration of each of the burrs into the whip-stock from time to time will be regulated. By disconnecting the two levers *b'* and *h'* the first of them may be moved by hand so as to open the cutters sufficiently apart preparatory to the application of a whip-stock to the jaw-levers.

The next portion of the machine is the mechanism for moving the two cutters vertically relatively to one another while they may be in revolution, the object of this motion of the cutters being to prevent them from becoming clogged by the material removed from the stock by them. I have found by experience that unless they are movable up and down while revolving they are liable to become so clogged as not to perform their office to good advantage, especially when reducing whalebone or various other kinds of material.

Each shaft of the cutters C C rests on one of two cams, *r' r'*, carried by a horizontal cross-shaft, *s'*, having a beveled gear, *t'*, on one end of it. (See Figs. 3 and 5.) A beveled pinion, *u'*, fixed to the lower end of a vertical shaft, *v'*, engages with the gear *t'*. A worm-gear, *w'*, on the upper end of the shaft *v'*, engages with a worm or screw, *x'*, on the shaft *o'*, hereinbefore described. While the shaft *o* may be in revolution the cams *r' r'* will be put in revolution and will raise and lower the cutters in manner required.

The mechanism for supporting the whip-stock near the cutters comes next in order be described. It consists of two plates, *y' z'*, formed and arranged as shown in top view in Fig. 1, and in side view in Figs. 6 and 7. One of these plates is bent around the other, or receives it in manner as shown in Fig. 1. Each plate has an angular opening, a^3, extending through it, the vertices of the angles of the two openings being arranged in opposite directions. The two plates slide through two supporting-standards, b^3 c^3, and there is a spring, d^3, connected to each plate and one of the standards, the same being so as to draw on the plates in such manner as to cause the vertices of

the angular openings to approach each other. The two plates are jointed at their front ends to a lever, e^3. A spring-catch, f^3, when hold of the lever, serves to increase the opening through the two plates to its maximum and so maintain it, in order to enable a whip-stock to be either drawn out of the opening or inserted through it, as circumstances may require. The opening of the two side plates, created by their two angular openings when lapping on one another, is in line the axis of the mandrels and receives the whip-stock and holds it at four points of its circumference. While the whip-stock may be in the act of being moved along for the purpose of being reduced to shape by the cutters the two plates y' z' will accommodate themselves to its varying form and still hold it in its proper position relatively to the cutters, and prevent them from moving it laterally out of place.

It has been heretofore stated that by revolving the shaft u by means of the crank v the carriage B may be moved in either direction longitudinally. There is other mechanism, however, for effecting the forward movement of the said carriage, and which, preparatory to the employment of the crank v, as described, should be thrown out of action on the shaft u.

This mechanism I shall now proceed to describe: On the rear side of the frame A there is an inclined shaft, g^3, duly supported in bearings h^3 h^3, and arranged as shown in Fig. 3. A bevel-gear, i^3, fixed on the lower end of the shaft, engages with the gear t', hereinbefore described, and thereby communicates motion to the shaft g^3. Another bevel-gear, k^3, fixed on the inclined shaft, engages with a bevel-gear, l^3, carried by a tubular shaft, m^3. (See Fig. 8, which is a vertical section of the said shaft m^3 and the shaft u, with their clutch.)

A clutch, n^3, operated by a lever, o^3, serves to connect the two shafts u and m^3, so that when they are clutched together the rotary motion of the tubular shaft will be communicated to and will revolve the shaft u, and thereby cause the carriage B to be put in motion forward.

A handle, p^3, provided with a spring-latch, q^3, is jointed to the said clutch-lever o^3, and serves to move the lever so as to force the two parts of the clutch into engagement. A spring, r^3, applied to the frame A and the said handle, serves to throw the two parts of the clutch out of action with each other, when the latch q^3 may be withdrawn from the handle.

On the carriage B having nearly attained the extent of its forward motion, a projection, r^4, from the said carriage will be carried against the spring-latch q^3, and will so move it as to unlatch the handle and allow the spring r^3 to effect the disengagement of the clutch n^3, and thereby arrest the movement of the said carriage B.

In the operation of the above-described machine the whip-stock, after having been fixed between the jaw-levers of the two mandrels, will be moved forward between the two cutters, and by them will be reduced to the proper form or taper lengthwise, and will at the same time be made circular in cross-section.

Having thus described the said machine, what I claim therein as of my invention is as follows—that is to say:

1. A combination, consisting not only of mechanism for revolving the whip-stock and moving it longitudinally, but of two cylindrical burrs or cutters, and a mechanism whereby such burrs or cutters, while being revolved, are moved either toward or apart from one another, as may be required, in order to enable them to produce the necessary diametric variation of the whip-stock from end to end of it, the said combination, principally or substantially, consisting of the carriage B, with its puppets b c, mandrels c' d, and their gears f g, the jaw-levers i i, the cone k, the screw l, the gears m m, the shaft, o, with its feather-connection, the belt s, the two wheels t t', and their shafts u v, the bars C C, the pulleys a^2 c^2, the endless band b^2, and the shaft d^2, the pattern or guide-rail k', the rods a' a', and the levers b' h', the whole being arranged and connected, so as to operate in manner substantially as explained.

2. The combination of the same, and a mechanism for moving the two burrs or cutters in direction of their axes, in order to prevent the said burrs from becoming clogged by the material removed by them from a whip-stock, such mechanism, as hereinbefore described, consisting of the cams r', shaft s', gears t' u, shaft v', worm-gear a', and the screw x', fixed on the shaft o.

3. The combination for supporting the whip-stock near the cutters, the same consisting of the two plates y z', provided with angular openings a^3 a^3, and springs d^3, and arranged relatively to each other, and supported in manner and so as to operate substantially as described.

4. The adjustable or movable pattern k', its box l', and the adjusting-screws and nuts thereof, combined or arranged together in manner substantially as described.

5. The combination of the two frames D E, provided with the screw y and nuts z z, and constituting each of the cutter carriages, as set forth.

6. The combination of the contractile connecting-rods a' a', with the cutter carriages or frames D E D E, and the levers b' and h', arranged and applied in manner and so as to operate with the pattern k', substantially as specified.

7. The combination of the two rotary mandrels c' d, and mechanism to rotate them synchronously, as described, with one or more burrs or cutters, C C, so arranged that when in revolution against an article held to and re-

volved by the mandrels such burr or burrs shall cut into the article in a direction lengthwise, rather than crosswise, of it.

8. The combination of the screw a^5 or straining mechanism, with the two rotary mandrels c' d, their jaws, and one or more cutters or burrs, C C, arranged substantially as specified, such mandrels being provided with mechanism for synchronously rotating them, as described.

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