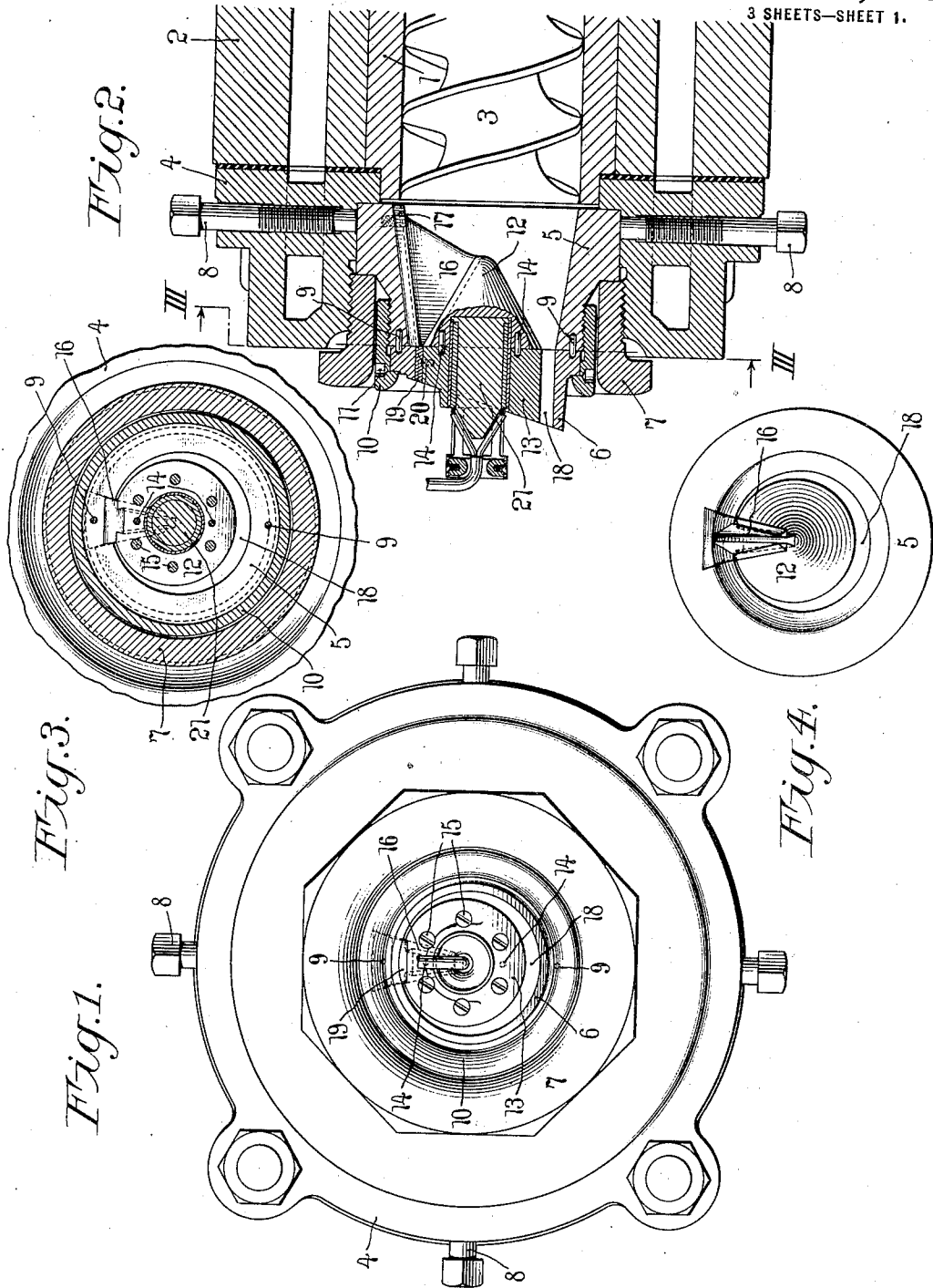


1,368,658.

Patented Feb. 15, 1921.

3 SHEETS—SHEET 1.



Witness:
Harry G. Fleischer

Inventor:
Vernon Royle
by his attorney
Rex Seward

1,368,658.

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3 SHEETS—SHEET 2.

Fig. 6.

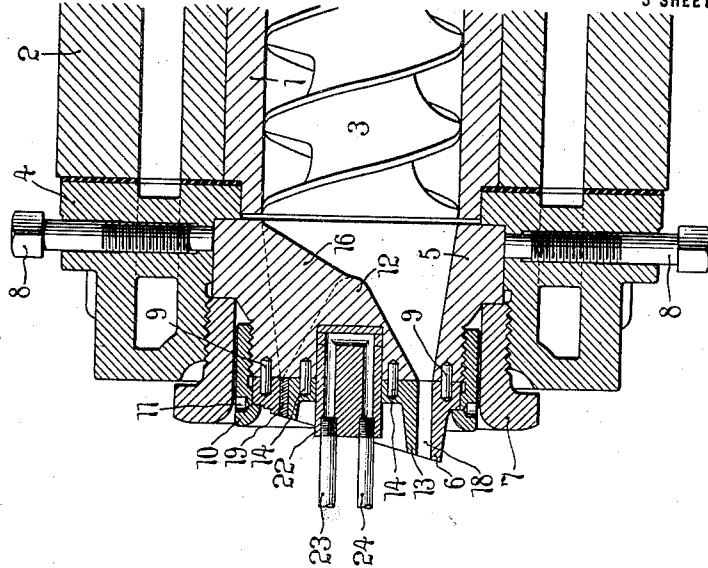
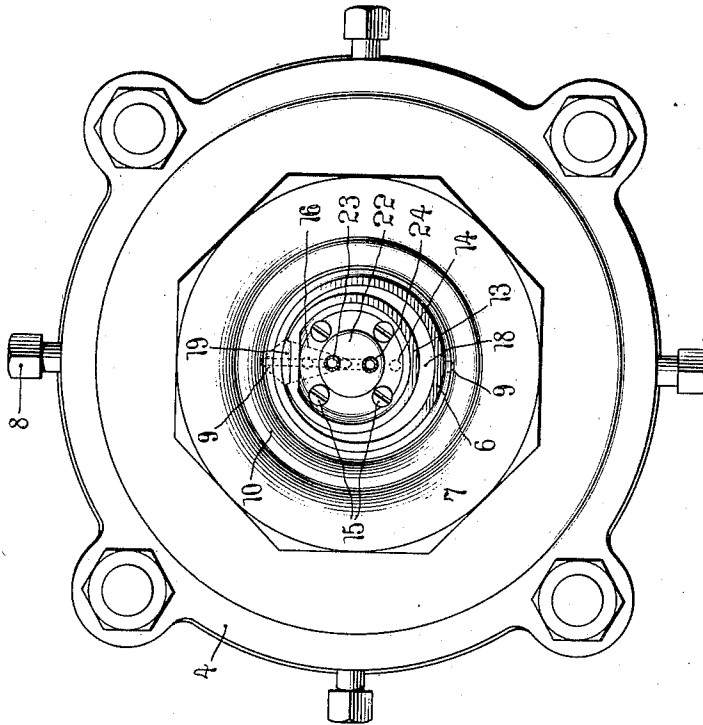


Fig. 5.



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1,368,658.

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3 SHEETS—SHEET 3.

Fig. 8.

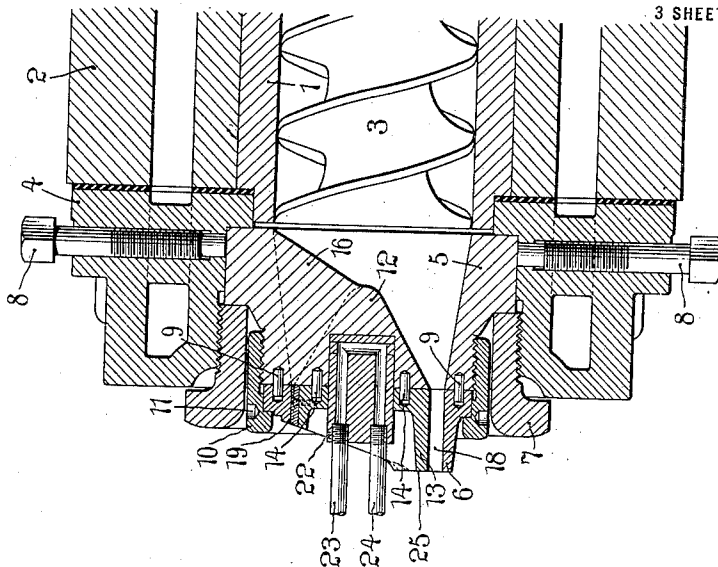
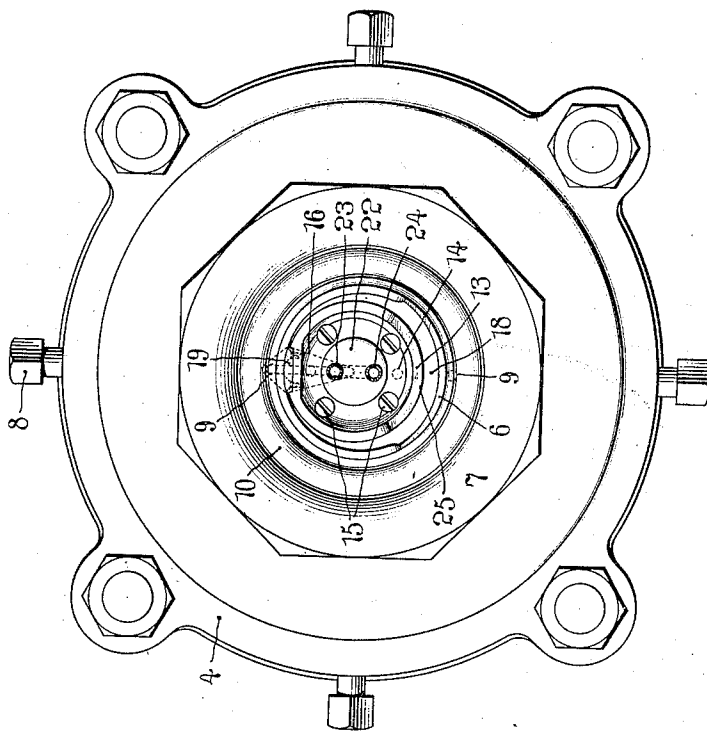


Fig. 7.



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UNITED STATES PATENT OFFICE.

VERNON ROYLE, OF PATERSON, NEW JERSEY.

TUBING-MACHINE.

1,368,658.

Specification of Letters Patent.

Patented Feb. 15, 1921.

Application filed October 11, 1916. Serial No. 125,049.

To all whom it may concern:

Be it known that I, VERNON ROYLE, a citizen of the United States and resident of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Tubing-Machines, of which the following is a specification.

This invention relates to improvements in tubing machines and more particularly to that class of such machines which are designed for the production of the so called treads of pneumatic vehicle tires. These treads, as is well understood, are commonly composed of rubber compound and vary in thickness when viewed in cross section.

One object is to provide means for regulating the distribution and movement of material at the time of ejection, so that the various portions of the product will be of substantially uniform density and ejected at a substantially uniform rate of speed.

Another object of the invention is to provide a machine of the said character in which the die and core are segmental and removable.

A further object consists in having the core and die connected by means of a web, which latter serves as a dividing and guiding means for the material which forms the product.

A still further object consists in providing means for heating the core, and in providing certain improvements in the form, construction and arrangement of the several parts whereby the above mentioned and still other results may be effectively attained.

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

Figure 1 represents a front elevation of that portion of the tubing machine which includes my invention,

Fig. 2 represents a vertical section there-through,

Fig. 3 represents a detail section taken in the plane of the line III—III of Fig. 2,

Fig. 4 represents a rear view of the die and core,

Fig. 5 represents a view similar to Fig. 1, showing a modified form.

Fig. 6 represents a vertical section of the form shown in Fig. 5,

Fig. 7 represents a view similar to Fig. 1, showing a second modified form, and

Fig. 8 represents a vertical section of the form shown in Fig. 7.

Before proceeding to the description of the forms of the invention shown herein, it may be pointed out that I believe the feature of having the front faces of the core and die, which constitute the ejecting or delivery part of the machine, so arranged that part or parts of the said faces projects or project in advance of other parts thereof, is broadly new. This arrangement compensates for the varying width of the aperture between the core and die so as to feed the various portions of the product at an equal rate of speed and cause them to be of the same density.

Referring to the form shown in Figs. 1 to 4 inclusive, the feed cylinder is denoted by 1, its jacket or casing by 2, the feed screw by 3, and the die holder by 4. As all of these elements are of well known and approved form and constitute no part of my invention, they will not be specifically described herein.

Within the die holder 4 there is mounted the die, which consists of two parts 5 and 6. The part 5, which lies to the rear, adjacent the feed cylinder 1, is clamped in place in the die holder 4 by means of a nut 7, and is centered and locked against rotary movement by four set screws 8, located in the die holder 4, and spaced a quadrant's distance apart. The part 6 of the die is centered with respect to the part 5, by means of dowels 9, and the two parts 5 and 6 are held firmly together by means of a locking ring 10, which has its outer surface provided with suitable recesses 11 designed to be engaged by the teeth of a spanner for actuating the locking ring in a well understood manner.

The inner walls of the part 5 of the die are uniformly flared toward the rear, as is clearly shown in Fig. 2; while the walls of the forward part 6 are cylindrical. The latter part has its outer face lying in a plane at an angle to the axis of the die, the arrangement being such that the lower portion of the part 6 projects in advance of the upper portion.

Within the die 5, 6, is mounted the core, and it likewise consists of a rear portion 12 and a front portion 13, which are centered with respect to each other by means of dowels 14 and firmly secured together by a plurality, six in the present instance, of screws 15.

The rear portion 12 is in the form of a cone tapered toward the rear, and it is supported within the part 5 of the die by means

of a web 16, which is dove-tailed into the parts 12 and 5, as clearly shown in the drawings.

A set screw 17 serves as a means for locking the web 16, when it is forced home into full engagement with the part 5. This web 16 is wedge-shaped, (see Fig. 4) the taper lying in the same direction as the taper of the conical part 12 of the core.

The front portion 13 of the core is cylindrical, but its front face, like that of the part 6 of the die, is slanted so as to lie in a plane at an angle to the axis of the core, and the arrangement and adjustment is such that the front face of the said part 13 lies in the same plane as the front face of the part 6.

As will be clearly seen from the drawings, a line of severance between the parts 12, 13, of the core, is coincident with the line of severance of the parts 5, 6, of the die; so that the tapered portion 12 of the core terminates in the same plane as the flared portion 5 of the die, while the cylindrical portion 13 of the core is coextensive with the corresponding portion 6 of the die.

Furthermore, the core is somewhat smaller than the interior of the die, and it is mounted so as to lie eccentrically therein, the adjustment being such that there is a greater distance between the said parts at their lower portion than at the upper portion. The space or passage thus formed is denoted by 18 and it is closed for a short distance, at its uppermost point, by a stop 19, which is fastened to the part 13 by means of a screw 20. Thus the passage 18, when viewed from the front or rear, has a crescent shaped appearance, as will be clearly perceived by reference to Figs. 1, 3 and 4.

The core 12, 13, is bored out to form a central chamber, which is calculated to receive an electrical heating unit 21, for the purpose of maintaining the core at a suitable elevated temperature. This electrical heating unit 21 may be of any well known or approved form, and, as its particular construction forms no part of this invention, it will not be detailed.

Referring to the form shown in Figs. 5 and 6, it may be stated that it is, as to all its parts, the same as the preferred form just described, except that the web 16 is integral with the die and core instead of being separable; while the heating mechanism for the core consists of a suitable plug 22, which is supplied with steam inlet and outlet pipes 23, 24.

The second modified form shown in Figs. 7 and 8, is the same in all respects as the form shown in Figs. 5 and 6, except that the aperture between the core and die is of such a shape as to be of the same width throughout a considerable portion of its lateral extent, as clearly shown in Fig. 7. Furthermore, those portions of the front faces of the core

and die which bound the said part of the aperture lying therebetween, are perpendicular to the axes of the said core and die, as clearly shown at 25, Fig. 8, while the remainder of the said front faces is inclined, as in the other forms. Thus, the varying projection of the core and die corresponds with the cross sectional shape of the aperture therebetween, so as to effectively attain the accurate feeding of the material hereinbefore mentioned. This modified form is adapted for the production of tire treads which are of that class commonly known as "raised" treads.

In operation, the plastic rubber compound is fed in the usual manner by the plodder or feed screw 3 and is thereby forced through the passage 18 and ejected in the form of a strip which is curled so as to be almost tubular. The fact that the front portions 6 and 13, respectively, of the die and core are slanted so as to increase the length of the passage 18 therebetween as the said passage increases in width, causes the material to be fed at an even rate of speed; while the flare of the inner wall of the die part 5 and the taper of the part 12 and the web 16 serve to insure the feeding of an appropriate amount of the material to all parts of the passage 18 so that the various portions of the product have substantially the same density. The wedge shaped character of the web 16 also gradually parts the material so that the action of the stop 19 is not so abrupt as to injuriously hinder the ejection of the material from the adjacent parts of the passage 18.

The heating of the core greatly facilitates the operation, as it tends to retain the material at the proper temperature so as to insure its uniform and desired plasticity.

In addition to the advantageous features just described, it will be noted that, by making the core and die of a plurality of parts, I am enabled to machine the said parts before assembly, thus insuring proper shaping and surfacing thereof, as well as promoting economy of manufacture and repair. These last mentioned advantages are accentuated by the removable mounting of the core within the die, employing the dove-tailed web 16, as embodied in the preferred form.

Again, the particular shape of the core 12, 13, and web 16, so controls the feed of the material that the part 5 may be simply and cheaply fashioned with a uniform flare, instead of a varying one, as has been necessary heretofore.

Without here developing further the meritorious features of this improvement, which are inherent in the structure herein shown and described, I will say that various changes may be made 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 specific details set forth

except as they may be included in the claims.

What I claim is:

1. In a tubing machine, a die holder, a die, and a core composed of a plurality of sections, one section having an interlocking engagement with another section of the core and with the die, whereby the core is removably supported by the die.
2. In a tubing machine, a core having its front end cylindrical and its rear end conical.
3. In a tubing machine, a die, a conical core, and a web removably connecting one side of said core with said die.
4. In a tubing machine, a die, a conical core, and a web removably connecting one side of said core with said die, the said web having a dove-tailed engagement with the die and core.
5. In a tubing machine, a die, a conical core having its apex disposed toward the rear, and a web connecting one side of said core with said die, the said web being also tapered toward the rear.
6. In a tubing machine, a conical core having its longitudinal axis arranged in a horizontal plane and its front face lying in a plane inclined to its longitudinal axis.
7. In a tubing machine, a die having its longitudinal axis arranged in a horizontal plane and its front face lying in a plane inclined to its longitudinal axis.
8. In a tubing machine, a die and a core mounted therein, the said die and core having their front faces coincident and lying in a plane inclined to their axes.
9. In a tubing machine, a die, a core mounted therein so as to leave an aperture of varying width between the two, the front face of the core lying in a plane inclined to its axis.
10. In a tubing machine, a die, a core eccentrically mounted therein so as to leave an aperture of varying width between the two, the front face of the core lying in a plane inclined to its axis.
11. In a tubing machine, a die, a core mounted therein so as to leave an aperture of varying width between the two, the front face of the die lying in a plane inclined to its axis.
12. In a tubing machine, a die, a core eccentrically mounted therein so as to leave an aperture of varying width between the two, the front face of the die lying in a plane inclined to its axis.
13. In a tubing machine, a die, a core mounted therein so as to leave an aperture of varying width between the two, the front faces of the core and die being coincident and lying in a plane inclined to their axes.
14. In a tubing machine, a die, a core eccentrically mounted therein so as to leave an aperture of varying width between the two, the front faces of the core and die being coincident and lying in a plane inclined to their axes.
15. In a tubing machine, a die, a core mounted therein so as to leave an aperture of varying width between the two, the front face of the core lying in a plane inclined to its axis, with that part of the said face which projects forwardly adjacent the widest part of the said aperture.
16. In a tubing machine, a die, a core eccentrically mounted therein so as to leave an aperture of varying width between the two, the front face of the core lying in a plane inclined to its axis, with that part of the said face which projects forwardly adjacent the widest part of the said aperture.
17. In a tubing machine, a die, a core mounted therein so as to leave an aperture of varying width between the two, the front face of the die lying in a plane inclined to its axis, with that part of the said face which projects forwardly adjacent the widest part of the said aperture.
18. In a tubing machine, a die, a core eccentrically mounted therein so as to leave an aperture of varying width between the two, the front face of the die lying in a plane inclined to its axis, with that part of the said face which projects forwardly adjacent the widest part of the said aperture.
19. In a tubing machine, a die, a core mounted therein so as to leave an aperture of varying width between the two, the front faces of the core and die being coincident and lying in a plane inclined to their common axis, with that part of the said faces which projects forwardly adjacent the widest part of the said apertures.
20. In a tubing machine, a die, a core concentrically mounted therein so as to leave an aperture of varying width between the two, the front faces of the core and die being coincident and lying in a plane inclined to their common axis, with that part of the said faces which projects forwardly adjacent the widest part of the said apertures.
21. In a tubing machine, a die uniformly flared toward the rear and a core uniformly tapered toward the rear, the said core being mounted within and supported by the die so that the front termini of the flare and taper are in the same plane.
22. In a tubing machine, a die, a core mounted therein so as to leave an aperture between the two, the said core having a tapered rear end, a web connecting the tapered end of the core and the die, and a stop located adjacent the web, and serving to close part of the said aperture.
23. In a tubing machine, a die, a core mounted therein so as to leave an aperture between the two, the said core having a tapered rear end, a wedge-shaped web con-

necting the tapered end of the core and the die, and a stop located adjacent the web, and serving to close part of the said aperture.

5 24. In a tubing machine, a die, a core mounted therein so as to leave an aperture between the two, the die having a flared rear end, and the core having a tapered rear end, a web connecting the flared end of the die with the tapered end of the core, and a bridge located adjacent the front edge of the web, and serving to close part of the said aperture.

15 25. In a tubing machine, a die, a core mounted therein so as to leave an aperture between the two, the die having a flared rear end, and the core having a tapered rear end, a wedge-shaped web connecting the flared end of the die with the tapered end of the core, and a bridge located adjacent the front edge of the web, and serving to close part of the said aperture.

20 26. In a tubing machine, a die, a core mounted therein so as to leave an aperture between the two, the said die having a cylindrical front end and a flared rear end, and the core having a cylindrical front end and a tapered rear end, a web connecting the flared end of the die with the tapered end of the core, and a stop located between the cylindrical parts of the die and core and adjacent the web, the said stop serving to close part of the said aperture.

25 27. In a tubing machine, a die, a core mounted therein so as to leave an aperture between the two, the said die having a cylindrical front end and a flared rear end, and the core having a cylindrical front end and a tapered rear end, a wedge-shaped web connecting the flared end of the die with the tapered end of the core, and a stop located between the cylindrical parts of the

die and core and adjacent the web, the said stop serving to close part of the said aperture.

28. In a tubing machine, a die and a core mounted therein, the said die and core each having a portion of its front face projecting in advance of another portion thereof.

29. In a tubing machine, a die and a core mounted therein, the said die and core having adjacent portions of their front faces projecting in advance of other portions thereof.

30. In a tubing machine, a die, a core mounted therein so as to leave an aperture of varying width between the two, the said die having a portion of its front face projecting in advance of another portion thereof.

31. In a tubing machine, a die, a core mounted therein so as to leave an aperture of varying width between the two, the said core and die each having a portion of its front face projecting in advance of another portion thereof.

32. In a tubing machine, a die, a core mounted therein so as to leave an aperture of varying width between the two, the said core and die having adjacent portions of their front faces projecting in advance of other portions thereof.

33. In a tubing machine, a die, a core mounted therein so as to leave an aperture of varying width between the two, the said core and die each having a portion of its front face projecting in advance of another portion thereof, the said projecting portions being adjacent to the widest part of the said aperture.

In testimony that I claim the foregoing as my invention I have signed my name this ninth day of October, 1916.

VERNON ROYLE.