Nov. 25, 1941. T. G. WHYTE 2,264,060

SPINNING MACHINE

Filed July 16, 1940

Fig.1.

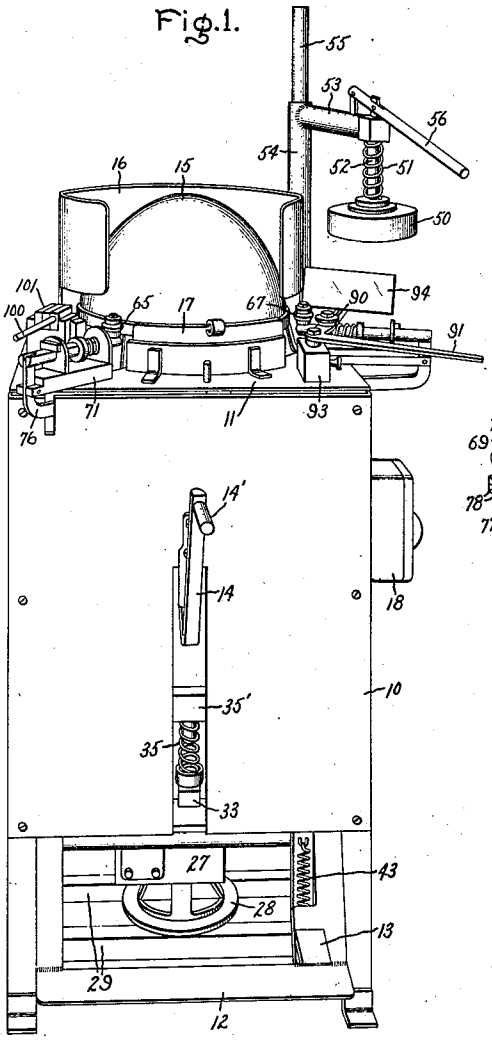


Fig.2.

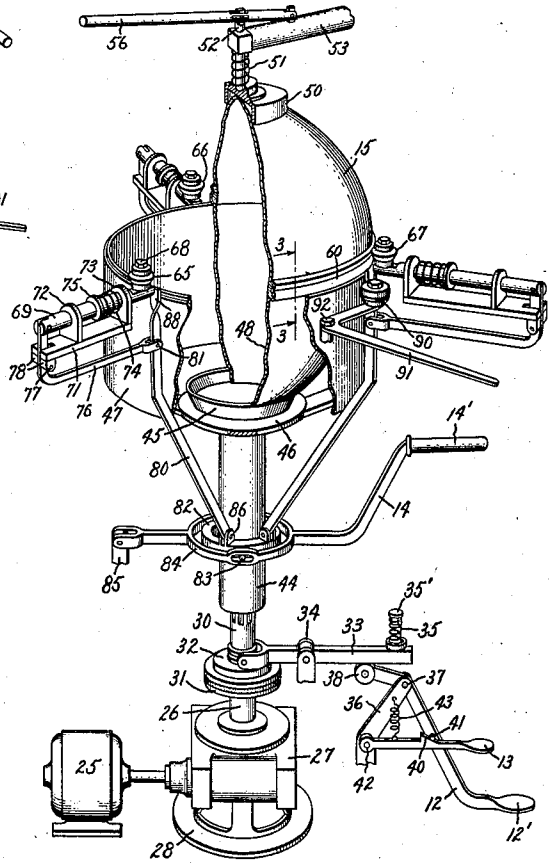


Fig.3.

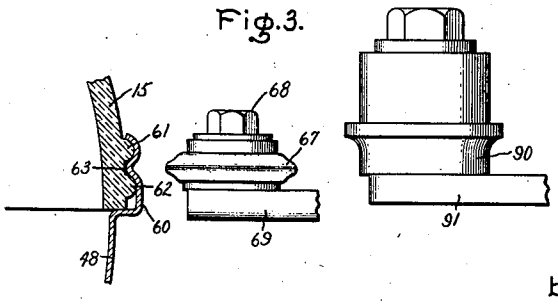
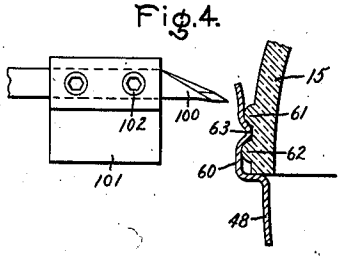


Fig.4.



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SPINNING MACHINE

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3 Claims. (Cl. 113—52)

My invention relates to spinning machines, and more particularly to spinning machines for spinning sheet metal elements to glass or ceramic elements.

The object of my invention is to provide an improved machine of this type and for an understanding of my invention, together with other and further objects thereof, reference is to be had to the following description taken in connection with the accompanying drawing. The scope of the invention is pointed out in the appended claims.

My invention is well adapted for use in the manufacture of light fixtures for spinning a metallic reflector onto a glass globe and accordingly I have elected to illustrate and describe a spinning machine especially adapted for this use. It is to be understood, however, that my invention is not limited necessarily to a machine for such use but may be used wherever found applicable.

In the manufacture of light fixtures, especially the type used for highway lighting, it has been found advantageous to joint together a metallic reflector and an enclosing globe by molding or spinning the edge of the reflector over a grooved rim on the glass globe. This has been done heretofore by a spinning process whereby the metal of the reflector was slowly molded over the grooved rim of the glass globe by a tool held against the metal while the reflector and globe were revolved. This molding must be done with considerable pressure in order to produce a tight joint and yet this pressure must not be great enough to break the glass. This hand process while it produces a satisfactory structure, is relatively slow and expensive.

By my invention, I provide a machine for performing such a spinning operation which machine is capable of producing satisfactory structures at a cost substantially lower than by the hand method.

In the accompanying drawing, Fig. 1 is a front elevation of a machine embodying my invention; Fig. 2 is a skeletonized view of the working elements of the machine; Fig. 3 is an enlarged sectional view looking in the direction of the arrows 3—3 in Fig. 2, and Fig. 4 is an enlarged sectional view illustrating an element of the machine of Fig. 1.

Referring to the drawing, Fig. 1 discloses in front elevation a machine having therein a light reflector and globe ready to be united. The elements of the machine are enclosed within a cabinet 10, the top of which is a working table 11 arranged at a suitable height from the floor. A machine starting treadle 12 extending over the one side of the cabinet is provided for operation by the foot of an operator and a trip lever 13 is provided at one end of the treadle for tripping the starting treadle and thereby stopping the machine. An operating lever 14, provided with a handle 14', projects through a slot in the front of the cabinet 10 for manipulation vertically by the hand of an operator. The globe 15 of a fixture is visible above the table 11 of the machine and is partly surrounded by a circular guard 16. The front section 17 of this guard is in a lowered position and may be raised, before starting the machine, so as to prevent injury to the operator during operation. An electric starting switch is provided within a box 18 attached to the side of the cabinet 10, for starting the motor of the machine.

The working elements of the machine are illustrated partly in Fig. 1 and more clearly in Fig. 2. They comprise a motor 25 connected to drive a vertical shaft 26 of the machine through a suitable gear transmission 27 resting on a base 28. The base 28 rests on cross bars 29 in the cabinet 10 as shown in Fig. 1. A clutch is provided between the shaft 26 and the drive shaft 30 of the machine. One member 31 of the clutch is rigidly attached to the shaft 26 and the other clutch member 32 is rigidly connected to the shaft 30.

The clutch member 32 and the shaft 30 are axially movable by a lever 33 pivoted upon a stationary support 34. The lever 33 is connected to the clutch member 31 by the conventional pin and groove connection, at one end, and is urged in a clockwise direction about its pivot by a spring 35 pressing upon its other end from a stationary support 35'. Spring 35 biases clutch member 32 to a position where it is out of engagement with clutch member 31, i. e., it serves to bias the clutch toward open position.

A closing of the clutch is obtained by an operation of the foot treadle 12. This treadle is illustrated in Fig. 1 as extending over the full width of the cabinet. In Fig. 2 it is diagrammatically illustrated as being provided with a foot pad 12'. It comprises a lever pivoted upon a stationary support 36, which is preferably a frame member of the cabinet 10, by a pivot pin 37. A roller 38 is provided at the end of the lever 12 and is in contact with the under side of lever 33 at a point between pivot support 34 and spring 35. A clockwise movement of the lever, which is obtained by an operator stepping upon the pad 12' and

moving it down, effects an upward movement of the roller 38 and a closing of the clutch. The treadle and, thereby, the clutch are locked in this closed position by the trip lever 13.

The trip lever 13 is provided with a tooth 40 which cooperates with a pin 41 on the treadle 12 to lock the treadle in the closed clutch position. The trip lever is pivoted upon the support 36 by a pin 42 and is urged upwardly, that is counter-clockwise about its pivot 42 by a spring 43. In operation, the treadle 12 is moved clockwise to close the clutch and in this operation the pin 41 slides over the inclined surface of the tooth 40. As the treadle 12 reaches the closed clutch position, the pin 41 passes the crest of the tooth 40 and enables the spring 43 to lift the trip lever 13 so as to move the vertical side of the tooth 40 against the pin 41 and prevent a return movement of the pin and treadle. When the operator is ready to stop the machine he need only move the trip lever downwardly to release the pin 41 and enable the spring 35 to open the clutch.

The shaft 30 driven by the clutch member 32 is splined to a hollow spindle 44. The spindle 44 is provided, at its upper end, with a suitable head in the form of a cup 45 for receiving a reflector 48 and is supported for rotation by a spider 46. The spider 46 is attached to a cylinder 47 which is supported within the cabinet 10 and is dimensioned to receive the reflector 48 illustrated in Fig. 2.

The spindle 44 rotates the reflector through frictional contact between the spindle head 45 and the end of the reflector. In order to raise this frictional contact to a maximum the reflector is pressed against the spindle head by a rotatable plate member 50. This plate member rests on the upper end of the globe and is urged downwardly by a spring 51 which surrounds a supporting shaft 52 and is under compression between the plate 50 and a supporting arm 53. The supporting arm projects horizontally from a sleeve 54 which is rotatable about a vertical shaft 55 projecting above the table 11 (see Fig. 1). The length of this supporting arm is such that the plate 50 and its shaft 52 are held on the axis of the spindle 44 when the plate engages the end of the globe. The shaft 52 and plate member 50 may be lifted against the pressure of spring 51 by a lever 56 which is pivoted to the horizontal arm 53, and additionally may be moved about the shaft 55. In operation, a reflector 48 is placed on the spindle head 45 and a globe 15 is placed on the reflector, the cylinder 47 maintaining this assembly in an upright position. The lever 56 is then moved upwardly to lift the plate member 50 and is moved sidewardly to move the plate 50 over the end of the globe 15 and is then allowed to engage the end of the globe, the pressure on the globe then being that of the spring 51. The plate member 50 is hollowed to receive the tapered end of the globe 15. It may, however, be formed to suit the shape of any globe which is to be worked upon.

The reflector 48 is provided with a flange 60 which is of a greater diameter than the reflector proper and is joined to the reflector by a horizontal shoulder upon which the end surface of the globe 15 rests. The globe is in turn provided with a beaded rim, or flange, comprising parallel beads 61, 62 having a semi-circular cross-section and being spaced from each other to form a groove 63. (See Fig. 3.) To join the globe to the reflector the reflector flange 60 is to be molded into the groove 63 of the globe and the end of the flange is to be molded over the upper half of the bead 61.

To perform the molding or spinning operation the machine is provided with tools mounted on the table 11 and placed under the control of the lever 14. The tools comprise a plurality of rollers having contours conforming to the groove in the reflector rim. In the illustrated machine three such rollers are provided, 65, 66, 67. The three rollers are mounted and supported about the axis of the spindle 44 equally spaced from each other in exactly the same manner, wherefore the description of one will suffice for all of them. In Fig. 2 the support for roller 65 is clearly illustrated and it will be decribed in detail.

The roller 65 is supported for rotation about a vertical pin 68 which is held in a horizontally supported axially movable shaft 69. The support for this horizontal shaft comprises a base 71 attached to the table 11, at its front end, and having its back end projecting beyond the edge of the table. Two ears 72 and 73 spaced from each other and projecting upwardly from the base 71 are provided with bearings in which the shaft 69 is mounted and in which the shaft may move axially and radially of the axis of the spindle. A helical spring 74 is mounted on the shaft 69 between the ear 73 and a collar 75 fixed on shaft 69 between ears 72 and 73. Spring 74 is under compression and acts to urge shaft 69 outwardly to move the roller 65 away from the reflector flange.

The roller 65 and shaft 69 are moved toward the reflector simultaneously with the rollers 66 and 67 by the lever 14 through a system of links and levers. The shaft 69 for the roller 65 is moved by a bell-crank lever 76 which is pivoted intermediate its ends by a pin 77 projecting through ears 78 on the under side of the base 71. One end of this lever is pivoted to the end of the shaft 69 and the other end is connected to a link member 80 by a pin 81. The lever 76 is bent at right angles at a point below its pivot pin 77 so that a substantially vertical movement of the link member 80 results in a horizontal movement of the shaft 69 connected to the other end of the lever.

A vertical movement is obtained for the link 80 from the lever 14 through a ring 82 which is slidable on the spindle and is connected by a pin and slot connection 83 to a ring 84 which is a part of the lever 14 and is concentric with the ring 82. The lever 14 is pivoted at its end to a stationary support 85 whereby a vertical movement of the handle 14' on the free end of the lever 14 effects a vertical movement of the ring 82 through the pin and slot connection 83 and effects a vertical movement of the link 80 which is pivoted to the ring 82 at pin 86. This vertical movement is translated into a horizontal movement of the shaft 69 and its roller 65 by the bell-crank lever 76. As above stated, the rollers 66 and 67 are simultaneously moved with the roller 65 by a similar arrangement of levers. In Fig. 2 the support for the roller 66 is partly shown and for the roller 67 the support and operating lever system is shown complete.

The function of the link 80 is to transmit the movement of the ring 82 to the lever 76. It is given a second function, however, by providing an extension 88 above the pin 81 by which the lever 76 is connected to the link. The link 80 is made of sheet metal strip. The extension 88 of this strip is twisted 90° so that the end of this extension 88 becomes parallel to the surface of

the cylinder 47. The end of the extension is further bent close to the cylinder surface and is close enough to engage the shoulder at the end of the reflector flange 60. In operation the handle 14' is pushed downwardly to move the rollers 65, 66, 67 inwardly against the pressure of the springs 74 to roll the flange 60 into the groove in the rim 61 of the globe 15. When this operation is completed the handle 14' may be moved upwardly. This movement retracts the rollers and their shafts and simultaneously moves upwardly the link extensions 88 to lift the completed fixture. This lifting enables an operator to easily remove the completed fixture from the machine.

The rollers 65, 66, 67 in the illustrated machine are placed in a common plane and roll the flange into the single groove 63. (See also Fig. 3.) It is also desirable to roll the edge of the metal flange over the end of the rim. An additional roller 90 is, therefore, provided. It is mounted at one end of a bell crank 91. The bell crank is pivoted by a pin 92 on a block 93 on the table 11. This last operation of turning the end of the flange 60 over the end of the rim 61 is carried out subsequent to the rolling operation carried out by the rollers 65, 66, 67. The operation is performed by the operator by simply moving the bell crank 91 about its pivot. A mirror 94 (Fig. 1) is provided so that he may better watch the action of the rollers 67 and 90. Fig. 3 is an enlarged view of the rollers 67 and 90. It illustrates their relationship to each other and to the reflector in a vertical plane. Their spaced relationship in a horizontal plane is illustrated in Fig. 2. The spacing being such as to enable independent operation of the rollers 67 and 90.

It is also desirable to provide a cutting tool for cutting off, or trimming, the end of the reflector flange 60. This operation may be desirable because of inaccuracies of manufacture. Such cutting tool 100 is provided on the table 11. It is held in a pivoted tool holder 101, in which it is held in any suitable manner such as set screws 102, for example, illustrated in Fig. 4. For cutting the end of the flange, the tool holder is merely turned about its pivot to bring the cutting point of the tool into contact with the metal flange. This operation is also performed by the operator and may be carried out after the flange has been rolled into the groove on the globe rim and before rolling the end of the flange over the end of the rim.

The operation of the machine is simple so that it may be entrusted to an unskilled laborer and is performed rapidly because of the relatively rapid rotation of the fixture and the multiplicity of rolling tools. The equal spacing and simultaneous movement of the tools equalizes the pressure exerted on the fixture about its axis and substantially eliminates breakage of the globes in this process.

What I claim as new and desire to secure by Letters Patent of the United States:

1. In a machine for spinning together a sheet metal reflector and glass globe of a lighting fixture, or the like, the combination of a motor, a spindle, means for supporting said globe and reflector upon said spindle, a plurality of radially spaced spinning tools mounted about the axis of said spindle and in the plane of overlapping flanges on said reflector and globe, a single operating lever connected to said tools to operate them simultaneously toward said overlapping flanges to mold the said metal flange to said globe flange, and means responsive to a movement of said operating lever for retracting said tools and simultaneously lifting said reflector above said tools.

2. In a machine for spinning together a sheet metal reflector and a glass globe of a lighting fixture, or the like, the combination of a motor, a spindle, means for supporting said globe and reflector upon said spindle, a plurality of spaced spinning tools mounted about the axis of said spindle and in the plane of overlapping flanges on said reflector and globe, a bell crank connected to each of said spinning tools, a link member connected to said bell cranks respectively, a ring member mounted upon said spindle and connected to each of said link members, and an operating lever connected to move said ring axially along said spindle to effect a radial movement of said spinning tools.

3. In a machine for spinning together a sheet metal reflector and a glass globe of a lighting fixture, or the like, the combination of a motor, a spindle, a clutch operable to connect said motor to said spindle, means for supporting said globe and reflector upon said spindle, a plurality of radially spaced spinning tools mounted about the axis of said spindle and in the plane of overlapping flanges on said reflector and globe, an operating lever connected to each of said spinning tools to move said tools horizontally, a link member connected to each of said operating levers and provided with an extension provided to engage the flange of said reflector, a ring member axially movable on said spindle connected to each of said ring members, and a common operating lever connected to move said ring movable in one direction to effect an operation of said tools and movable in a second direction to move said link extensions into position to lift said reflector.

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