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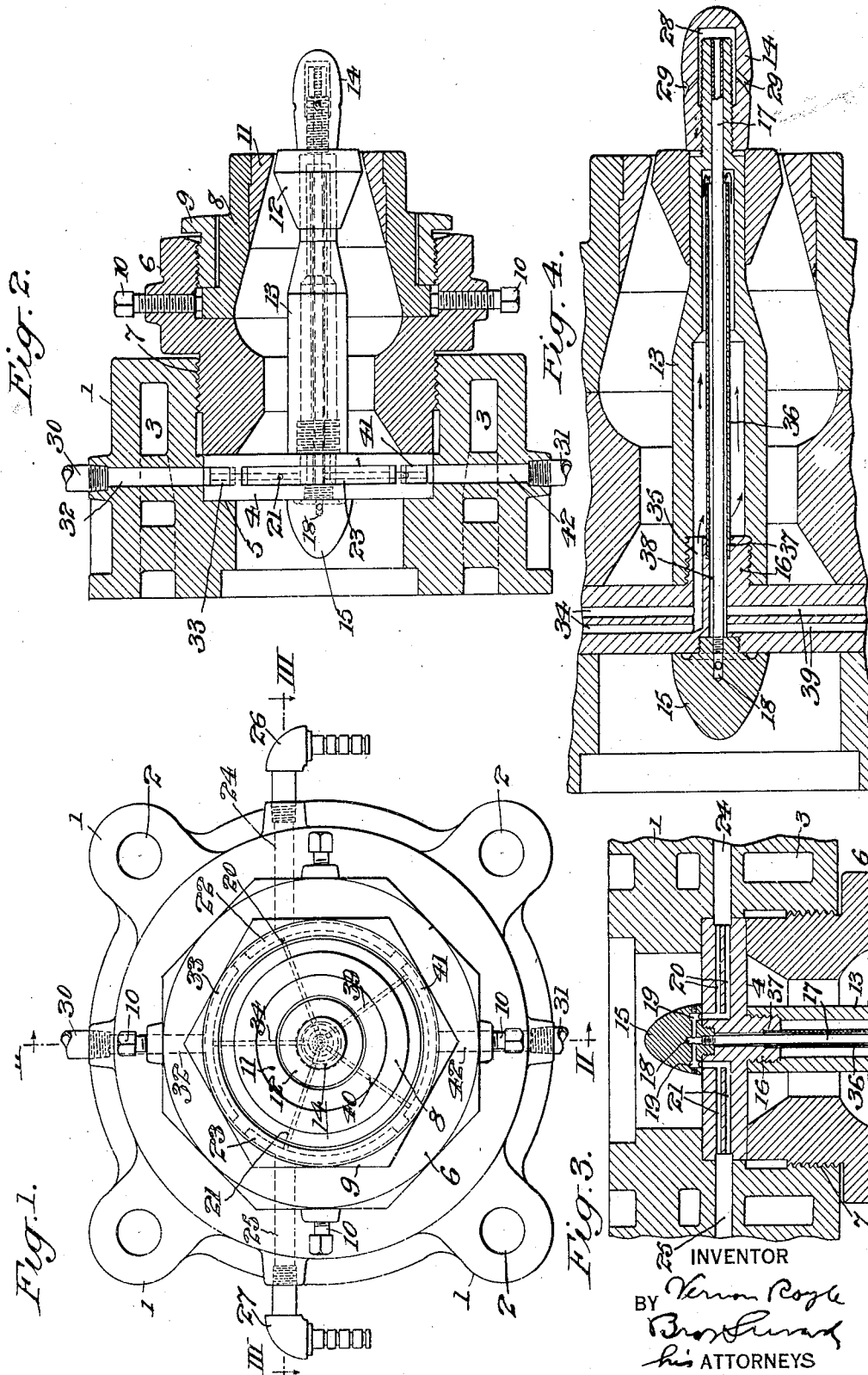
V. ROYLE

1,925,545

TUBING MACHINE

Filed May 10, 1928

2 Sheets-Sheet 1



Sept. 5, 1933.

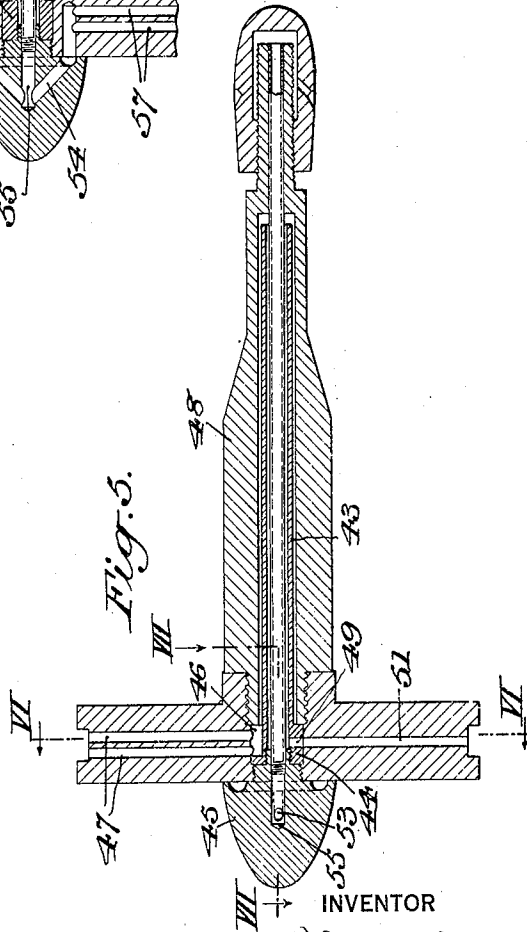
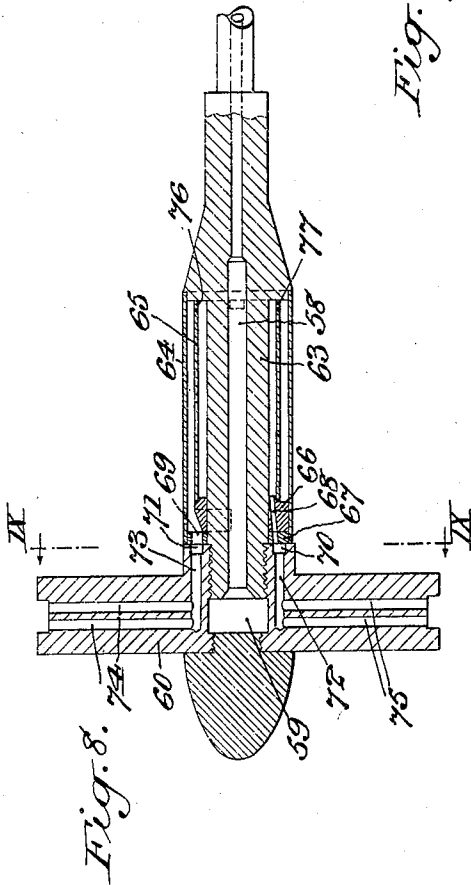
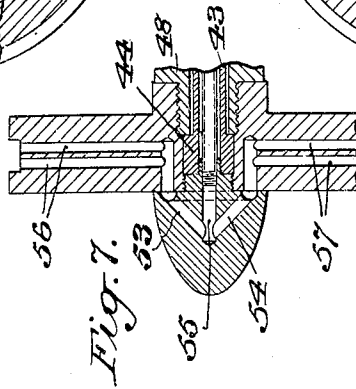
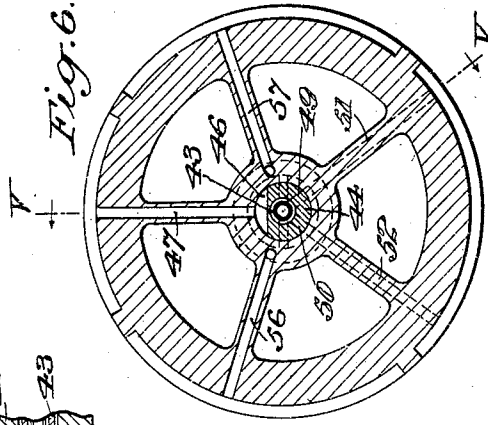
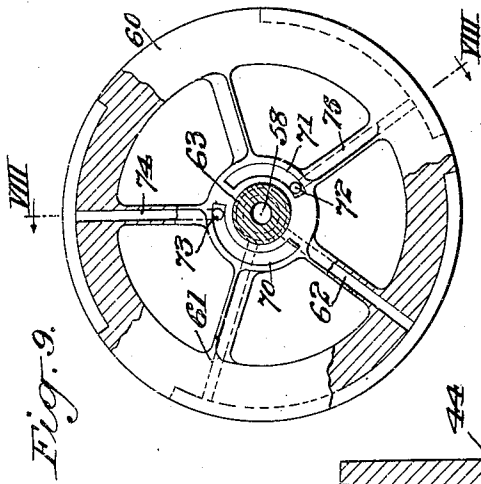
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,925,545

TUBING MACHINE

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Application May 10, 1928. Serial No. 276,599

6 Claims. (Cl. 18—14)

This invention relates to an improvement in tubing machines, and has for an object to provide an improved core structure whereby the latter is adapted for the circulation in its body portion or stem of a temperature controlling medium in order to facilitate the operation of the device.

Another object consists in providing such a structure which is so fashioned that both a temperature controlling medium and a non-adhesive medium, such as talc, may be passed through the core bridge and core, with the temperature controlling medium returning through the said parts and the non-adhesive medium passing into the interior of the tube being extruded by the machine.

A further object consists in providing such a structure which is so arranged that circulation of the mediums just named may be effected without hindering the passage of the material being extruded to any greater extent than would be the case if there were no provision for circulation.

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

Practical embodiments of the invention are represented in the accompanying drawings, in which

Fig. 1 represents an elevation of the preferred form;

Fig. 2 represents a central section, partly in elevation, taken in the plane of the line II—II of Fig. 1, looking in the direction of the arrows;

Fig. 3 represents a detail section taken in the plane of the line III—III of Fig. 1, looking in the direction of the arrows;

Fig. 4 represents an enlarged detail section at right angles to Fig. 3;

Fig. 5 represents a longitudinal section, showing a modified form, and taken in the plane of the line V—V of Fig. 6, looking in the direction of the arrows;

Fig. 6 represents a section taken in the plane of the line VI—VI of Fig. 5, looking in the direction of the arrows;

Fig. 7 represents a detail section, at right angles to Fig. 5, and taken in the plane of the line VII—VII of Fig. 5;

Fig. 8 represents a longitudinal section, partly in elevation, showing a second modified form, and taken in the plane of the line VIII—VIII of Fig. 9; and

Fig. 9 represents an elevation, partly in section, taken in the plane of the line IX—IX of Fig. 8.

Referring to the preferred form shown in Figs. 1 to 4 inclusive, the head, as a whole, is marked 1, and it is fitted to be secured to a tubing machine casing in any well known or approved form as, for instance, by stud bolts (not shown) passing through holes 2 and provided with nuts. Suitable passages, indicated by 3, may be formed in the head 1 for the circulation of a temperature controlling medium, according to the customary practice.

The head 1 is adapted to carry a set of tubing elements or parts for forming the material, such as rubber compounds, into tubes and, as the shape and construction of the exterior or die elements constitute no part of this invention, being disclosed in my co-pending application Serial No. 226,156, filed October 14, 1927, they will merely be referred to without detailed description of their construction, arrangement, or function.

The core bridge is marked 4, and it is held seated in a shoulder 5 formed in the head 1 by a member 6 that is threaded into the head, as indicated at 7. The said member 6 is formed so as to have a part restricting the opening through which the material being extruded passes, as clearly shown in Figs. 2, 3 and 4. A part 8 is seated in the member 6 and locked therein by a ring nut 9. The said part 8 is centered by set screws 10, threaded in the member 6 in radial disposition, and it carries a die ring 11 that is intended to cooperate with an inner die member 12 fitted on the core, to form the opening through which the tube is extruded.

The core proper is denoted by 13 and it has a forward extension 14 threaded thereon, and a rear extension 15 threaded into the core bridge 4. The said core 13 is supported in position by being screwed onto a projection 16 of the core bridge 4.

It will be observed that the core 13 is hollow and it is provided with a centrally disposed tube 17, which may be composed of brass or other suitable material. The rear end of the said tube is threaded into the extension 15 and the front end is secured to the front end of the core 13 as, for instance, by brazing.

The tube 17 communicates by a port 18 with passage 19 in the extension 15 that, in turn, is in communication with radially disposed ducts 20, 21 formed in two arms of the core bridge, which ducts open into arc shaped chambers 22, 23 in the core bridge 4 that are connected with inlets 24, 25 in the head 1 that communicate with inlet pipes 26, 27 for the non-adhesive material such as talc or soapstone.

During the operation of the apparatus, the non-adhesive material is fed inwardly through the said pipes, and, by traversing the various passages, enters and proceeds through the tube 17. It is ejected from the forward end of the said tube into a chamber 28 in the extension 14, and thence passes outwardly through ports 29 formed in the said extension, so as to impinge upon the interior of the tube being formed and prevent its inner walls from adhering when the tube collapses after extrusion.

The temperature controlling medium for the core, which may be water, is fed in through pipe 30 that is tapped in the head 1 and is returned through pipe 31 that is also tapped into the head 1 in a position diametrically opposite the pipe 30.

On flowing in through the pipe 30, the medium traverses a channel 32 in the head 1, which channel opens into an arc shaped chamber 33 formed in the circumference of the core bridge 4. The said chamber 33 is in communication with ducts 34 formed in an arm of the core bridge, which ducts extend into a passage 35 in the hub 16 of the core bridge. The said passage 35 debouches into the hollow interior of the core 13, as clearly shown in Fig. 4.

A tube 36, which may be composed of brass or other suitable material has one end set into the core bridge hub 16, as indicated at 37, so as to support it within the core 13 and in such position as to surround, with clearance, the tube 17 for the talc or the like, and be spaced from the inner walls of the core. The opening in the hub 16 which is traversed by the tube 17 is larger than the said tube and is of substantially the same diameter as the tube 36 so as to form a circular passage 38 leading from the tube 36 to two sets of ducts 39, 40 formed in two radial arms of the core bridge.

The said ducts 39, 40 are in communication with an arc shaped chamber 41 fashioned in the periphery of the core bridge, which chamber, in turn, communicates with a passage 42 in the head 1 that leads to return pipe 31.

As a result of the foregoing construction it will be seen that the temperature controlling medium, such as water, that is fed in through pipe 30 will enter the hollow within the core 13 surrounding pipe 36, will then enter the said pipe at its free forward end, will then pass rearwardly through the said pipe 36 and passage 38, and will thence move outwardly through ducts 39, 40, chamber 41, passage 42 and return pipe 31. The course of the said medium is indicated, in part, by arrows on Fig. 4. In this way, it will be seen that the temperature controlling medium circulates throughout substantially the whole of the interior of the core 13 so as effectively to maintain the latter at the desired temperature for extruding the particular compound of material that is in hand; and that the circulation of the said medium does not in any way affect or obstruct the injection of the non-adhesive medium.

Referring to the modified form shown in Figs. 5, 6 and 7, it may be said that the method of operation is the same and the general construction similar. There is, however, a certain difference at the bridge core, which will now be described.

The tube corresponding to tube 36 in the preferred form is here marked 43 and it is formed with an enlarged inner end 44 that is threaded directly onto the rear extension of the core which is, in this form, marked 45. The said enlarged inner end 44 is cut away, as indicated at 46, to

form a means of communication between the inlet ducts for the temperature controlling medium, which are here marked 47, and the interior of the core 48. The said enlarged end 44 also has two ports 49, 50 communicating with ducts 51, 52 in the radial arms of the core bridge that lead to the outlet for the temperature controlling medium. It will also be observed that, in this form, the hollow interior of the core 48 is of the same diameter throughout.

The construction of the rear extension 45 in this modified form also differs somewhat from the preferred form with respect to the passages for the non-adhesive material, in that the modified form has a pair of slanting passages 53, 54 that connect the central passage 55 with the leads for the ducts 56, 57 in the radial arms of the core bridge through which the non-adhesive material enters.

Referring to the second modified form shown in Figs. 8 and 9, it will be noted that the passage in the core for the travel of the non-adhesive material consists of a simple bore 58 instead of a separate tube. This bore is restricted towards the forward end, and it will be understood that the core is provided with a forward extension of the same construction as that represented by 14 in the preferred form.

This bore 58 is fed from a chamber 59 formed in the hub of the core bridge 60, which chamber is in communication with ducts 61, 62 in two of the radial arms of the core bridge, said ducts being in communication with a source of non-adhesive material supply as in the other forms of the invention.

In this second modified form the core is marked 63 and it is reduced centrally and surrounded by a pair of tubes 64, 65, which may be composed of brass or the like. The forward ends of the said tubes are secured, as by brazing, to the core, and the rear ends are similarly fixed to blocks 66, 67 that are fastened to the reduced portion of the core. The said blocks are provided with openings 68, 69 that communicate with arc shaped channels 70, 71 which open into passages 72, 73 in the hub that are in communication with the water inlet and return ducts 74, 75 formed in two radial arms of the core bridge. These ducts have suitable connection with the temperature controlling medium, as in the other forms.

The tube 65 is perforate at its forward end as indicated at 76, 77 to provide communication between the two circular chambers formed by the tubes 64, 65 surrounding the core 63.

As a result of this construction, the water or, other temperature controlling medium, can enter through the ducts 74 to the space or chamber between the tubes 64 and 65, then pass through the perforations 76, 77 into the space or chamber between the tube 65 and core 63, and then egress through the opening 68 and ducts 75.

It is a characteristic of this second modified form shown in Figs. 8 and 9 that the temperature controlling medium will be adjacent to the exterior of the core because the thin tube 64 constitutes the outer wall of the core at the portion of circulation. Hence the medium will be strongly effective in controlling the temperature of the core surface in contact with which the material being extruded is passed. In this respect the preferred form is next effective, and the modified form shown in Figs. 5, 6 and 7, least effective. Varying conditions of operation may lead to the selection of any one of these forms for this reason and also for constructional reasons.

The operation of the device has been explained in connection with the mechanical description so that the same need not be repeated, but it may be said that the mode of operation is substantially the same in connection with all the forms, and that the apparatus provides means for accurately controlling the temperature of the core body or stem with which the material being extruded passes in close contact. This is a matter of substantial importance because proper temperature control greatly facilitates the operation and increases the output as well as improving the product. Such control is not sufficiently acquired by acting upon the exterior members only, and my invention lends itself to a more perfect result in this respect than has heretofore been attainable, particularly by reason of the fact that the core proper or stem which supports the core die member has its temperature regulated to the desired point.

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:

1. In a tubing machine, a longitudinally disposed cylindrical core body, and means for injecting and ejecting a non-adhesive medium therethrough and for circulating a temperature controlling medium therein.

2. In a tubing machine, a core bridge, a longitudinally disposed cylindrical core body supported thereby and extending forwardly therefrom, and passages in the bridge and body for the injection and ejection of a non-adhesive medium and the circulation of a temperature controlling medium.

3. In a tubing machine, a core bridge, a rear-

ward extension therefrom, a core body supported by and extending forwardly from the bridge, passages in the bridge and extension for leading a non-adhesive medium to the tube being extruded, and passages in the bridge and body for circulating a temperature controlling medium through said parts.

4. In a tubing machine, a hollow core body, a plurality of tubes within said body, one tube being within the other, the outer tube being spaced from the walls of the body and the inner tube being spaced from the outer tube, means for circulating a temperature controlling medium through said body exterior to said outer tube and also between the two tubes, and means for injecting a non-adhesive medium through the inner tube.

5. In a tubing machine, a core bridge, a hub projecting forwardly therefrom, a hollow core body threaded to said hub, a tube fitted to said hub and located within the body, said tube being spaced from the side and forward end walls of the core body, and means for circulating a temperature controlling medium through said body both without and within said tube.

6. A tubing machine head having a bore through which the material to be extruded may be forced, a die supporting spider mounted inwardly of said head, a mandrel attached to said spider for carrying a plug die at the extrusion orifice of said head, a plug die mounted on the end of said mandrel, and a cap nut for holding and adjusting said die on said mandrel, said spider, mandrel, and cap nut having ducts there-through for the passage of dusting powder and compressed air to be forced within the interior of the tubing, the ducts through said cap nut being outwardly directed for spraying the powder against the inner walls of the tubing.

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