2 Sheets-Sheet 1.

G. M. Morrow,

Gage Lathe.

No. 83,082. Patented Oct. 13, 1868.

Fig: 1.

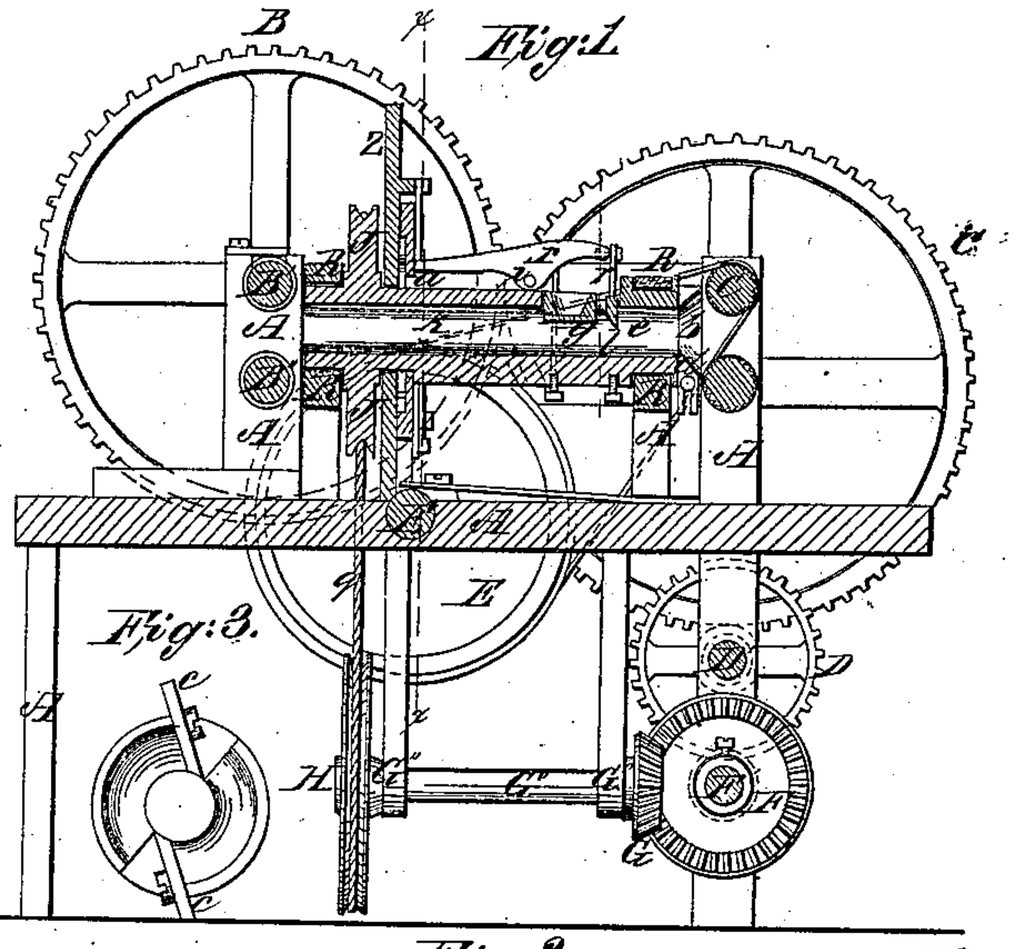


Fig: 3.

Fig: 5.

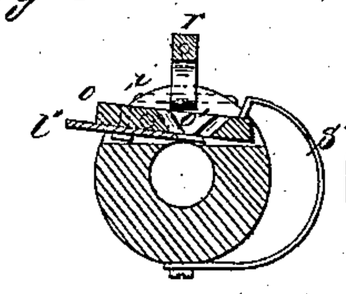


Fig: 2.

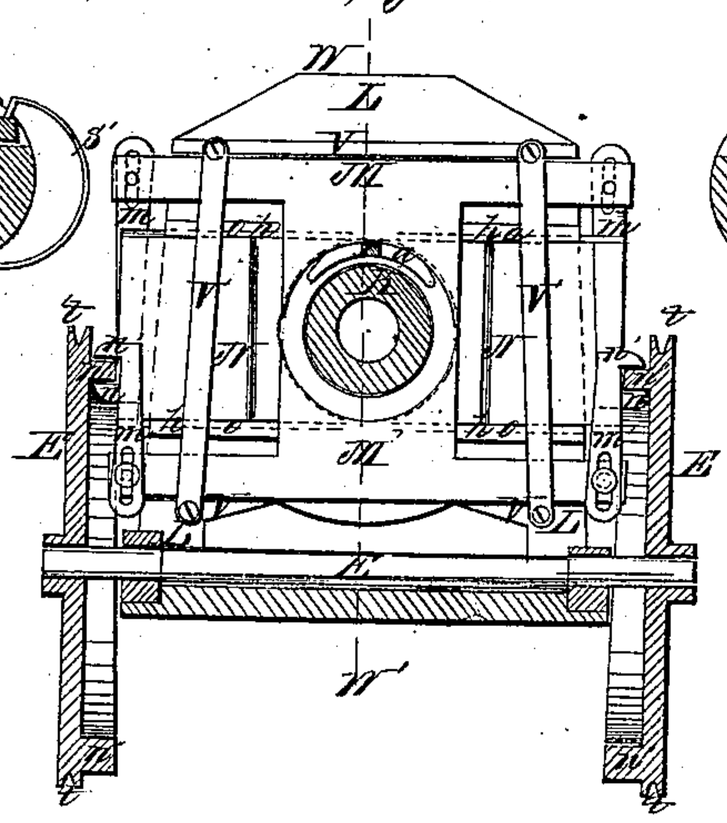
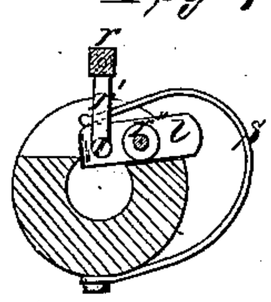


Fig: 4



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2 Sheets-Sheet 2.

G. M. Morrow,

Gage Lathe.

No. 83,082. Patented Oct. 13, 1868.

Fig: 6.

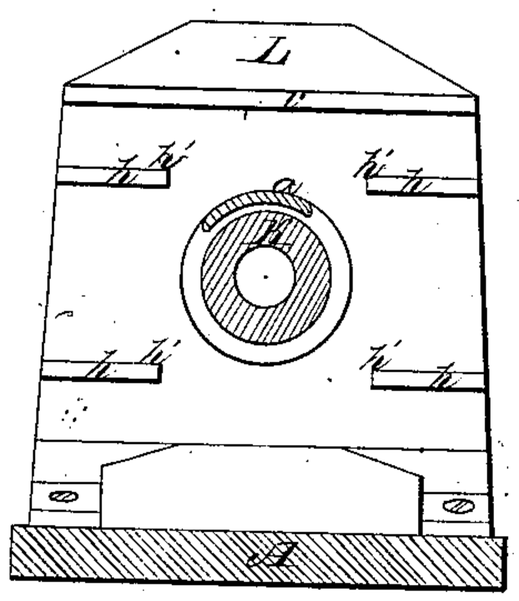
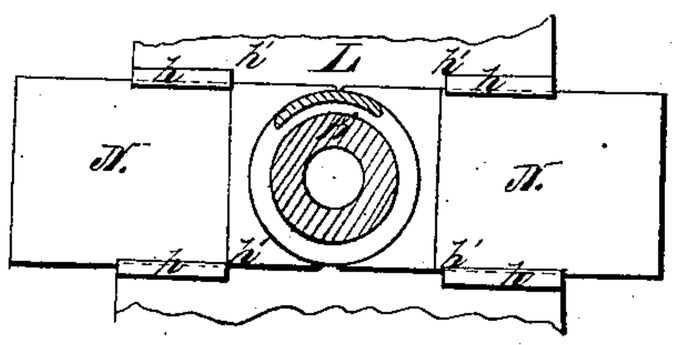


Fig: 7.



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United States Patent Office.

G. M. MORROW, OF CLARKSVILLE, OHIO.

Letters Patent No. 83,082, *dated October* 13, 1868.

IMPROVEMENT IN MACHINES FOR TURNING BROOM-HANDLES.

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, G. M. MORROW, of Clarksville, in the county of Clinton, and State of Ohio, have invented new and useful Improvements in Machines for Turning Broom-Handles; 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, in which—

Figure 1 is a central longitudinal section of my machine, through the line *w–w'*, fig. 2.

Figure 2 is a cross-section of the same, through the line *x–x'*, fig. 1.

Figure 3 is an end elevation of the mandrel and bevel-bits.

Figure 4 is a cross-section of the mandrel, through the line *y–y'*, fig. 1, showing the tapering-bit.

Figure 5 is a cross-section of the mandrel, through the line *z–z'*, fig. 1, showing the finishing-bit.

Figure 6, sheet 2, is a front sectional elevation of the frame-plate, with the curved plates removed, to show the guides.

Figure 7, sheet 2, is a similar view, shown with the laterally-sliding plates between their guides.

Similar letters of reference indicate corresponding parts.

This invention relates to a machine for turning broom-handles, or other rods that require to be tapered, and consists in the employment of cam-wheels, which control the action of the bits, together with other devices perfecting the whole, as will be hereinafter more fully set forth.

In the drawings—

A is the general frame of the machine.

A mandrel, K, revolves in bearings, R, fixed in said frame, as shown in fig. 1.

This mandrel is driven at a high speed by the round belt, *q*, passing over the pulleys J and H.

The pulley H is on the shaft G', which latter is hung in bearings G'', and receives its motion by means of bevel-gearing G and F, the bevel-wheel F being mounted on a shaft, F', to which the power is applied.

The feeding-gear, by which the handle to be turned is fed into the mandrel, is partially shown by the toothed wheels D, C, and B.

The wheel D is driven by a pinion on the shaft, F, and exterior to the frame of the machine.

The shaft of this wheel D is shown at D', on which latter is another pinion.

This latter engages the teeth of the wheel C, of which C' is the shaft.

B is a toothed wheel, of the same diameter as the wheel C. It is mounted on a shaft, B'.

B'' and C'' are feed-shafts, and receive their motion, by means of their milled surfaces, at the point over which the handle passes.

When the handle to be turned enters between the shafts C' and C'', it is slightly pinched between the two, and motion is thereby communicated to the shaft C'', for a purpose to be shown.

The mandrel is provided with three different bits.

The first, shown at fig. 3, is composed of a pair of bevelled cutters, *c c*, secured rigidly by a set-screw.

These cutters are for the purpose of cutting off the corners of the rough handle, which is generally a square strip, sawed out.

The second is the tapering-bit, and is shown at fig. 4.

This is a single cutter, *l*, presenting the lower corner of its cutting-edge to the bore of the mandrel.

It is not rigidly fixed, like the first, but oscillates on a pivot, *r''*.

A spring, *s*, bolted to the mandrel, bears down this cutter in the manner shown.

A link, *r'*, connects the lever *r* with the cutter, and the latter is thus controlled in its action by other parts of the machine, to be hereinafter described.

The third is the finishing-bit, and is shown at fig. 5.

This is a bevelled cutter, presenting its cutting-edge flatwise to the bore of the mandrel.

The cutter is secured to the under side of a stock, *o*, which latter is furnished with an opening, *o'*, for the escape of the shavings.

The stock is pivoted to the mandrel at *o''*, and oscillates in a manner similar to the tapering-bit, having a spring, *s'*, to bear it downward.

This bit is not attached to the lever *r*, but simply follows the taper made by the tapering-bit, and cuts away a smooth shaving, thus leaving a finished surface upon the handle.

The lever *r* is pivoted in a longitudinal slot on the exterior of the mandrel by a pivot, *i*, figs. 1 and 5.

The shorter arm of this lever is connected by the link *r'* to the tapering-bit, and at the extremity of the longer arm is a curved cross-piece, *a*. (See fig. 2.)

The curve of this cross-piece should conform to the space between the mandrel and the curved edges of the four plates M M', N N, which plates are the means of controlling the action of the tapering-bit, as will be now shown.

The frame-plate L is bolted to the frame of the machine in the position shown.

The mandrel K passes through this plate.

A projecting bead, *v*, serves, in connection with the bars *v'*, screwed to the plate, to retain the plates M.

The upper and lower edges of the plates M are semicircular, and enclose the mandrel.

These plates are connected, by means of screws, with the catches *m m*, and *m' m'*, which catches are formed with projections *n n n' n'*, for the purpose of resting upon the flanges *n''* of the cam-wheels E.

The cam-wheels E are rigidly attached to their shaft E', having bearings in the frame A, whereby they both revolve together.

The flanges *n″* are made with a true taper throughout one complete revolution, both as to their upper and lower surfaces, and also as to their lateral surfaces, whereby the plates M M′ and N N are actuated to control the bit *l*, as will be more fully shown.

The projections *n* and *n′* of the catches *m m m′ m′* rest on the cam-flange *n″*, and, when the wheels E are revolved, the projections *n n′* will be actuated downward and upward, respectively, which will cause them to force down and up the plates M and M′, respectively, and, as the plates are thus brought towards each other, the circle which their curved edges assist to form is contracted. At the same time the lateral surfaces of the cam-flanges press directly against the outer vertical edges of the plates N N, and thus cause them to approach each other, whereby the semicircular curve on their inner edges is made to assist in contracting the complete circle composed of the four curved edges of the plates M M′, N N, as shown.

The plates N slide in guides *h*, riveted to the frame-plate L, and their motion is thereby steadied, and the inner ends *h′* of the said guides serve as guides to the vertical edges of the plates M M′.

Both the lateral and vertical plates are thus provided with guides, and, when the plates are actuated inwardly towards the mandrel, the circle which their several edges form is contracted, and when the same are actuated outwardly from the mandrel, the same circle is expanded.

The inward movement of the plates is accomplished by the tapering surfaces of the cam-flanges, and the said movements take place against the resistance of the spring *s*, bearing down the tapering-bit *l*, the lever *r* being connected with this bit, as before shown, and, when the cam-wheels make one complete revolution, the abrupt shoulders formed by the cam-flanges returning upon themselves, pass the edges of the lateral plates, and the edges of the projections *n′ n* of the connections of the vertical plates, thus permitting the outward movement of these plates in obedience to the spring *s*, which was previously compressed by the passage of the cam-flange which urged the said plates inward.

Thus it occurs that the action of the cam-flange and plates, by contracting the circle formed by the latter, depresses the lever *r*, which raises the bit *l* by degrees while the handle is undergoing formation, and cuts the same with a tapering surface.

The plates are not identically in the same plane, for that position would not permit the proper contraction of the circle formed by them, but the plates N N work with close contact behind the plates M M′, and thus the contraction of the circle is possible.

The curved cross-piece *a*, which conforms approximately to this circle, has its convex surface broad enough to act upon and be acted upon by the circular edges of both pairs of plates, as thus placed in rear of the other, whereby each successive point of a single revolution of the mandrel K, and the wheel E in conjunction with the mandrel, exerts a controlling action on the tapering-bit, and this controlling action is primarily due to and caused by the three tapering surfaces of the cam-flanges *n″*, before described.

The length of the cam-flange should be, in practice, such that the wood or rod to be tapered should pass through the mandrel at one complete revolution of the cam-wheel, which would leave the latter in the right position for repeating the work.

The mechanism for accomplishing the revolution of the said wheels in the proper slow and uniform manner will now be described.

The feed-shaft C″ being milled or corrugated in front of the mandrel, is revolved by the passage of the wooden rod being tapered. This latter is drawn on and forced in by the lower feed-shaft, C′, which is also the shaft of the wheel C, deriving its motion from the train of wheels between it and the power, as before described.

Round belts, as shown, pass over each end of the feed-shaft C″ and around in the groove *t* in each cam-wheel, and, as the wooden rod is being fed by the revolution of the lower feed-shaft, C′, the upper shaft, which is simply a feed-roller, partakes of a corresponding motion as the rod is fed into the machine, and this motion is duly transmitted to the cam-wheels E by the belts aforesaid, and thus the cam-flanges are made to actuate the plates, and through them, by means of the cross-piece *a* and lever *r*, the tapering-bit *l* is made to adjust itself during the passage of the rod or handle through the mandrel.

The rod or handle is turned with an increasing taper, that is, from the smaller toward the greater end.

The wheel B and its shaft B′ are for continuing the passage of the turned handle after its end has left the front feed-shaft, and also to eject the finished handle from the mandrel.

The advantages of this invention consist in its simplicity, durability, and speed, there being no loss of time by frequent stoppages, as is the case with all other machines for the same purpose.

I am aware that other inventions have been made for turning tapering handles, and therefore do not claim, broadly, the automatic regulation of a tapering-bit; but

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

1. Controlling the cutters, through the medium of the plates, sliding at right angles to each other, the catches *n n′*, and the cam-wheels E, constructed to operate substantially as described.

2. The combination of the sliding plates M M′, N N, catches *m m′*, *n n′*, wheels E, having flanges *n″*, and shaft E′, with the hollow mandrel K, pivoted lever *r a*, link *r′*, cutters *l l″*, and springs *s s′*, substantially as described for the purpose specified.

G. M. MORROW.

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