

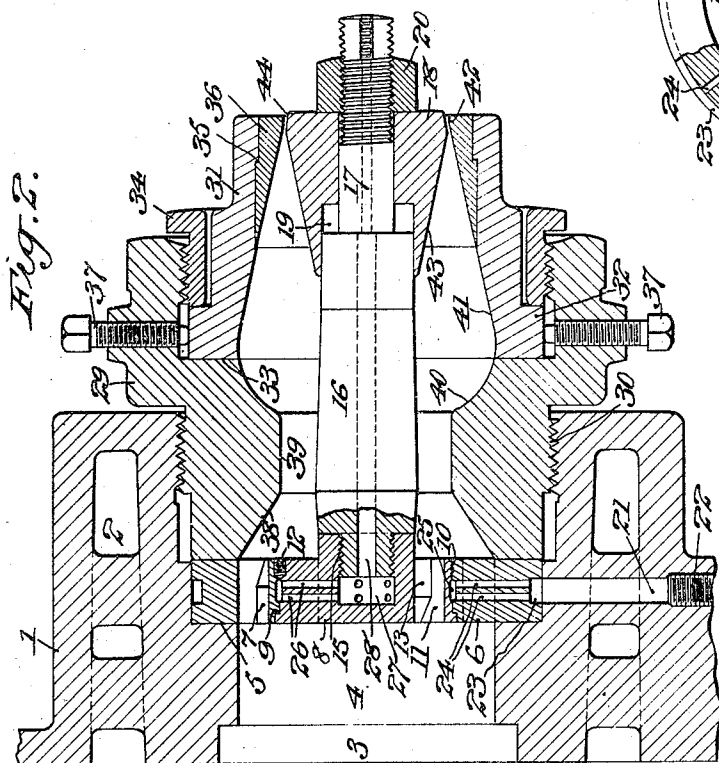
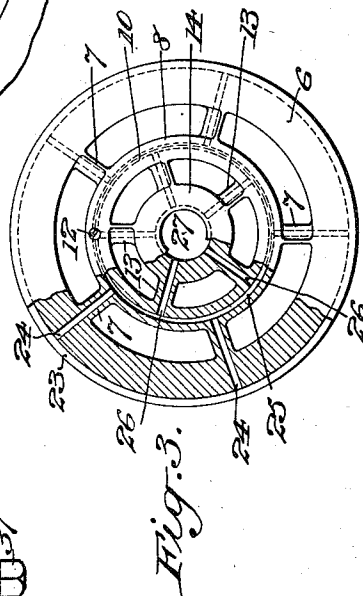
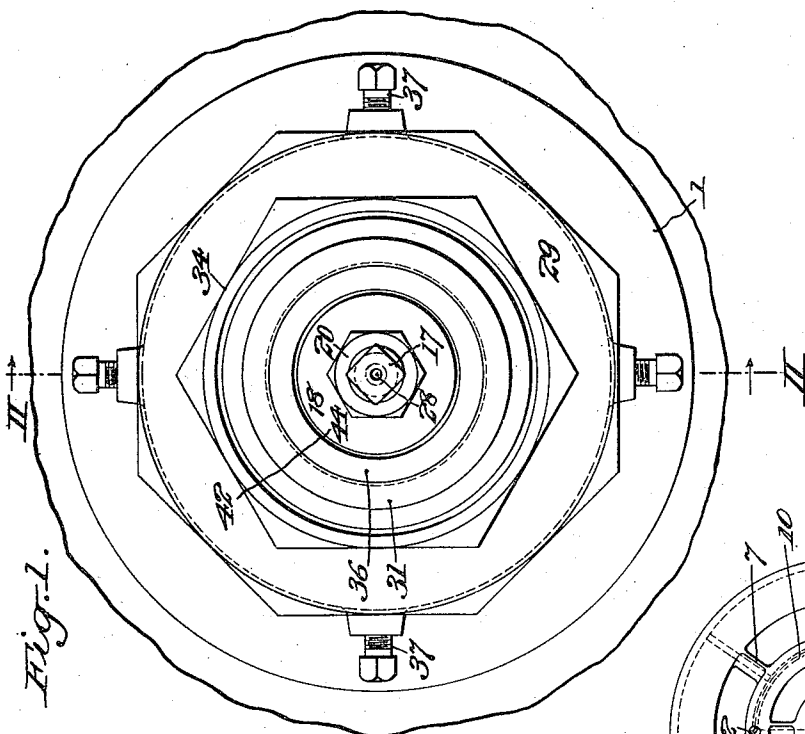
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TUBING MACHINE

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TUBING MACHINE.

Application filed November 21, 1924. Serial No. 751,441.

This invention relates to improvements in tubing machines and, more particularly, to the construction of the discharge portion of such machines.

5 It has for an object to provide a core bridge and core structure in which the apertures through which the material for forming the tube passes are multiplied in number and arranged in an improved manner.

10 Another object consists in providing a core bridge and core structure that includes two series of apertures concentrically arranged, one within the other.

15 Another object consists in providing a core bridge structure that includes apertures through which the material may pass, in addition to the apertures immediately surrounding the core.

20 Another object consists in providing a discharge structure for such a machine that includes means for compressing the material after it has passed the core bridge and then permitting the same to expand before it reaches the die.

25 Another object of the invention consists in providing such a structure which includes a special form of die and means for adjusting the same.

30 Another object consists in providing certain improvements in the form, construction and arrangement of the several parts whereby the above named and other objects may effectively be attained.

35 A practical embodiment of the invention is represented in the accompanying drawings, in which

Fig. 1 represents a detail front view of the discharge portion of a tubing machine embodying my invention.

40 Fig. 2 represents a section taken in the plane of the line II—II of Fig. 1, looking in the direction of the arrows.

Fig. 3 represents a face view of a core bridge and core, partly broken away.

45 The front face of the tubing machine head is denoted by 1, and it has the usual channels 2 for permitting the circulation of a temperature controlling medium, as is well understood in the art.

50 The said front piece has a bore 3 in which the screw or plodder (not shown) operates in the usual manner.

The said bore is reduced in diameter, as indicated at 4, and it is then enlarged so as

to provide a shoulder 5 against which the core bridge is seated, as clearly shown in Fig. 2.

The said core bridge includes an outer member 6 that has a series of five inwardly and radially projecting spokes 7 which spokes, in turn, support a ring 8 that is formed integral therewith.

The said ring 8 is shouldered, as shown at 9 and threaded, as indicated at 10, in order to receive an annulus 11 which has a flange mating with the shoulder 9 and a thread co-operating with the thread 10. This annulus is fixed in the ring 6 by a set screw 12.

A set of five spokes 13 project inwardly from the annulus 11 and carry a hub 14 which is formed integral therewith.

55 The said hub is bored and threaded, as indicated at 15, so as to receive the threaded end of the core 16 for removably securing the latter in the hub and thereby causing the core to be supported in position by the core bridge.

The outer end of the core is reduced in diameter, as denoted at 17, and slidingly receives an inner die member 18 which has a recess 19 at one end so as to enable the said die member to also slide upon the body of the core 16, as clearly shown in Fig. 2.

60 The reduced portion 17 of the core is threaded and carries a nut 20 for adjusting the die member 18 on the said core.

A port 21 is formed in the front piece 1 and threaded at 22 for the reception of a pipe leading from a suitable source (not shown) of non-adhesive powdered material, such as talc. The said port 21 communicates with a peripheral channel 23 formed in the outer circumference of the core bridge member 6, and said channel 23 is also in communication with ducts 24, two of which are located in each of the spokes 7. The said ducts 24 communicate with a channel 25 that is formed in the inner periphery of the ring 8 and outer periphery of the annulus 11, and said channel 25, in turn, communicates with ducts 26, two of which pass through each of the spokes 13. The last named ducts open into a chamber 27 in the hub 14, which chamber communicates with a longitudinal duct 28 that extends through the core 16 from end to end. The arrangement just described enables the non-adhesive powder to be injected through the port

21 to the interior of the tube being extruded from the machine, for a purpose well understood in the art.

The core bridge and core are firmly held in position in the tubing machine by a member 29 that is threaded into the front piece 1, as indicated at 30, and abuts the outer face of the member 6 of the core bridge.

The outer member of the die includes a portion 31 that has a shoulder 32 formed thereon and faced to abut a shoulder 33 on the member 29. A ring nut 34 which is threaded into the member 29 holds the portion 31 of the die firmly in place.

The bore of the portion 31 is shouldered, as indicated at 35 to receive, with a tight fit, the die element 36 which constitutes a part of the outer die member that immediately coacts with the inner die member 18.

It will be seen that the said members 18 and 36 are normally held in their most forward position with respect to the tubing machine by the movement of the material being extruded.

Set screws 37 are threaded into the member 29, in radial disposition, and abut the portion 31 so as to provide means for exactly centering the latter with respect to the member 29 and to the core 16 and die member 18.

By reference to Fig. 2 it will be seen that the interior of the member 29 is sharply reduced in diameter in a direction forwardly of the core bridge so as greatly to restrict the size of the passage around the core at this point. This taper is marked 38. Immediately forward of this taper comes a cylindrical portion 39 of quite small diameter, after which the bore of the said member 29 is curved outwardly or flared, so as to increase its diameter to substantially the diameter immediately adjacent the core bridge. This flared portion is marked 40. The outer portion 31 of the die matches the portion 40 of the bore of the member 29 and is shaped so as to, at first, slightly increase the diameter of the opening surrounding the core and then gradually, by an inward taper, reduce the same until the front face of the die members is almost reached. This portion of the bore is marked 41. Immediately adjacent the front face of the die members the said bore becomes cylindrical and of a size slightly greater than the diameter of the inner member 18 of the die. This portion of the bore is actually formed upon the element 36 carried by the portion 31, and is marked 42.

The inner die member 18 is tapered, as indicated at 43, so that its diameter increases from its rear end towards its front face until it approximates the front face, at which time the taper is reversed so as slightly to decrease the diameter of this member as its front face is immediately ap-

proached and actually reached. This taper on the immediate front portion of the member 18 is marked 44 and cooperates with the cylindrical portion 43 on the outer diameter 36 to provide means for adjusting the width of the opening between the members 18 and 36 by sliding the member 18 longitudinally, one way or another, on the reduced portion 17 of the core, by means of the nut 20.

It should be noted that the core 16 has a taper which slightly increases its diameter opposite the part 38 of the bore of the member 29 and that it then has an opposite taper which slightly decreases its diameter in a forward direction until the inner die member 18 is reached.

The structure hereinabove described enables the material being pushed forward by the screw or plodder to pass through a considerable number of openings in the core bridge, which openings are arranged in two circular series, each opening in the one series being staggered with respect to adjacent openings in the other series. This plurality of openings and, additionally, the said arrangement of such openings, serves to break up the material somewhat and thereby prevent it from passing around the core and to the die in knotted formation, or other objectionable formations in which it frequently appears immediately at the delivery end of the screw. Any disadvantage which might result from this breaking up of the material into several streams or ribbons is immediately counteracted by the contraction of the bore surrounding the core resulting from the taper 38, that serves to bring together and compress the various parts of the material that have passed through the core bridge. The material thus compressed is maintained in such a condition when passing through the portion 38 of the bore, but it is permitted to expand when encountering the portion 40 of the bore, and is only gradually again compressed as it reaches the die and is extruded from the opening thereof. This arrangement allowing for expansion of the material before it reaches the die prevents it from being forced too rapidly through the die and thus prevents the presence of imperfections in the extruded tubing.

The slight gradual increase in the diameter of the core immediately opposite the tapered portion 38 of the member 29 cooperates in the compressing of the material at this juncture, already described, while the gradual taper of the core in the opposite direction forwardly of said portion 38 facilitates the travel of the material and its extrusion through the die.

It will be understood that various changes may be resorted to in the form, construction and arrangement of the several parts, without departing from the spirit and scope of my invention, and hence I do not intend

to be limited to the details herein shown and described, except as they may be included in the claims.

What I claim is:

5 1. In a tubing machine, a core bridge comprising a plurality of separate annular members secured together one within the other.

2. In a tubing machine, a core bridge comprising four annular members one within the other.

3. In a tubing machine, a core bridge comprising a plurality of separate annular members concentrically arranged and secured together one within the other.

15 4. In a tubing machine, a core bridge comprising two separable portions, each portion including a pair of rings connected by spokes, said portions being secured together one within the other and locked in cooperative engagement.

20 5. In a tubing machine, a core bridge having a plurality of annular air passages, said passages being connected by a plurality of radial ducts arranged in staggered relationship.

25 6. In a tubing machine, a core bridge having a plurality of concentric annular air passages, said passages being connected by a plurality of radial ducts arranged in staggered relationship.

30 7. In a tubing machine, a core bridge comprising, an outer annulus, an intermediate annulus and a central annulus, the outer annulus being connected to the intermediate annulus by a plurality of spokes, and the intermediate annulus being connected to the central annulus by a plurality of spokes, an annular air passage in the outer annulus, an annular air passage in the intermediate annulus, a chamber in the central annulus, and ducts in said spokes connecting said annular passages with each other and the annular passage in the intermediate annulus with the chamber.

45 8. In a tubing machine, a core bridge comprising, an outer annulus, an intermediate annulus and a central annulus, the outer annulus being connected to the intermediate annulus by a plurality of spokes, and the intermediate annulus being connected to the central annulus by a plurality of spokes, said spokes being arranged in staggered relationship, an annular air passage in the intermediate annulus, a chamber in the central annulus, and ducts in said spokes connecting said annular passages with each other and the annular passage in the intermediate annulus with the chamber.

55 9. In a tubing machine, a core bridge comprising, an outer annulus, an intermediate annulus and a central annulus, the outer annulus being connected to the intermediate annulus by a plurality of spokes, and the intermediate annulus being connected to the central annulus by a plurality of spokes, an

annular air passage in the intermediate annulus, a chamber in the central annulus, and a plurality of ducts in individual spokes connecting said annular passages with each other and the annular passage in the intermediate annulus with the chamber.

10. In a tubing machine, a core bridge comprising, a plurality of separate annular members concentrically arranged and secured together one within the other, said members being connected by a plurality of radial spokes and provided with annular air passages, and said spokes having radial ducts connecting said annular air passages.

11. In a tubing machine, a core bridge comprising, a plurality of separate annular members concentrically arranged and screw threaded together one within the other, said members being connected by a plurality of radial spokes and provided with annular air passages, and said spokes having radial ducts connecting said annular air passages.

12. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a tapered portion which restricts its diameter, a cylindrical portion which maintains its restricted diameter, and a curved flared portion which expands its diameter, when considered in a forward direction.

13. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a tapered portion which restricts its diameter, a cylindrical portion which maintains its restricted diameter, a curved flared portion which expands its diameter, and a tapered portion which again restricts its diameter, when considered in a forward direction.

14. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a tapered portion which restricts its diameter, a cylindrical portion which maintains its restricted diameter, and a curved flared portion which expands its diameter, when considered in a forward direction, in combination with a core located in said bore, which core is tapered in opposite directions toward its ends.

15. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a tapered portion which restricts its diameter, a cylindrical portion which maintains its restricted diameter, a curved flared portion which expands its diameter and a tapered portion which again restricts its diameter, when considered in a forward direction, in combination with a core located in said bore, which core is tapered in opposite directions toward its ends.

16. A tubing machine head having a bore through which the material to be extruded may be forced, said bore being restricted and

then expanded, when considered in a forward direction, in combination with a core located in said bore, which core is tapered in opposite directions toward its ends, and a die member mounted on said core, which die member is flared so as to increase its diameter in a forward direction.

17. A tubing machine head having a bore through which the material to be extruded may be forced, said bore being restricted, expanded and again restricted, when considered in a forward direction, in combination with a core located in said bore, which core is tapered in opposite directions toward its ends, and a die member mounted on said core, which die member is flared so as to increase its diameter in a forward direction.

18. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a tapered portion which restricts its diameter, a cylindrical portion which maintains its restricted diameter, a curved flared portion which expands its diameter, when considered in a forward direction, in combination with a core located in said bore, which core is tapered in opposite directions toward its ends, and a die member mounted on said core, which die member is flared so as to increase its diameter in a forward direction.

19. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a tapered portion which restricts its diameter, a cylindrical portion which maintains its restricted diameter, a curved flared portion which expands its diameter and a tapered portion which again restricts its diameter when considered in a forward direction, in combination with a core located in said bore, which core is tapered in opposite directions toward its ends, and a die member mounted on said core, which die member is flared so as to increase its diameter in a forward direction.

20. A tubing machine head having a bore through which the material to be extruded may be forced, said bore being restricted and then expanded, when considered in a forward direction, in combination with a core located in said bore, which core is tapered in opposite directions toward its ends, and a die member mounted on said core, which die member is tapered in opposite directions toward its ends.

21. A tubing machine head having a bore through which the material to be extruded may be forced, said bore being restricted, expanded and again restricted, when considered in a forward direction, in combination with a core located in said bore, which core is tapered in opposite directions toward its ends, and a die member mounted on said core, which die member is tapered in opposite directions toward its ends.

22. A tubing machine head having a bore

through which the material to be extruded may be forced, said bore having a tapered portion which restricts its diameter, a cylindrical portion which maintains its restricted diameter, a curved flared portion which expands its diameter, when considered in a forward direction, in combination with a core located in said bore, which core is tapered in opposite directions toward its ends, and a die member mounted on said core, which die member is tapered in opposite directions toward its ends.

23. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a tapered portion which restricts its diameter, a cylindrical portion which maintains its restricted diameter, a curved flared portion which expands its diameter and a tapered portion which again restricts its diameter, when considered in a forward direction, in combination with a core located in said bore, which core is tapered in opposite directions toward its ends, and a die member mounted on said core, which die member is tapered in opposite directions toward its ends.

24. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a portion adapted to house the screw, a chamber in front of said portion and in the rear of the bridge location, a tapered portion which restricts the bore diameter in front of the bridge location, and a curved flared portion which expands the bore diameter in front of the tapered portion.

25. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a portion adapted to house the screw, a chamber in front of said portion and in the rear of the bridge location, a tapered portion which restricts the bore diameter in front of the bridge location, a curved flared portion which expands the bore diameter in front of the tapered portion, and a restricted portion of substantially constant diameter between the tapered portion and the flared portion.

26. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a portion adapted to house the screw, a chamber in front of said portion and in the rear of the bridge location, a tapered portion which restricts the bore diameter in front of the bridge location, and a curved flared portion which expands the bore diameter in front of the tapered portion, the portion of the head which includes said tapered and flared portions being removable.

27. A tubing machine head having a bore through which the material to be extruded may be forced, said bore having a portion adapted to house the screw, a chamber in

front of said portion and in the rear of the bridge location, a tapered portion which restricts the bore diameter in front of the bridge location, a curved flared portion which expands the bore diameter in front of the tapered portion, and a restricted portion of substantially constant diameter between the tapered portion and the flared portion, the portion of the head which includes said tapered, flared and restricted portions being removable.

28. In a tubing machine, a core, and a die member slidably and adjustably mounted on said core.

29. In a tubing machine, a core, a die

member mounted thereon, and means for slidably adjusting the die member longitudinally of the core.

30. In a tubing machine, a core having a plurality of diameters, a die member having a plurality of interior diameters, said die member being mounted on the core with its plurality of interior diameters engaging the plurality of diameters of the core, and means for adjusting the die member on the core.

In testimony, that I claim the foregoing as my invention, I have signed my name this 18th day of Nov., 1924.

VERNON ROYLE.