

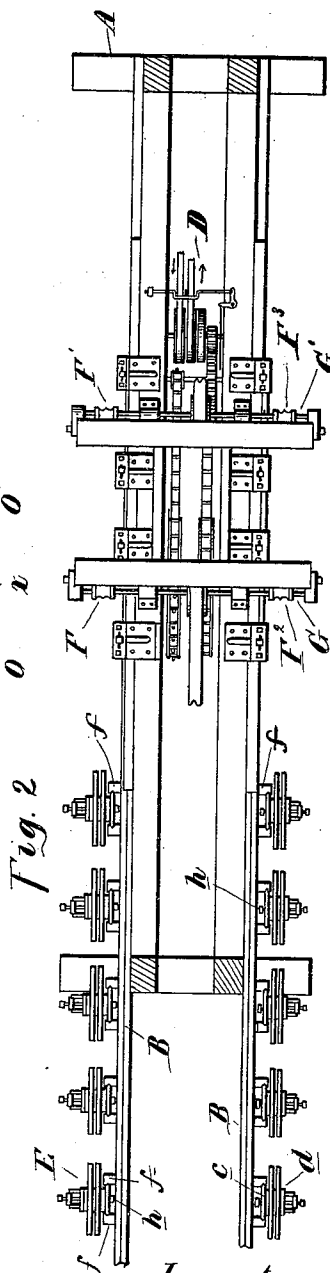
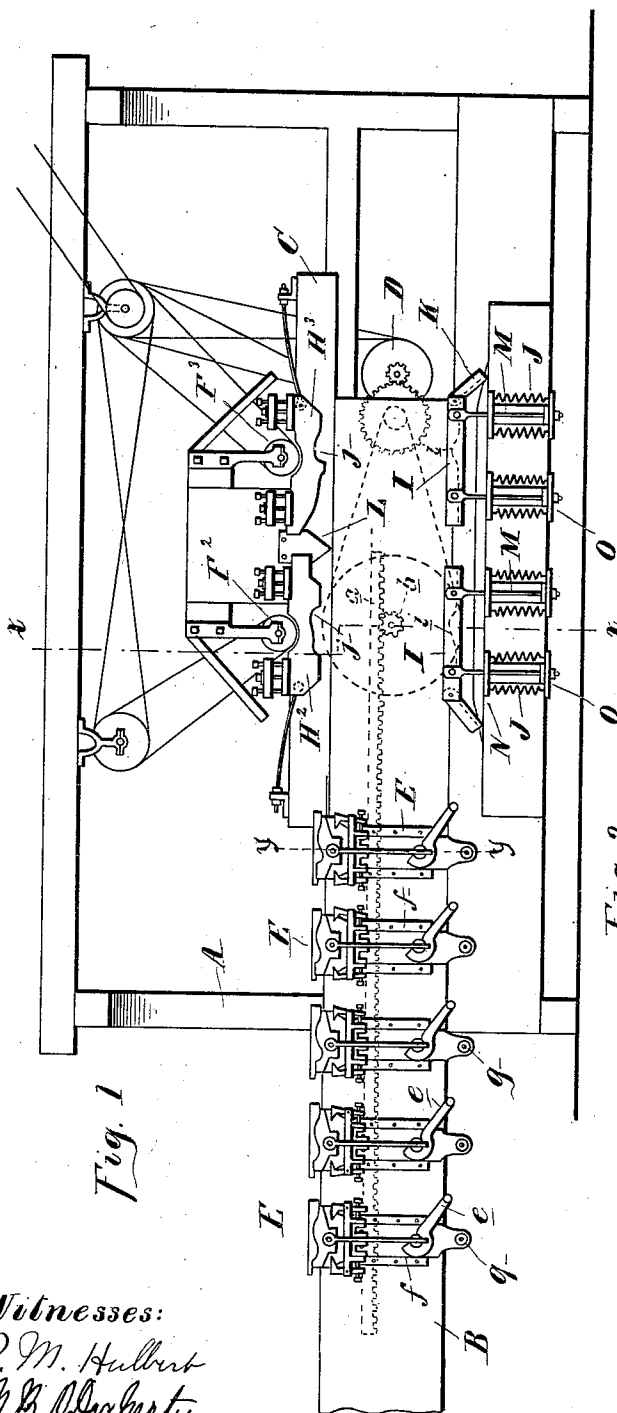
(No Model.)

2 Sheets—Sheet 1.

C. DOUGLAS.
SHAPER.

No. 469,852.

Patented Mar. 1, 1892.



Witnesses:
P. M. Hulbert
M. B. O'Dogherty

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UNITED STATES PATENT OFFICE.

CHARLES DOUGLAS, OF DETROIT, MICHIGAN.

SHAPER.

SPECIFICATION forming part of Letters Patent No. 469,852, dated March 1, 1892.

Application filed March 25, 1891. Serial No. 386,395. (No model.)

To all whom it may concern:

Be it known that I, CHARLES DOUGLAS, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Shapers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in shapers especially designed for shaping various articles of curved or irregular outline—such as handles for shoe-brushes, brush-backs, &c.—and other work which is accomplished by means of shapers.

The present object of my invention is to do this work in a manner whereby a mechanical feed is employed; and to this end my invention consists in the use of a stationary pattern or patterns secured separately and independently of the work, in connection with a mechanical feed of the blank; and, further, my invention consists in the peculiar combination of two cutter-heads, two stationary patterns which are complementary to each other, and of a reciprocating feed device which works in connection with both cutters and both patterns, all as more fully hereinafter described, and shown in the drawings, in which—

Figure 1 is a side elevation of my shaper; Fig. 2, a plan view thereof, and Fig. 3 a vertical cross-section on line *x x* and line *y y* in Fig. 1, the latter being taken through the clamping device; Figs. 4 and 5, detail views of a blank for a shoe-brush handle before entering the machine. Figs. 6, 7, 8, 9, and 10 are diagrams showing the blank in different stages of the operation. Fig. 11 represents the blanks for cutting brush-backs.

A is the frame of the machine, of any suitable description and supporting the operating parts.

B B are two reciprocating feed-slides secured to opposite sides of the frame, respectively, in suitable horizontal guides C, engaging the upper and lower edges of the feed-slides. Each slide is reciprocatingly operated by suitable mechanical devices, such as a feed-rack *a*, secured to each slide and engaging with a pinion *b*, which receives its motion from the source of power through any suitable intermediate mechanism provided with

a belt-shifter D or other known mechanical device for automatically reversing the motion of the feed-slides after they have carried the work past the cutters. As such devices are in common use for similar purposes, no specific description need be given. The feed-slides are made of any suitable length to carry a number of work-holding clamps E, consisting of a stationary jaw *c* and a movable jaw *d*, the latter being secured on the end of a lever *i*, fulcrumed in suitable extensions on the supporting-plate E' of the clamp, the lower end of the lever *i* engaging with an inclined bearing *i'*, sleeved on a suitable stud secured to the plate E' and carrying a hand-lever *e*. These clamps are vertically slidingly secured in vertical guides *f*, secured to the feed-slides, and each clamp has two guide-rollers *g* and *h*, the former to raise the clamp for presenting the work to the cutters and the latter to gage its approach to these cutters, as more fully hereinafter described. There are four of these cutters F F' F² F³ shown, which are secured upon the ends of two transverse shafts G G', journaled on top of the frame and revolved in opposite directions. Below each cutter are adjustably secured to the frame in any suitable manner the stationary patterns H H' H² H³, on the lower edge of which the rollers *h* of the work-holding clamps are guided while being drawn along by the slide.

I I are lifting-rails secured to the frame, one below each pattern. Each lifting-rail is yieldingly supported by suitable springs J and has an inclined section K loosely hinged to one end. The office of the lifting-rails is to lift up the clamps while they are passing under the cutters and to crowd them against the patterns with sufficient force to cause the rollers *h* on the clamp to follow the exact outline of the patterns while being drawn along by the feed-slide. The inclined section K of the two rails are hinged to the outer ends, so that when the feed-slide is going in one direction the rollers *g* of the clamps will go up and pass over one rail only, and when going in the opposite direction will pass up and over the other rail only, and to guard against any possibility of having any clamp lifted up by the two rails in succession (which might happen by a clamp not sliding freely in its

vertical bearings) a depressing-guide L is placed between the two patterns, which by forcibly striking the roller *h* of a clamp forces the latter down, so that its roller *g* must pass under the succeeding rail even if the clamp should not drop by its own weight when it leaves the end of the rail. The lifting-rails are made yielding in any suitable manner for the purpose described. In the drawings the rails are pivotally secured near the end to the tension-rods M, which pass through vertical guides N on the frame and are provided at the lower end with a yoke O, to which the springs J are secured at one end, all so arranged that the rails are perfectly free to yield more or less to force the rollers *h* to travel in contact with the outline of the patterns, and free to tilt so that the clamps may be spaced close enough to permit the rails to control two clamps at the same time. Where the patterns are of an abrupt outline, I preferably form a part or the whole of the rails correspondingly with the patterns—as, for instance, shown in the drawings in Fig. 1, wherein humps *i* are formed upon the rails, as shown in dotted lines to correspond with the deep indentations *j* of the patterns.

In machines of the character of my machine, devised for shaping wood by cutting in the direction of the grain of the wood and where the line of cutting goes in and out, it is well understood that if the work is required the cutting should always be done with the grain and never against the grain, especially with small work, where the wood is apt to split, or with wood of coarse grain, and no shaping-machine of this character has been devised heretofore which dispenses with the guiding hand and judgment of the workman in manipulating the work in such manner that the cutter always “cut in”—that is, with the grain and never against the grain. The important part of my invention consists in accomplishing this by mechanical means alone, with the advantage of doing the work much faster and more perfect and dispensing with the use of skilled labor for the purpose entirely. To this end the two patterns on each side are made complementary to each other, as will be seen by describing the work of shaping shoe-brush handles with my machine.

Blanks are first procured of the form shown in Fig. 4 and marked 1. Into these a saw-kerf 2 is made, as in Fig. 5. Then the blanks are properly clamped into the work-holders on one side of the machine, where the reciprocation of the slide first presents them to one cutter and then to the other. Suppose the blank is first presented to the cutter F, which operates in connection with the pattern H, as shown in Fig. 6. Then the work of this cutter will be to cut into the blank along the dotted lines, as shown on the blank below, while the cutter F', which operates in connection with the pattern H' after the slide reverses, will cut after the dotted line shown in Fig. 7. The

work of shaping one edge of the blank is thus obtained without cutting against the grain by dividing the work between the two cutters and making the patterns complement each other. The proper way of shaping the two patterns for any given work can thus be readily determined by selecting for one pattern all such portions which can be cut with the grain by feeding the work in one direction, and for the other pattern all the work which can be cut with the grain by feeding the work in the opposite direction, so that if the two patterns were superimposed they would exactly complement each other. Where the cutters are not required to cut, the respective patterns should be suitably shaped to keep the work away from the cutters, although this may be accomplished by other means, such as by means of the rails or other devices which may be readily contrived. In this connection it will be understood that in constructing machines of this character obvious improvements may be added for readily adjusting, changing, or modifying the patterns, the rails, and other parts for doing a variety of work with the same machine.

Referring back again to the cutting of the shoe-brush handle, the blank after having been shaped upon one edge is provided with another saw kerf, as at 3 in Fig. 8, and then clamped into the work-holders on the other side of the machine, where the operation is precisely similar—that is, one cutter—as, for instance, the cutter F²—in connection with the pattern H², cuts the blank, as shown in dotted lines in Fig. 9, and the cutter F³, in connection with the pattern H³, accomplishes the rest. The object of making the saw-kerfs 2 and 3 into the blank is to prevent the splitting off of the wood, which in small articles may happen at the places where the cutters are cutting rather deeply into the wood.

While I have described my machine as adapted for shaping a blank with the use of four cutters, it will be understood that if the two sides or edges are to be shaped alike or only one side or edge has to be shaped the two cutters on one side will do the work, and the machine may then be constructed for work on one side only or for different work on the two sides. Preferably I construct the slides on the two sides to work independently of each other, so that each attendant may stop and start it on his own account.

The specific construction of the work-holders or clamps is a matter more or less dependent upon the kind of work the machine is intended to perform and may be readily determined, and if the machine is designed for a variety of work it will be equally within ordinary skill to make necessary and obvious provisions. Generally I prefer to construct the clamps so as to each receive two or more blanks, and in securing the blanks into these work-holders it must not be overlooked that the blanks have to be adjusted in position

therein, and suitable provision therefor has to be made.

Among other work to be performed by this machine the shaping of brush-backs may be mentioned. These may be shaped from blanks shown in Fig. 11, and the shaping required is to round the corners off, as shown in dotted lines, and the work may be done with two cutters on one side of the machine by reversing the blanks in the holders after one edge is shaped. By making the slides of suitable length a large number of work-holders may be secured thereto, and ample time is afforded to the attendants to remove the work and put new blanks in without even stopping the slides.

What I claim as my invention is—

1. In a shaper, the combination, with a revolving cutter and a frame, of a longitudinal movable slide in the frame, means for moving the slide, a series of work-holders on the slide, tracing-wheels on the holders, a pattern-holder above the slide, a spring-supported lifting-rail, and means for elevating the holders to engage the rail, substantially as described.

2. In a shaper, the combination, with a revolving cutter, of a longitudinally-movable work-holder, a fixed pattern-holder and a lifting-rail, and means for guiding the holder onto the rail and permitting its passage back below the same, substantially as described.

3. In a shaper, the combination of two oppositely-revolving cutters journaled in fixed bearings, a reciprocating feed-slide carrying one or more work-holders secured in transverse guides to said feed-slide, and a fixed pattern for each cutter, with which said work-holders are adapted to make sliding contact

alternately while the slide is drawn in opposite directions, substantially as described.

4. In a shaper, the combination, with two oppositely-revolving cutters, of longitudinally and vertically movable work-holders, pattern-holders above the work-holders, separated lifting-rails below the cutter, and means for elevating the holders to the rails and permitting them to be moved back below the same, substantially as described.

5. In a shaping-machine, the combination of two oppositely-revolving cutters journaled in fixed bearings, a reciprocating feed-slide carrying one or more holders secured in transverse guides to said feed-slide, two complementary patterns, one for each cutter, with which said work-holders are adapted to make sliding contact in passing the cutters, and the lifting-rails having hinged sections for alternating said contact, substantially as described.

6. In a shaping-machine, the combination of two oppositely-revolving cutters journaled in fixed bearings, a reciprocating feed-slide carrying one or more work-holders secured in transverse guides to said feed-slide, two complementary patterns, one for each cutter, with which said work-holders are adapted to make sliding contact in passing the cutters, the lifting-rails having hinged sections for alternating said contact, and a depressing-guide between the two patterns, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES DOUGLAS.

Witnesses:

M. B. O'DOUGHERTY,
P. M. HULBERT.