

Mar. 13, 1923.

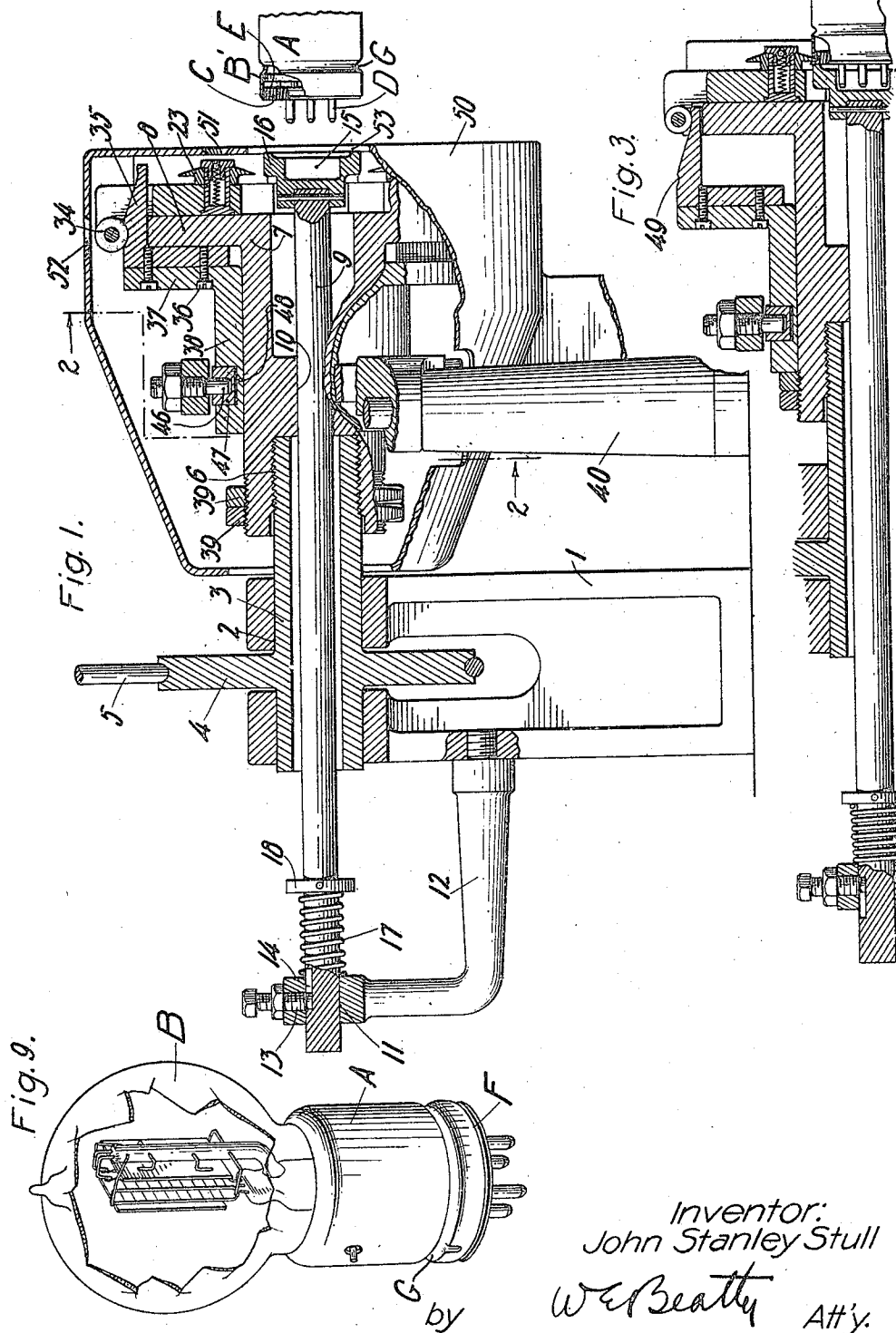
J. S. STULL

1,448,577

METAL SPINNING MACHINE

Filed Mar. 19, 1920

3 sheets-sheet 1



Inventor:
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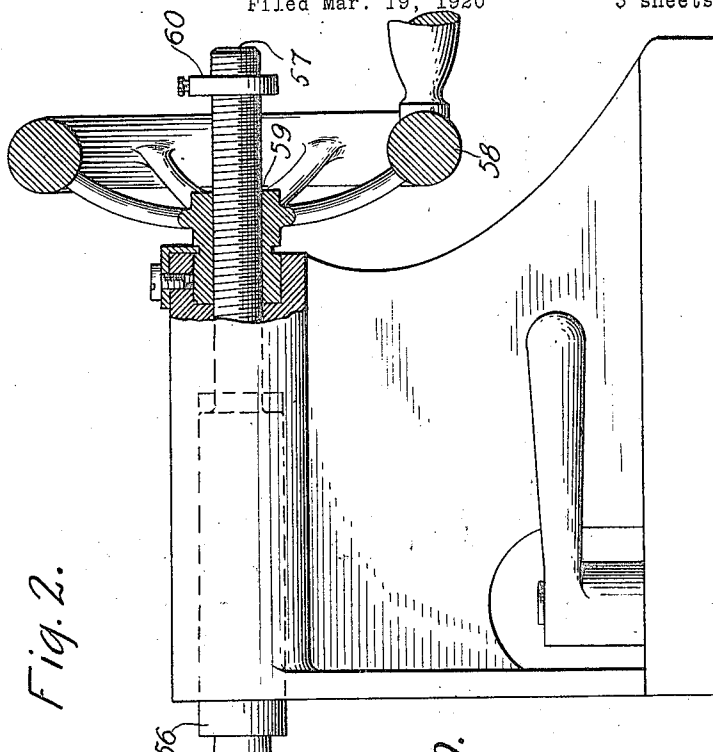


Fig. 2.

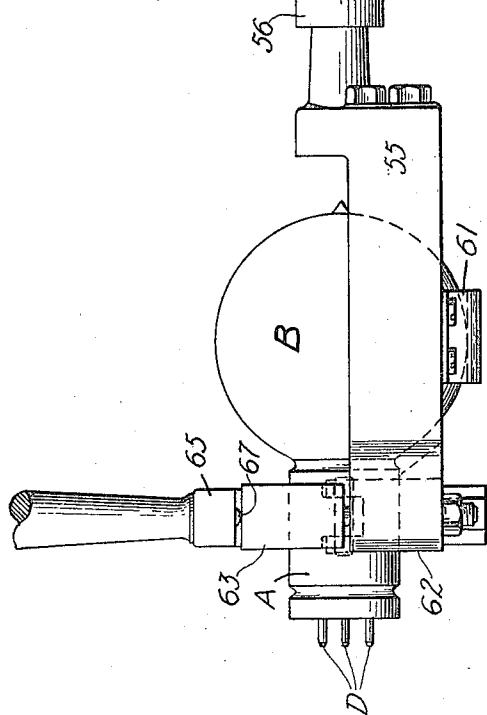
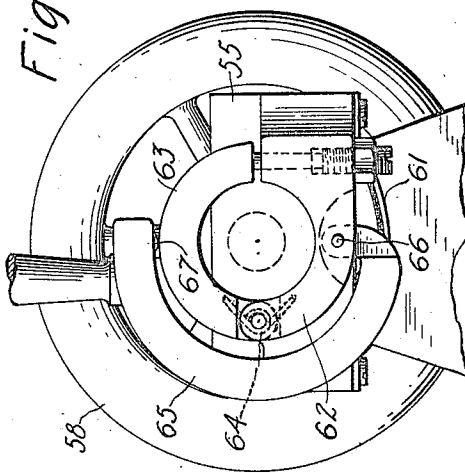


Fig. 10.



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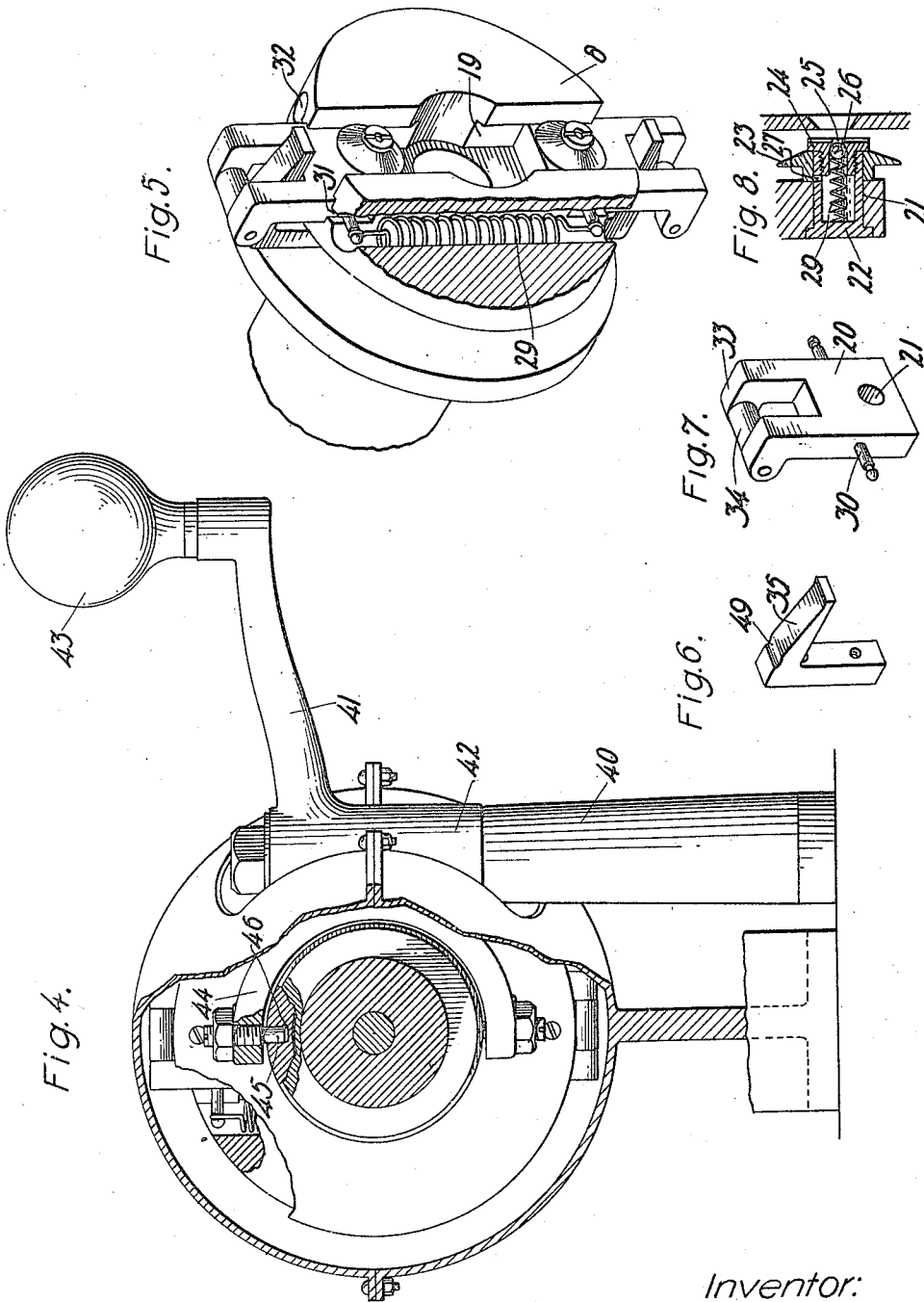
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METAL SPINNING MACHINE

Filed Mar. 19, 1920

3 sheets-sheet 3



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UNITED STATES PATENT OFFICE.

JOHN STANLEY STULL, OF CHICAGO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

METAL-SPINNING MACHINE.

Application filed March 19, 1920. Serial No. 367,203.

To all whom it may concern:

Be it known that I, JOHN STANLEY STULL, a citizen of the United States, residing in Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Metal-Spinning Machines, of which the following is a full, clear, concise, and exact description.

This invention relates to special tools and machinery and more particularly to devices for spinning metal tubes and the like and it has for its object to provide a simple, efficient and conveniently operable machine for spinning the shells or sleeves of the bases of electrical vacuum bulbs of any kind into the cap pieces, though the invention is adapted for wide use in this general capacity or other similar work.

This invention, in general, comprises the provision of a plurality of tools which are carried on a rotary head and are adapted to revolve about the axis thereof. Resilient means are provided which tend to draw the tools toward their common axis upon being released so as to impress the work. A manually operable cam mechanism is provided and adapted normally to hold the tools in a retracted position. This mechanism is adapted to be operated without stopping the rotary head. A yielding pad is positioned approximately coincident with the axis of the tools and functions to hold the parts of the tube base in proper position while the spinning operation is being performed. A support is provided for the parts of the tube, which is so constructed as to permit the parts to be readily presented to the spinning device and easily removed from the support after the spinning operation.

The invention further resides in certain other improvements and combinations of parts as will be hereinafter more fully described in the specification and claims.

In the drawings:

Figure 1 is a vertical, central, longitudinal section of a spinning machine constructed in accordance with and illustrating one embodiment of my invention, with portions broken away and other portions partly in side elevation; Figure 2 is an elevation of the movable support for the parts of the tube during the spinning operation; Figure 3 is a fragmentary detail section in the same plane as Figure 1 but showing certain of the

parts in different positions; Figure 4 is a transverse section on the line 2—2 of Figure 1; Figure 5 is a perspective view of the tool head, partly broken away; Figure 6 is a perspective view of one of the cams associated with the tool carriages; Figure 7 is a perspective view of one of the tool carriages; Figure 8 is an enlarged detail section through one of the tools; Figure 9 is a perspective view of the finished work-piece; and Figure 10 is an elevation of the tube support as viewed from the left in Figure 2.

Similar reference numerals throughout the several views indicate the same parts.

To first explain the nature of the work accomplished in the present embodiment of the invention, reference is made to Figure 9 and to the fragment of the work-piece shown at the right of Figure 1, wherein A represents a metal sleeve or shell on the base of a vacuum tube or bulb B. In the end of the shell is a cap B' of micarta which carries the projecting terminal plugs D and a cap C of bakelite or similar insulating material. This cap has a peripheral V-shaped groove E, and the function of the present machine is to spin a rib F on the inside of the shell to lock in the groove E and hold the cap in place. The cap B' rests against the shoulder G of the shell and the cap C rests against the cap B' during spinning and is held there by means of the pad 15 bearing against it.

Referring now to the other figures, 1 indicates a standard on the main frame of the machine, which standard carries the main bearing 2, and in this bearing turns the tubular hub 3 of a driving pulley 4 carrying a belt 5. Threaded at 6 on the forward end of the hub 3 to turn therewith, is the hub 7 of an annular tool head 8. A rod 9 extends axially through the head 8. The forward portion of rod 9 has a bearing at 10 in the hub 7 and its rear end slides in a bearing 11 in a bracket arm 12 secured to the standard 1. A stop pin 13 threaded into the bearing and cooperating with a short groove 14 in the rod 9 prevents its rotation during its longitudinal movement. At its forward end, the rod 9 carries a head in the form of a pad 15 with a surrounding flange 16. The rod 9 and pad 15 are normally held in a projected position, beyond the head 8 and the tools carried thereby, by a spring 17 coiled about the rear end of rod 9 between a stop collar 18 thereon and the bracket 12.

The tool head 8 (Figure 5) is provided with aligned radial guides 19 in which a pair of tool carriages 20 is adapted radially to slide. One of the carriages is shown in detail in Figure 7. The inner end of each carriage is bored at 21 to receive a hollow stud 22 (Figure 8) on which turns a disc tool 23. The tool 23 is held in place by a threaded cap 24 having a central oil opening 25 closed by a ball valve 26 that is held in place by a spring 27. The oil is communicated to the bearing of the tool 23 on the stud 22 through an opening 28 in the latter. The carriages 20 and the tools thereon tend normally to move inwardly toward the axis of the head under the influence of springs 29 connecting the carriages together, the ends of each spring being engaged over pins 30 projecting laterally from the carriages through slots 31 in the guides 19. The springs 29 lie in recesses 32 in the head paralleling the guides 19.

For the purpose of permitting the tools and their carriages to move inwardly, the outer ends of the latter are bifurcated to provide yokes 33 and extending between the outer ends of the arms of these yokes are rollers 34. Cams 35 engage beneath the rollers and extend through the yokes as shown in Figures 1 and 4. These cams are of the form shown in detail in Figure 5 and are rigidly secured by screws 36 to the flange 37 of a sleeve 38 slidable longitudinally on the hub 7 of the tool head 8 and rotating with it. The sleeve 38 is shifted back and forth between the head and a pair of threaded stop collars 39 on the end of the hub 7 by a shifting device carried by a standard 40 rising at one side of the standard 1 and forwardly of it. A lever 41 having a bearing on the upper end of the standard 40, which extends through the hub 42 of the lever, is provided at one end with an operating handle 43 and at the other with a yoke 44 (Figure 4) embracing the sleeve 38 and having radial pins 45 occupying bearings 46 in a ring 47 that is not rotatable but occupies an annular groove 48 in the sleeve 38. By reciprocating the lever 41, the sleeve 38 carrying the cams may be shifted back and forth without stopping the head 8.

The cams 35 normally occupy the forward position shown in Figure 1 in which the carriage rollers 34 occupy depressions 49 formed at the high end of the cam surface. This holds the carriages in their outer positions and the tools 23 retracted.

In Figures 2 and 10 is shown a device for supporting the work piece in a position central with respect to the axis of the spinning device and for moving the work piece forward into a position in which it is adapted to be operated upon by the spinning head.

This device comprises a fixture 55 which is

secured to a sliding tail stock 56 of the machine. The tail stock 56 has the usual threaded portion 57 which is advanced or retracted by the rotation of a hand wheel 58 having an interior threaded bore 59. The threaded portion 57 has a stop 60 fixed thereon to limit its forward movement. The fixture 55 comprises a rectangular frame, the open mid-portion of which has a curved plate 61 for supporting the bulb B of the tube. The front portion of the frame comprises a split ring of an inner diameter corresponding to the outer diameter of the tube shell A. The shell A of the tube rests on the lower half 62 of the split ring. The upper half 63 of the split ring is pivoted at 64 and is moved in place to embrace the shell A. A curved lever 65 pivoted at 66 is moved into position so that a latching notch 67 thereon presses against the upper surface of the part 63 to hold it in position embracing the shell A. To engage the spinning head the fixture is moved forward until the work piece presses against the pad 15 until it is in the plane of the tools 23. At this instant the stop 60 prevents further forward movement of the fixture. The lever 41 is then operated to shift the sleeve 38 rearwardly and allow the rollers 34 to ride down the surfaces of the cams 35. This carries the tools 23 inwardly or toward each other and into engagement with the work-piece as shown in Figure 8 with the requisite pressure to form the rib F. When so formed, the hand lever 41 is moved in the opposite direction advancing the cams through the yokes 33 and causing the rollers 34 to ride thereon so that the tools 23 are retracted and the work-piece A is free to be withdrawn.

The working parts are preferably enclosed within a suitable housing 50 provided with oiling apertures 51 and 52 and with an axial opening 53 for the insertion of the work-piece.

What is claimed is:

1. In a machine for spinning tubular metal members into supporting caps, a rotary head, a spinning tool carried thereon, said tool being adapted to be adjusted without stopping said head, a holding mechanism for advancing a tubular member and cap into operative position to said spinning tool, and yielding means cooperating with said holding means for maintaining the cap in the desired position during spinning.

2. In a machine for spinning tubular metal members into supporting caps, a rotary head, a radially adjustable spinning tool carried thereon, yielding means for moving said tool into work engaging position during the rotation of said head, means for retracting said tool against the action of said yielding means and during the rotation of said head, a holding mechanism for advancing a

tubular member and cap into operative position to said spinning tool, and means cooperating with said holding means for maintaining the cap in the desired position during spinning.

3. In a machine for spinning tubular metal members into supporting caps, a radially adjustable spinning tool, a longitudinally movable holding and centering device for a tubular member and cap and for advancing the same into operative position to said spinning tool, and a spring operated pad movable relative to said head and passing therethrough to be engaged by the cap as it and tubular member are advanced into operative position to said spinning tool whereby energy is stored in said spring operated pad to maintain the cap and tubular member in operative relation during the spinning.

4. In a machine of the character described, the combination with a rotary head and a pad arranged axially thereof and embodying a spindle reciprocally mounted in said head and a spring causing it to normally protrude yieldingly beyond the head, of a radially movable spinning tool on the latter adapted to cooperate with a work-piece held against the pad.

5. In a machine of the character described, the combination with a rotary head having a hub and provided with a radial guide, and a pad arranged axially thereof, of a carriage slidably mounted in the guide, a spinning tool on the carriage, a spring tending to move the carriage inwardly to bring the tool into cooperation with a work-piece in pad device and a sleeve slidable axially on the hub of the head and having a cam cooperating with the carriage to retract the tool.

6. In a machine of the character described, a rotary head having a hub and provided with a radial guide, a carriage movable in the guide, a spinning tool on said carriage, a spring tending to move said carriage inwardly of the head, arms projecting from the outer end of the carriage, a roller extending between and carried by said arms and a sleeve slidably axial on said hub, said sleeve having a cam cooperating with said roller to retract said tool.

7. In a machine of the character described, a rotary head having a radially arranged groove in the face thereof, a carriage reciprocally mounted in said groove, a spinning tool on said carriage, a spring tending to move said carriage inwardly, arms extending from the outer end of said carriage, a roller interposed between and carried by said arms, and a reciprocating cam member projecting between said arms, said cam member being adapted to retract the carriage against the action of the spring.

8. In a machine of the character described, a rotary head having a diametrically arranged groove in the face thereof, carriages reciprocally mounted in said groove, a spinning tool mounted on each carriage, a yoke at the outer end of each carriage, a roller carried by each yoke, a cam member projecting through each yoke and contacting with said roller, said cam member being adapted to move said carriage outwardly, and springs connecting said carriages to normally draw them toward each other.

In witness whereof, I hereunto subscribe my name this 15th day of March, A. D., 1920.

JOHN STANLEY STULL.