(No Model.) 2 Sheets—Sheet 1.

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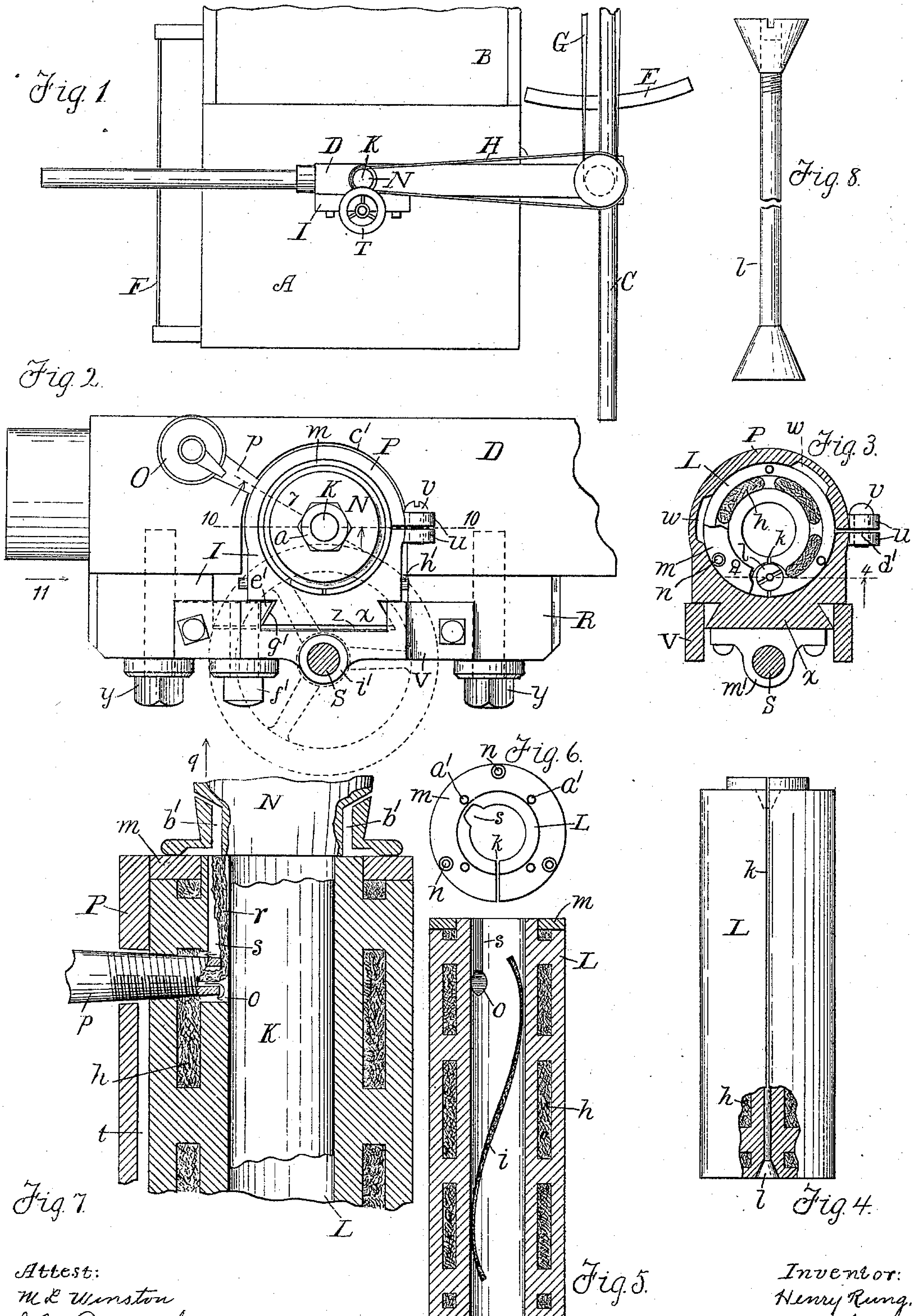
SPINDLE HOLDER FOR ROUTING MACHINES.

No. 540,273. Patented June 4, 1895.



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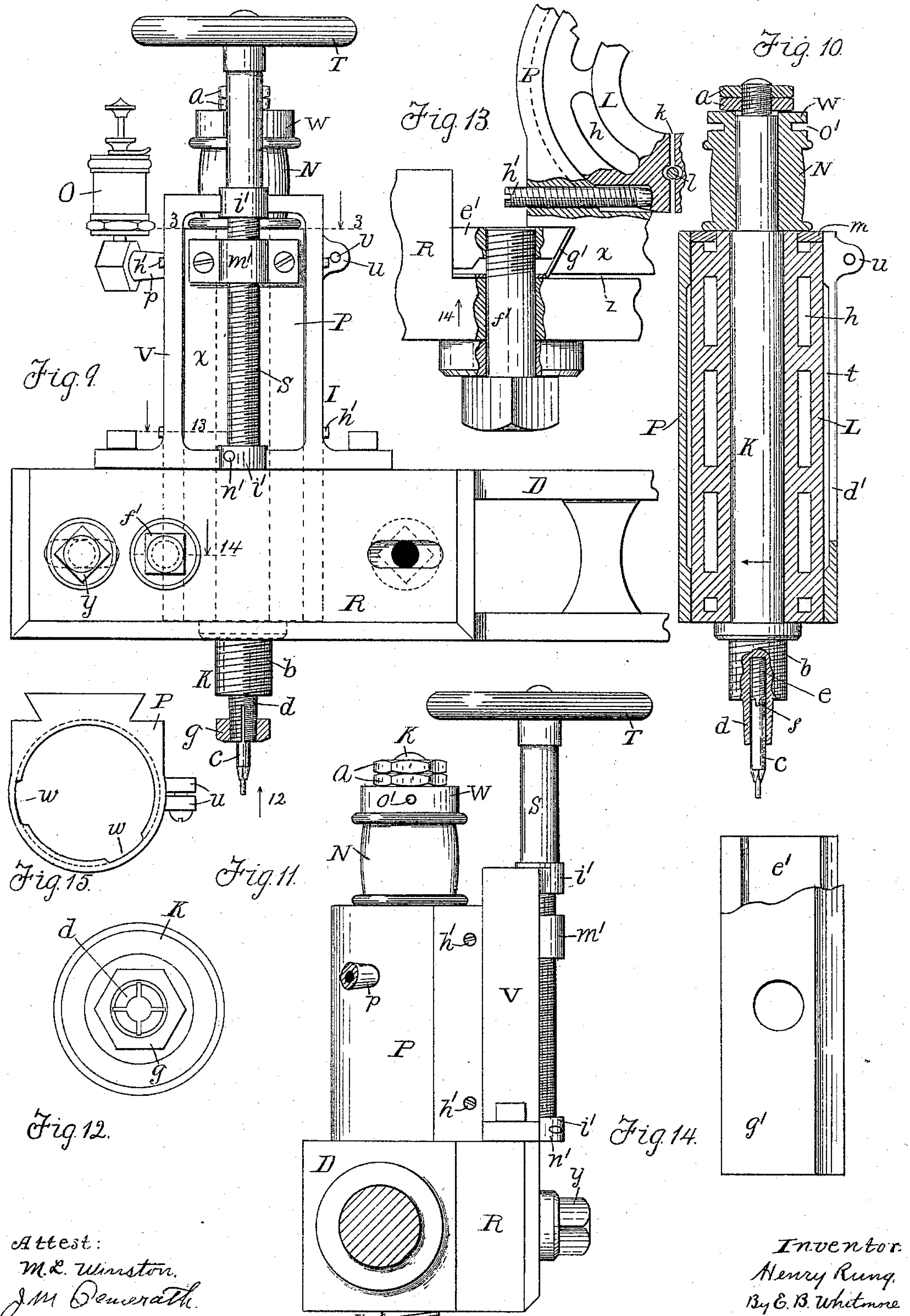

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UNITED STATES PATENT OFFICE.

HENRY RUNG, OF ROCHESTER, NEW YORK.

SPINDLE-HOLDER FOR ROUTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 540,273, dated June 4, 1895.

Application filed March 4, 1895. Serial No. 540,513. (No model.)

To all whom it may concern:

Be it known that I, HENRY RUNG, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Spindle-Holders for Routing-Machines, which improvement is fully set forth in the following specification and shown in the accompanying drawings.

Spindles for routing machines require to be run at a high velocity on account of which there is a great tendency for them to become heated, frequently necessitating the stopping of the machine for the purpose of cooling the heated parts. The object of my invention is to provide a holder or head for the spindle so constructed and arranged that friction will be reduced to a minimum, enabling the spindle to be run without becoming heated.

The invention consists in providing a split barrel for holding the spindle, suitably chambered to receive fibrous material, and a chambered jacket for the barrel to aid in keeping the latter cool, with means to adjust the parts to form suitable bearings, and other forms and constructions hereinafter fully described and more particularly pointed out in the claims.

Referring to the drawings, Figure 1, drawn to a small scale, shows in plan certain parts of a routing-machine with my improved parts attached in place. Fig. 2 is a plan of the device, the operating screw being horizontally sectioned near the top. Fig. 3 is a horizontal section of the parts holding the spindle, taken on the dotted line 3 3 in Fig. 9, a part of the cap-plate being broken away. Fig. 4 is a side elevation of the spindle-barrel, a part being broken away and vertically sectioned, as on the dotted line 4 4 in Fig. 3. Fig. 5 is an axial section of the spindle-barrel. Fig. 6 is a plan of the cap-plate for the spindle-barrel, showing the upper end of the latter. Fig. 7 is an axial section of the upper part of the spindle-barrel and some associated parts, taken on the dotted line 7 in Fig. 2, the spindle being mainly broken away. Fig. 8 is a condensed elevation of the spreader for the spindle-barrel. Fig. 9 is a front elevation of the device, seen as indicated by arrow 9 in Fig. 2. Fig. 10 is an axial section of the spindle-barrel and other parts associated with the spindle, taken on the dotted line 10 10 in Fig. 2. Fig. 11 is a side elevation of the device, seen as indicated by arrow 11 in Fig. 2, parts being broken away. Fig. 12 is a view of the lower end of the spindle, indicated by arrow 12 in Fig. 9. Fig. 13 is a plan of a portion of the spindle-barrel, jacket, and other parts, parts being horizontally sectioned on the dotted lines 13 and 14, respectively, in Fig. 9 to more clearly show interior parts. Fig. 14 is a side elevation of the gib-sheet and gib, seen as indicated by arrow in Fig. 13, a part of the gib-sheet being broken away. Fig. 15 is a view of the lower end of the jacket. Figs. 2 to 6, inclusive, and Figs. 9, 10, 11, 14, and 15 are drawn to a scale one-half working size, Figs. 7, 12, and 13 full working size, and Fig. 8 to a scale twice that of working size.

Referring to the parts shown, A, Fig. 1, is a liding table for holding the work, resting upon a frame B. C is an arm adapted to swing upon a rest E in a horizontal plane, and D a second arm, fulcrumed upon the arm C, to swing horizontally over the table upon a rest F. G and H are driving belts for the spindle, all of the above named parts being of common construction in machines of this character.

The arm D is adapted to be adjusted laterally along the arm C and it carries the spindle head I and spindle K. By the term "spindle head" is meant all the parts collectively, associated with the spindle and carried by the arm D.

The spindle, which is preferably made of steel, fully shown in Fig. 10, rests in a hard metal or composition barrel L adjusted to a fine bearing upon the spindle and is provided with a rigid belt pulley N above the barrel, with jam nuts *a* to hold the parts in place. At its lower end the spindle is threaded, at *b*, to receive a surfacing head or other tool, not essential to my invention, and bored longitudinally to receive a cutter *c*. This cutter is held by a threaded part *d*, nut *g* and part *e*, common to these machines, the part *e* being formed with a blade-like part *f* entering a slit in the cutter.

The barrel is formed with double walls—an outer and an inner circular wall—tied together at intervals, forming an annular oil space *h* which is filled with some fibrous or oil-absorbing material as cotton waste, for instance. On opposite sides of the interior of the barrel there are formed spiral slits i, Fig. 5, communicating between the space h and the spindle bearing, which are also filled by the fibrous material by means of which the latter is brought into direct contact with the spindle. The spiral slits are long, extending nearly the entire length of the barrel.

The spindle barrel is split longitudinally, as shown at k, Figs. 3 and 4, through one side so that it may be expanded or contracted for the purpose of being accurately adjusted to the spindle. A spreader l, consisting in part of a shaft, is placed longitudinally in the slit, provided at either end with a conical head, one being rigid with the shaft and the other screw-threaded thereon, its construction being fully shown in Fig. 8. The heads fit conical cavities in the ends of the barrel, on account of which by turning the threaded head, by means of a screw driver, the barrel will be slightly spread or sprung open.

The oil space h is closed at the bottom but open at the top and covered with a cap plate m, Figs. 5, 6 and 7, held in place by simple screws, at n. This ring is divided at one side to correspond with the division k in the barrel and is formed with openings a' over the space h to admit of oil passing upward to the base of the pulley.

Oil is supplied to the fibrous material in the space h and to the spindle from an ordinary oil cup O, Figs. 2 and 9, the tube p of which is threaded into the outer wall of the barrel, as appears in Fig. 7. The inner end of the tube enters an opening o in the inner wall of the barrel to a point near the spindle K the opening o being larger in diameter than the adjacent end of the tube so that the oil after flowing against the spindle may turn back, as indicated by arrows, into the space h and be absorbed by the fibrous material therein.

The pulley N rests directly upon the upper end of the spindle barrel and a strand of oil-conducting fibrous material r extends from the interior of the stem up through an opening or duct s in the spindle barrel adjacent to the spindle to form a contact with the under surface of the pulley to lubricate it. The pulley is formed at its lower end with openings b', which as the pulley turns, pass over the openings a' in the cap plate m. These openings, reduced in diameter at the upper end, pass outward through the surface of the pulley, as shown. On account of this construction the revolving of the pulley produces a moderate upward draft which causes the oil to flow in small quantities up through the openings a'. This assists to lubricate the pulley and tends to counteract the action of gravity upon the oil held by the fibrous material and keep it to the upper part of the bearing of the spindle, which oil would otherwise tend to settle to the lower part of the space h.

The spindle barrel is inclosed in an iron jacket P, Figs. 3 and 10, which occupies a vertical cavity c' in the arm D, as shown in Fig. 2. This jacket is of the same length as the spindle barrel and formed with an annular chamber t to form an air space between it and the barrel, and is longitudinally split nearly its whole length, as shown at d', Fig. 10. It is formed with opposing lugs u at its upper end, one at either side of the kerf d', and provided with a clamping screw v, Figs. 2 and 3, by means of which it may be tightened onto the barrel. Longitudinal openings w, Figs. 3 and 15, are formed at the ends of the jacket communicating with the chamber which admit of a free circulation of air within the jacket around the barrel to cool the latter, the air entering at the lower end and passing out at the upper end of the jacket. The tube p of the oil cup passes freely through the jacket, as appears in Fig. 7. Operating screws h', Figs. 9, 11 and 13, for the barrel are threaded horizontally through the opposite sides of the jacket in position to bear against opposing parts of the barrel. The ends of these screws bear against portions of the barrel adjacent to the kerf k and act in directions at right angles to the plane of the kerf and in a manner adapted to compress the barrel by springing together and cause it to more firmly press the spindle. The action of these screws upon the barrel is opposite to that of the spreader l, by means of which screws and spreader the bearing of the spindle in the barrel may be at any time nicely adjusted and wear compensated for.

The jacket is held by the cap R in a manner that adapts it to have vertical motions therein. It is formed at one side with a longitudinal V-shape or angular piece x, Figs. 2, 3 and 13, fitted to slide in a corresponding angular opening z in the cap piece or holder R which is rigidly secured to the arm D by bolts y. See also Figs. 9 and 11. A gib e', Figs. 2, 13 and 14, is provided to hold the jacket in place in the cap R. The gib is operated by a screw f' (see also Fig. 9), passing through the cap R and threaded in the gib. A steel gib sheet g' consisting of two parts or wings forming a diedral angle is employed to bear directly against the part x, it being between said part and the gib. The left-hand edges of the gib sheet and the gib, as appear in Fig. 13, abut directly against a shoulder of the cap R so that when the gib is drawn down by the bolt the jacket P with the spindle and other parts that it carries, is held firmly in the cavity z of the cap. The gib sheet from its elasticity tends of itself to hold the jacket with moderate force. When the gib is loosened for the purpose of raising or lowering the cutter the gib sheet serves to hold the jacket steady.

To move the spindle vertically a screw S, Figs. 2, 9 and 11, is employed parallel with the spindle. This screw is provided with a hand wheel T and is held by a hanger or rest V rigid with the cap R. The screw has bearings at i' i' in the hanger and is threaded in a nut m' rigid with the jacket P. The screw is secured to place in the bracket by means of a simple tangent pin n' passing through the bracket into an annular groove formed near the end of the screw, a construction that is common and well-known. By turning the hand wheel the spindle may be vertically raised or depressed as may be required.

The belt pulley is formed with an upwardly-extended, circular part w, Figs. 2, 9 and 10, provided with holes o' in which to insert a lever to hold the spindle when the nut g is turned thereon or when a surfacing head or other tool is turned upon the threaded part b.

What I claim as my invention is—

1. In a routing machine, in combination with a tool-carrying spindle, a holding barrel for the spindle, formed with an outer cylindrical wall and an inner cylindrical wall with oil space between, the inner wall extending around the spindle, in contact therewith and constituting a bearing for the spindle, and openings connecting the oil space with the spindle bearing, substantially as shown and described.

2. In combination with the spindle of a routing machine a holding barrel for the spindle formed with double walls and space between them communicating with the spindle bearing, the barrel being divided longitudinally at one side and means for expanding or contracting the barrel and for supplying oil to the spindle, substantially as and for the purpose set forth.

3. In a routing machine a spindle, a barrel holding the spindle formed with an annular oil space outside of the spindle communicating with the spindle bearing, said oil space being closed at the bottom and opening out at the top, and a plate to cover said space formed with perforations communicating with the space, in combination with a belt pulley on the spindle adjacent to the plate formed with openings adapted to pass over the perforations in the plate when the pulley is turned, substantially as and for the purpose specified.

4. The spindle of a routing machine and a holding barrel therefor formed with an outer and an inner wall inclosing an oil space communicating with the spindle bearing, in combination with an oil-supply tube rigid in the outer wall and passing into an opening into the inner wall with clear space between the tube and said inner wall communicating with said oil space, substantially as shown.

5. The spindle and pulley of a routing machine and a holding barrel for the spindle formed with an outer and an inner wall inclosing an oil space communicating with the spindle bearing, in combination with an oil-supply tube rigid in the outer wall and passing into an opening in the inner wall, a duct communicating between said opening and the base of the pulley and a strand of oil-conducting material in said duct connecting the interior of the tube with the pulley, substantially as shown and described.

6. A rotatory spindle, and a holding barrel for the spindle in one piece, the holding barrel being divided at one side, and means to expand or contract the barrel by spring action, in combination with a jacket for the barrel, in one piece, and divided at one side throughout the greater part of its length, and means to contract the jacket upon the barrel, substantially as and for the purpose specified.

7. A rotatory spindle, a barrel holding the spindle, and a chambered jacket to inclose the barrel, and openings communicating with the chamber in the jacket, in combination with a holder for the jacket, and means for moving the jacket in the holder, substantially as set forth.

8. A holding jacket for the spindle of a routing machine, adapted to slide in a holder, and a gib and a screw in the holder for controlling the jacket, in combination with an elastic gib sheet between the gib and adjacent parts, consisting of two parts or wings joined in an angle, one part adapted to press the jacket and the other part crossing the screw, substantially as shown and described.

In witness whereof I have hereunto set my hand, this 2d day of March, 1895, in the presence of two subscribing witnesses.

HENRY RUNG.

Witnesses:
ENOS B. WHITMORE,
M. L. WINSTON.