

H. D. Storer,

Sheet 1 of 2 Sheets.

Wood Molding Machine,

No. 21,379.

Patented Aug. 31, 1858.

Fig. 1.

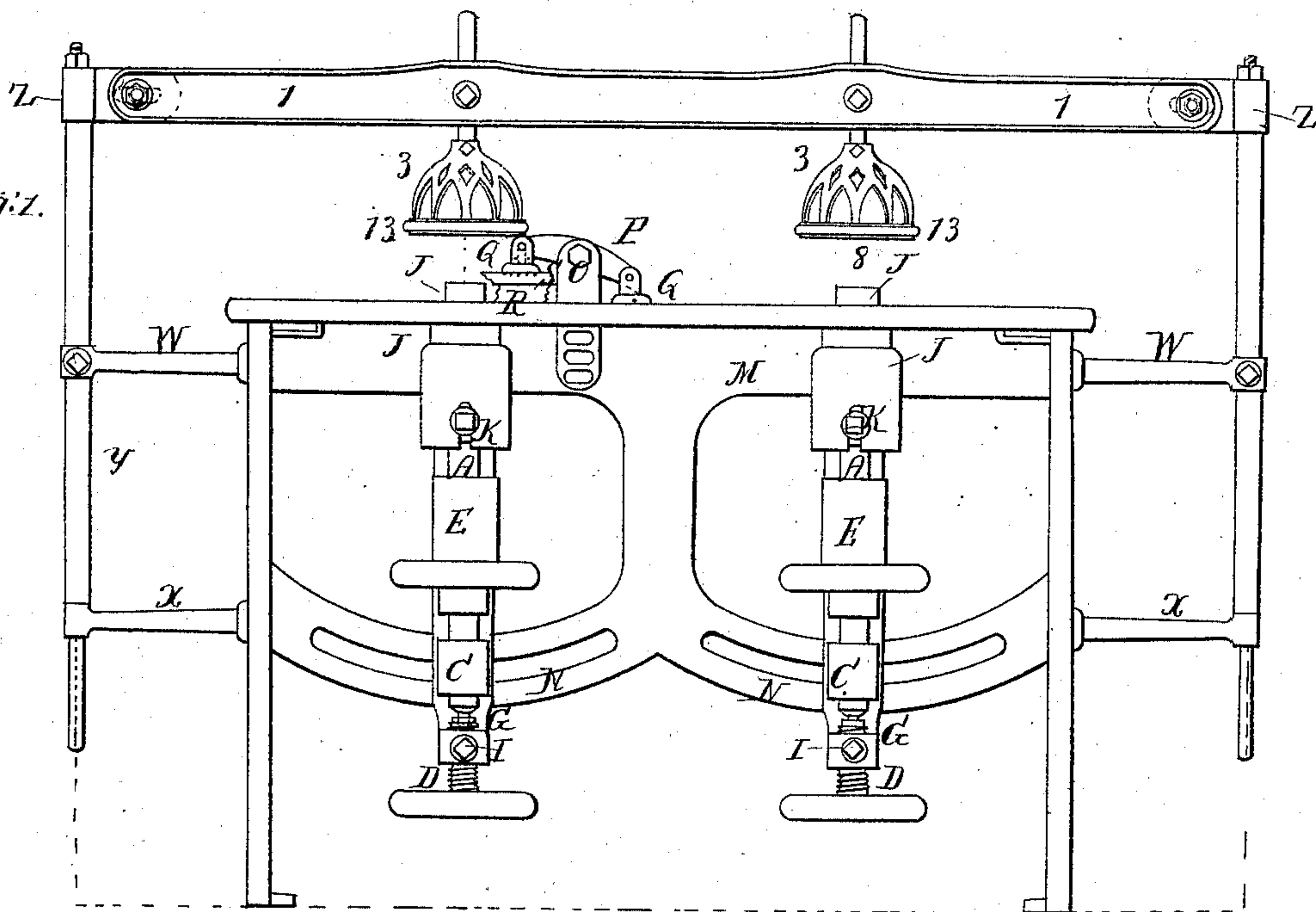
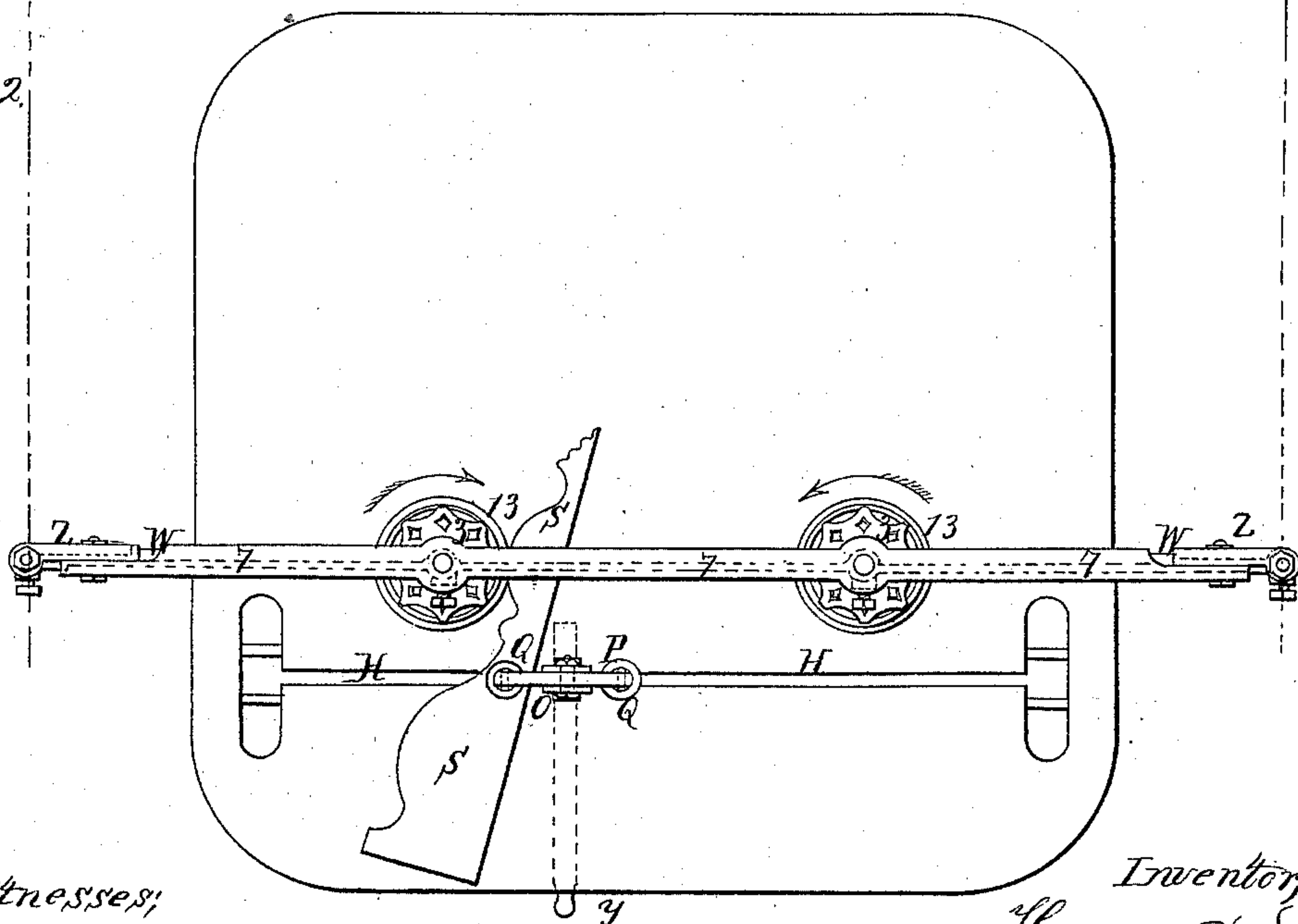


Fig. 2.



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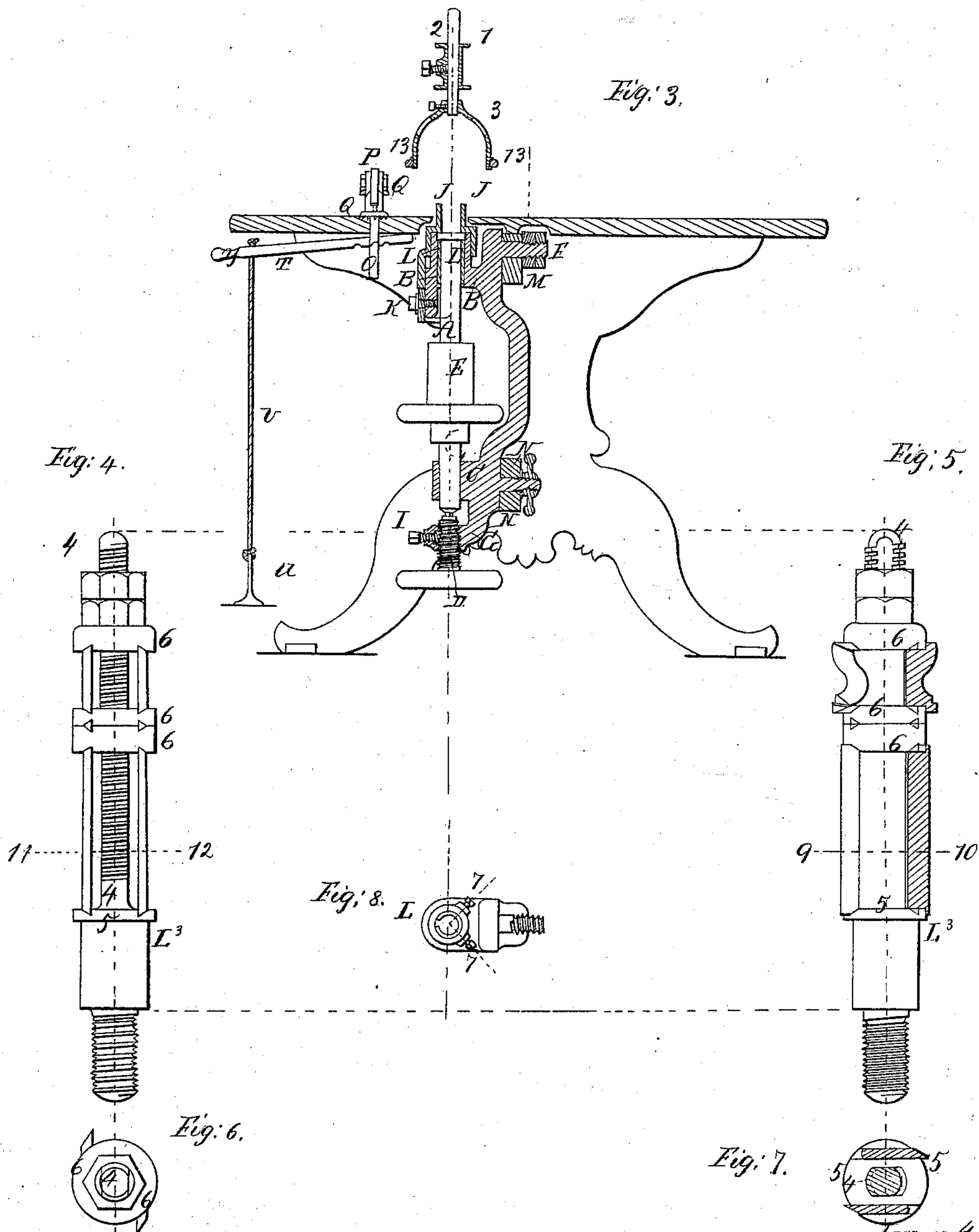
Inventor,
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UNITED STATES PATENT OFFICE.

HENRY D. STOVER, OF BOSTON, MASSACHUSETTS.

MACHINE FOR CUTTING IRREGULAR FORMS.

Specification of Letters Patent No. 21,379, dated August 31, 1858.

To all whom it may concern:

Be it known that I, HENRY D. STOVER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Cutting Moldings of Regular and Irregular Forms in Wood; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

Said drawings form a part of this specification and consist of—

Figure 1, a front elevation of the machine; lever T, stirrup U, and cord V, seen in Fig. 3, and the cutter heads being left out; Fig. 2, a plan of the machine; Fig. 3, a sectional elevation; the cutting plane being taken at S, Fig. 1; Fig. 4, an elevation of one of the cutter heads; looking at the cutter blades edgewise; Fig. 5, an elevation looking at the sides of the cutters; Fig. 6, a plan of the same; Fig. 7, a section at lines 9, 10, 11, and 12, and Fig. 8, a plan of the bearings for the arbors.

Like letters indicate the same or a similar part in all the figures.

Color is used in the sections merely to aid the eye in distinguishing parts, and without regard to conventional usage.

Description of the machine, and its operation, (with letters of reference to the drawings) including my improvement.—A, A, are two arbors, supported by the bearings B, C, and step D. These arbors are driven in opposite directions as indicated by arrows, in Fig. 2, by belts passing from any suitable driving wheels to their pulleys E. In the top end of these arbors, are formed screw sockets (the thread running in, in a direction opposite to the motion of the shaft or arbor), to receive the cutter heads, which heads are not shown in Figs. 1 and 3, but are drawn to a larger scale, see Figs. 4, 5, 6, 7.

B, is a bearing for the upper end of the arbor, and is hung by a pivot or stud F, which is free to turn in its support.

C, is a bearing for the lower end of the arbor. This bearing C, may be made separate from B, or be connected with it by a bar as shown in the drawing, or by any other connection. To its lower part is connected the arm G, in which is formed an internal screw to receive the step D, which step is screwed to fit it, and which may be made

fast at any point to which it is adjusted, so as to prevent its turning, by means of the set screw I. Between the point of this set screw and the step D, is interposed a bit of soft metal to prevent injury to the thread on the step, by the point of the set screw. A socket is made in the top of this step, large enough to hold a small quantity of oil, and two, or more small steel disks (see dotted lines Fig. 1), on these disks in the oil, the end of the arbor which is reduced quite small, rests. To the bearing C, is secured a screw stud which passes through the support, and on this stud is a nut by which it, with the bearing C, may be made fast at any point to which they may be adjusted.

The bearing B, has its stud F, screwed and provided with a double nut, or a nut, with a set nut to prevent its getting loose.

Heretofore the lower portion of the cutter head has constituted the guide for the pattern, but its velocity is so great as to at once wear, and soon destroy every pattern brought in contact with it.

It is one of the main objects of my invention to so construct and apply a guide as not to revolve at all, (which wears the pattern), and so as to be vertically adjustable to the thickness of the pattern, and vertical movement of the cutter head, and be the same diameter as the cutter head, and still have the cutter head always exactly in the center of this guide, which guide can be tipped and receive all the adjustments of the cutter head. The construction and application of this guide is as follows:

The upper end of bearing B, is turned and has a part extending around half its circumference and downward, but not in contact with the arbor, the outer surface of which is also turned. Then the guide J, the upper end of which is fitted around the lower part of the cutter head so as not to interfere with its turning freely within it, has its central-hollow-cylindrical part fitted to the turned top part of B, and a part extending around a portion of its circumference, and extending downward fitted to that part of B, which extends downward, and slotted to receive the set screw K, so as to not prevent its moving up and down freely. This guide J, resting as it does upon the upper end of the arbor, and the cutter head projecting partly over its top end, must always move up and down with the arbor, the set screw K, not being screwed up so

tight as to prevent this, or as occasion re-
 quires being loosened for the purpose. Thus
 the guide being fitted to the bearing B, as
 described becomes a firm stationary guide,
 5 wherever it is adjusted, for the pattern to
 bear against, while the cutter head revolves
 freely within and above it by reason of the
 part L³, Figs. 4, and 5, being removed from
 it. Now the belts which drive these arbors
 10 always draw in one direction and it is found
 that the ordinary linings of the bearings are
 liable to wear in that direction, so that after
 a time the cutter head and arbor will not
 remain exactly concentric, with the guide J
 15 which is fitted to the exterior of bearing B.
 Now to compensate and make provision for
 this inequality of wear, at the same time
 that I set up the linings, I make a lining or
 adjustable elastic sleeve L, see Fig. 8, in one
 20 curved piece, so that it will not extend quite
 around the arbor, but leaving a narrow open-
 ing directly opposite the direction in which
 the belt is drawing. I then arrange two set
 screws one on either hand at about an angle
 25 of 115°, from this open space, the set screws
 being thus arranged at an angle with each
 other, of about 90°. The line, and direction
 of draft, of the belt, being between and
 against them. By this arrangement when
 30 the lining or sleeve L becomes worn they
 will adjust themselves to the bearing if the
 set screws are turned up equally as far as
 may be, the ends of the lining or adjustable
 elastic sleeve between which is the open
 35 space, will be pressed against and exactly
 conjoin at all times with the arbors A, and
 keep them in the same relative position with
 the guide J, at all times. While the adjust-
 able elastic sleeve to the lining will still be
 40 firmly supported at three different points,
 which may be at equal, or nearly equal dis-
 tances around its circumference, the set
 screws are in this case somewhat nearer to
 each other, than to the ends of the sleeve or
 45 lining at the open space.

The bearings B, C, have for their sup-
 port the girts or cross bars M, N, which
 connect, and brace the legs, and which with
 the legs constitute the frame of the machine.
 50 The form of the lower girt is described by
 arcs of circles, whose centers are in the axes
 of the studs F, which pivot the bearings B,
 as is also that of those describing the slot
 through which passes the stud from bearing
 55 C, so that whether bearings B, C, be con-
 nected together, or be separate, the arbors
 may be set to any desirable angle with the
 surface of the table by loosening the nut
 on the stud of bearing C, and sliding said
 60 bearing C, upon girt N, to the desired posi-
 tion and setting the nut again. I make no
 claim to this feature in the machine now be-
 cause it is already secured to me by the pre-
 vious patent dated March 11, A. D. 1856,
 65 granted to myself and J. W. Bicknell.

In using these machines a pattern or pro-
 file of the form to be cut, is first prepared,
 of a suitable thickness to carry the material
 to be cut on its upper surface, and to which
 it is secured by screws or points, the profile 70
 edge of the pattern must then be brought
 to bear against the guide J, (or in other
 machines than mine against the lower part
 of the revolving cutter head). Now in do-
 ing this, and as it must be done when the 75
 cutters are in motion, the cutters usually
 come in contact with the material before the
 pattern comes to bear upon the guide J (or
 in other machines the base of the cutter 80
 head; or arbor.) Now in such cases unless
 extraordinary care on the part of the oper-
 ator is used, the cutting knives will strike
 deeply, and at once into the material, and
 thus jerk it from the hand of the operator,
 when it is thrown with great violence, often 85
 spoiling the work and causing other dam-
 age. Now to provide against such danger,
 and to enable the operator to perform his
 work with greater ease, I form the slot H,
 in the table, and fit the piece O, closely in 90
 it, making the piece O, sufficiently wide so
 that it may turn as little as possible therein.
 To the top end of this piece, I pivot the lever
 P. To each end of this lever, I pivot a dog, or
 foot, Q, in such a manner that it may be free 95
 to adjust itself to the upper surface not to
 the end of the material when pressure is
 applied. The lower part of this foot, or
 dog, Q, has small points in its face, or may
 be faced with rubber, so that it may hold 100
 on to the material effectually, and is piv-
 oted to the upper part, so as to be free to
 turn horizontally, so that it may thus form
 an axis, or pivot, about which the material
 with the pattern, may be swung upon the 105
 surface of the table, while at the same time
 it may be held by it.

R, is the pattern; S, the material.

The operation is as follows: The material,
 with its pattern is laid on the table as seen 110
 in Figs. 1, and 2. Then one of the dogs Q,
 is placed upon its surface the other resting
 on the surface of the table. Connection O,
 being provided with the openings seen be-
 low the table, the lever T, is passed through 115
 one of them with its inner end bearing upon
 the under side of the table. The stirrup
 U, is attached by the cord V, or a rod. Now
 by placing one foot in the stirrup and bear-
 ing down, it will be seen that the material 120
 will be held firmly, while at the same time
 both hands may be used to swing the pat-
 tern with the material in against the guide
 or cutter head without danger and with the
 greatest ease. When this device is not in 125
 use, it can be slipped along to either end of
 the slot H, and dropped in upon the two
 little bars seen in Figs. 1, and 2, where it
 is below the surface, and entirely out of the
 way till needed again. 130

A modification may be made by extending and curving the top end of O, so as to pivot the dog directly to it and dispense with the lever P, in which case the lower part should be curved too, so as to apply lever T directly under the dog. The several openings in O, are to adapt it to different thicknesses of material and allow of very readily introducing lever T.

10 In machines of this class it is desirable to have some guard over, and around the cutters, which may serve to protect the hands of the operator from being drawn accidentally into contact with the cutters, also to prevent the material from being thrown up accidentally. It is also desirable that such guard should be firm, and at the same time of such a nature that when the hand of the operator is accidentally forced in contact with it that it should not be likely to be bruised or cut by it. Again it should be readily removed out of the way of examining and setting the knives, as well as of such a character as not to obstruct too much the vision of the operator when watching the progress of the cutting operation. It should also be so arranged as to be expeditiously raised and replaced, so that work having openings through it may be put over the heads, as for instance when the inner edge of a circular picture frame is to be molded. To obtain all these advantages and have the supports out of the way of the material and operator at the same time have the whole tasteful and pleasing in its appearance, has cost no little inventive effort, but I think they are attained in the following:

To each end of the frame of the machine I apply the stands W, and X, of sufficient length to carry the supports a suitable distance from the cutter heads. Through the outer end of W, a hole is made as large as the support and into which it is fitted so as to slide up and down freely. The supports are marked Y, and have their lower ends made smaller to form a shoulder to rest on X, and prevent their sliding down too far when not set by the set screw. This smaller part also is fitted to a hole in the outer end of X, so as to slip up and down freely. In the stands W, are setscrews by which the supports are set at any convenient height, or held when resting on their shoulders. A round tenon is formed on the top of these supports to which are fitted the pieces Z, secured by a nut. From one to the other of these directly over the centers of the cutter heads, passes the bar 1, each end of which is fitted to the flat side of one of these pieces Z, which are also provided with a slot. A bolt passing through and fitted in a hole in each end of this bar 1, passes also through the slot in Z, and is provided with a nut, by which means bar 1, is secured and pivoted

to Z, so as to be held firmly sidewise but be free to turn in a vertical plane, and traverse the length of the slot. Through the bar 1, directly over each cutter head is a hole made vertically, and in each of these is fitted a short rod 2, so as to slide freely, and at the side is introduced a set screw by which it may be held at any point of adjustment. To the lower ends of these rods are fitted the open frame work guards 3, made of cast iron or other suitable material, but being provided with the elastic band 13, fitted to its lower rim as shown in Figs. 1, 2, and 3. These frame work guards are sufficiently large to allow the cutter heads to work under, and within them, the operator, viewing his work through the openings. The elastic band projecting beyond the metallic rim, will protect the operator from burning his hands thereon. The short rods 2, being free to slide up and down in the bar 1, the guard 3, may thereby be adjusted to the height of the material being worked. When a greater range is required for very thick work the supports Y, can be raised from their resting place and set by the set screw in stands W. When the guards are to be lifted for the purpose of letting the cutter heads through a hole in the work, the set screw in W, at one end is loosened and the support Y, slipped up, during which operation the slots in Z, will allow the bolt which secures bar 1, to it to slide so that the support can thus be lifted without being caused to bind in its bearings. When the machine is not used for such work the bolts through Z, and 1, can be screwed up tight, but in the other case should be screwed up only so as to give the requisite stiffness, so that they may traverse the more freely.

It is also found to be desirable in machines of this class to have some convenient means by which cutters of different lengths and shapes may be combined in one head so as to operate at one time at different heights from the table and so that 1, 2, or 3, or more sets as the case may require, may conveniently be used in the same head at the same time, and at different heights from the table. Now the common method of doing this is by means of a series of collars, fitted and kept in place by means of tongues and grooves, and which may be put on and taken off at pleasure, one or more at a time, from the central spindle, used in connection with a nut at the top and a fast collar or shoulder at the base of the head, between which they and the cutters are held, but there is no sufficiently simple and uniform method by which to prevent these collars from turning so that the grooves in them for holding the cutters may at all times be in the right position in respect to each other to receive both ends of the cutters, and at the same time admit of securing one, or two,

very short sets of cutters with only one or two of the collars which are ready on the spindle when a set of long knives have just been used; but the operator must go and get
 5 a quantity of collars and fit them on to fill up that part of the spindle, which has the tongue to prevent the collars from turning, to where the screw part reaches, so that the nut may be screwed down upon them; or if
 10 the spindle is grooved, then the tongues to prevent the collars from turning must be put in separately, into each collar, which makes a great deal of work. My method of constructing the head so as to avoid these
 15 objections, and get a much better head for small work, with also uniformity in appearance, and of weight about the axis, a very essential feature, as the speed is very great, is as shown in Figs. 4, 5, 6, and 7,
 20 and which I will describe as follows: 4, is the central spindle; 5, the fast collar, or shoulder with grooves to receive the lower ends of the cutters, but the spindle instead of being of one size only a part of the way
 25 up to receive the collars with tongues, or grooves, and the rest of the way of another size with a screw cut on this part to receive the nut is made all the way of one size above the fast collar and has a square threaded
 30 screw cut on it the whole length; then opposite sides of the spindle where the cutter blades are placed, are flattened or slabbed off and for two purposes, first for admitting the knives closer to the axis than they could
 35 otherwise be brought in small heads, and secondly to keep the collars from turning so that the grooves to receive the ends of the cutters may always correspond with each other in relative position, the collars are
 40 made so as to fit the outer surface of the thread of the screw, and the flatted sides of the spindle. With this arrangement, the nuts can be screwed clear down so as to hold the very shortest cutter, with only a single
 45 collar, which of course will be ready on, in all cases, as it is required even for the longest cutter. While with an intervening collar between each, any number of sets of cutters, of any desired length, may be used to
 50 the extent of the length of the spindle, the drawing shows one set of plane cutters, and one set of molding cutters, with a given

space between, which space is filled by two collars of unequal thickness. A variety of thicknesses of collars can be kept, so that
 55 any given space between sets of cutters can be filled by them. A sufficiently strong head can be made smaller, for fine work on this than on any other plan in use. The grooves in the collars can of course be varied in
 60 shape and adapted to hold single irons without caps, or to hold their caps, and braces, clamping the cutter between.

I do not wish to be understood in the following claims to claim in general terms the
 65 guards 3, without regard to the combination in their construction of the elastic band 13, and rigid frame work thereof, nor irrespective of their arrangement and combination
 70 with the table, and the rotary cutters, so as readily to be raised, one or both at a time, by the raising of one or both ends of the bar 1, the said bar having traversing joints allowing thereof as described, but

Having thus described my improvements,
 75 what I claim as my invention and desire to secure by Letters Patent, of the United States is as follows:

1. The guard 3, and bar 1 carrying them combined with the revolving cutter and table, in the manner described and for the
 80 purposes fully set forth.

2. I claim the guide J, so constructed and fitted to the outer surface of the bearing or tube B, as to be vertically adjustable thereon, to guide the pattern without wearing it,
 85 while the piece secured to the pattern receives shape from the cutting knives immediately above, essentially as set forth.

3. I claim the combination of the adjustable elastic sleeve L, with the tube or bearing B, and guide J, in the manner described and for the purposes fully set forth.
 90

4. I claim the slabbed spindle 4, collars 6, and the cutters, constructed and relatively
 95 arranged and operated, in connection with each other, essentially in the manner, and for the purposes fully set forth and described.

HENRY D. STOVER.

Witnesses:

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 HENRY FAXON, Jr.