May 8, 1962 J. W. VAN RIPER 3,032,812

CONTINUOUS VULCANIZING APPARATUS

Filed June 10, 1960 2 Sheets-Sheet 1

Fig. 1

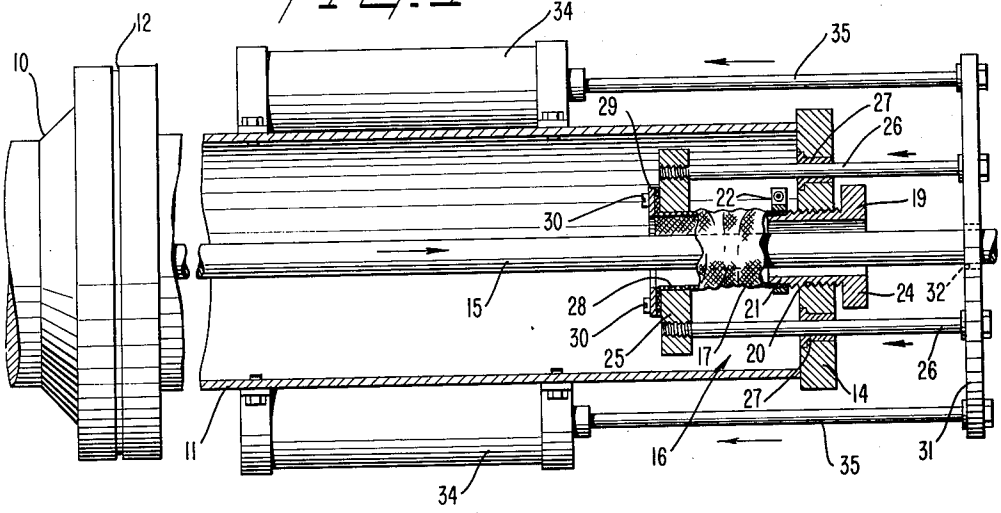


Fig. 2

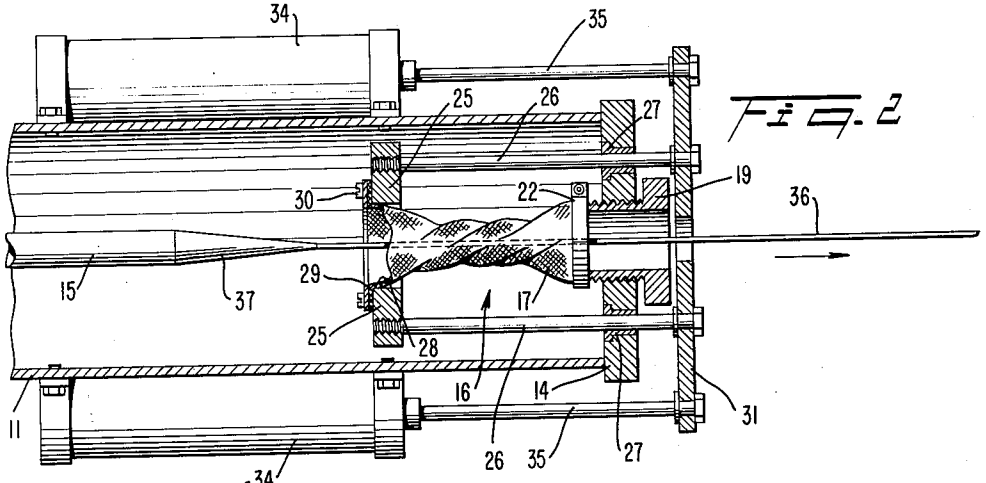
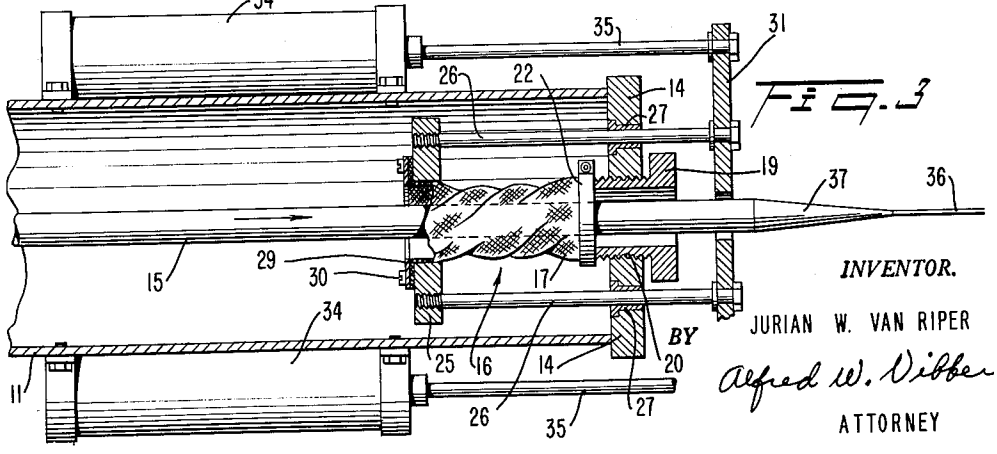


Fig. 3



INVENTOR.

JURIAN W. VAN RIPER

BY

Alfred W. Vibber

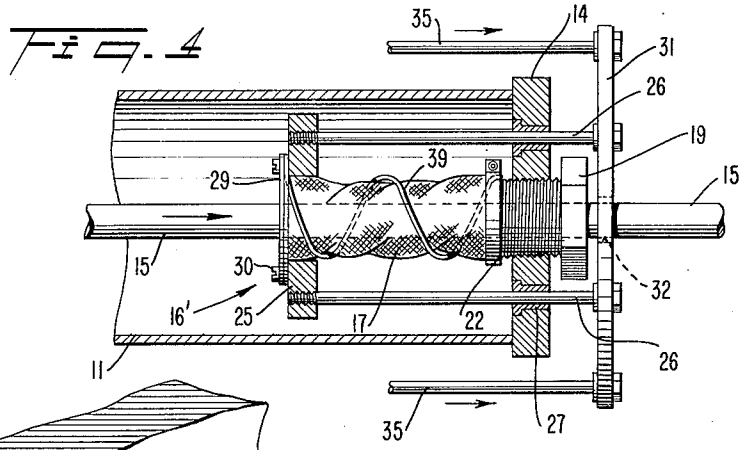
ATTORNEY

May 8, 1962 J. W. VAN RIPER 3,032,812

CONTINUOUS VULCANIZING APPARATUS

Filed June 10, 1960 2 Sheets-Sheet 2

Fig. 4



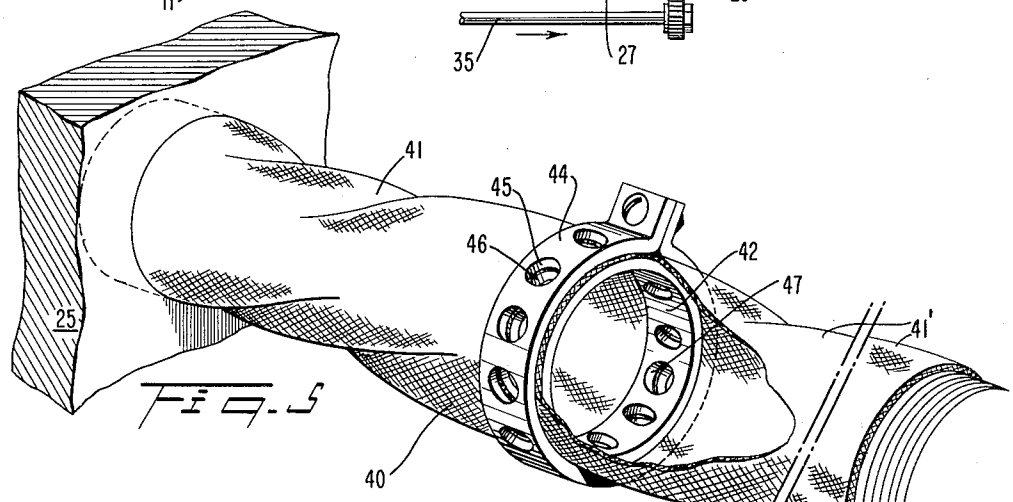


Fig. 5

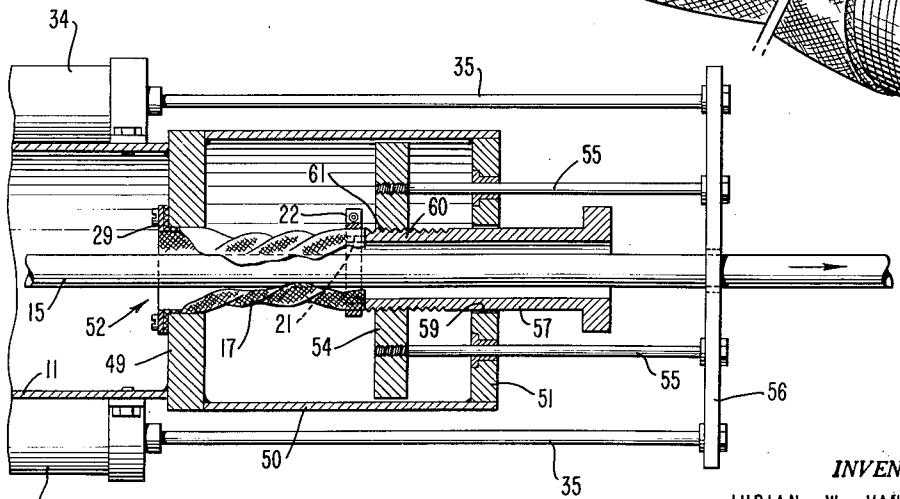


Fig. 6

INVENTOR.
JURIAN W. VAN RIPER
BY
Alfred W. Vibber
ATTORNEY

United States Patent Office 3,032,812 Patented May 8, 1962

3,032,812

CONTINUOUS VULCANIZING APPARATUS

Jurian W. Van Riper, 208 Beechwood Road, Ridgewood, N.J.

Filed June 10, 1960, Ser. No. 35,362
17 Claims. (Cl. 18—6)

This invention relates to a high pressure sealing device, and particularly relates to a sealing device adapted for use with continuous vulcanizing apparatus, although the device of the invention is not limited to such use.

Continuous vulcanizing apparatus is usually employed in the vulcanizing of elongated vulcanizable material such as extruded rubber-like sheaths upon cables and the like. In a typical such apparatus the unsheathed core of the cable is first passed through the head of a continuous extruding machine whereby the sheath is applied to the core. The sheathed cable passes out of the extrusion die directly into an elongated vulcanizing chamber wherein it is subjected to superheated steam under a pressure on the order of 225–250 pounds per square inch. After travel through the vulcanizing chamber, which may have a length, for example, of 150' or more, the cable passes into a cooling zone wherein it is subjected to cooling water whereby the sheath is cooled so that it may safely be brought out into the atmosphere without danger of damage to the sheath. A typical such continuous vulcanizing apparatus is shown, for example, in the patent to Ramsey et al., No. 2,561,820.

It is necessary to employ a sealing means at the exit end of the cooling zone of the chamber, to allow the elongated material to pass out of the chamber while maintaining the interior of the chamber under pressure. It is necessary that the sealing means used for this purpose be one which forms an effective seal with the material, preventing undue escape of fluid therepast, without injury to the material as it travels through the seal. It is desirable that the seal be adjustable as to the opening therethrough, whereby it can be opened wide, as during the initial presentation at the seal of the leading end of a large cable, so that the cable can readily be threaded through the seal. The seal of the invention meets all of the above requirements. It also possesses the advantage, particularly described in the preferred embodiments of the invention disclosed, of being capable of marked and rapid selective constriction and expansion, whereby it may selectively sealingly cooperate with a smaller diametered pull-through leader or the larger diametered material.

Because of the great length of the combined vulcanizing and cooling chambers, which makes it economically unfeasible initially to string or thread a sheathed cable entirely through the apparatus before the vulcanizing zone is subjected to steam, it is necessary to employ a pull-through leader of smaller diameter than the cable attached to the forward end of the latter for pulling the cable through the apparatus in the initial stages of the operation. The use of such pull-through leader, however, makes it necessary to employ two seals at the exit end of the cooling zone, one such seal being of larger diameter and adapted sealingly to cooperate with the cable when the cable reaches its location, and the other seal being an auxiliary, intermittently used, seal which cooperates with the pull-through leader. Van Riper Patent No. 2,883,702 shows a continuous vulcanizing apparatus employing such main and auxiliary seals.

Although the apparatus of the latter Van Riper patent is satisfactory and works well, the use of two seals not only complicates the apparatus but adds to its initial cost and the cost of its maintenance. Prior to the present invention, however, so far as I am aware, no single seal has been devised which could effectively selectively cooperate both with the pull-through leader and with the cable itself.

It is among the objects of the present invention to provide a novel fluid seal adapted for high pressure use with travelling elongated material.

A further object of the invention lies in the provision of a fluid seal of the character described which is capable selectively of forming an effective seal with elongated materials of markedly different diameters.

A still further object of the invention lies in the provision of a high pressure fluid seal which yields when an enlarged zone of elongated material passes therethrough while still maintaining a substantial seal with the material, the seal returning to its contracted sealing position when the enlargement has passed through it.

Yet another object of the invention resides in the provision of a high pressure fluid seal which is simple in construction, is compact and rugged, and is reasonable in overall cost, as well as the cost of the sealing element per se.

The above and further objects and novel features of the invention will more fully appear from the following description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only, and are not intended as a definition of the limits of the invention.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

FIG. 1 is a fragmentary view, partially in side elevation and partially in vertical axial section, through the exit seal of a first illustrative embodiment of continuous vulcanizing apparatus, the seal being shown in open position;

FIG. 2 is a view of the exit end of the apparatus shown in FIG. 1, the seal being shown closed to cooperate with a pull-through leader during the initial portion of a run of the apparatus;

FIG. 3 is a view similar to FIG. 2 but with the seal opened somewhat in order sealingly to cooperate with the cable being vulcanized;

FIG. 4 is a fragmentary view, partially in side elevation and partially in vertical axial section through a second embodiment of seal in accordance with the invention, the seal being shown in open position;

FIG. 5 is a fragmentary view in perspective of the central, sealing element of a third embodiment of seal made in accordance with the invention; and

FIG. 6 is a fragmentary view, partially in side elevation and partially in vertical axial section, of a fourth embodiment of high pressure fluid seal made in accordance with the invention.

As is apparent from the above, four embodiments of a sealing device made in accordance with the invention are shown herein:

(1) FIGS. 1, 2, and 3;
(2) FIG. 4;
(3) FIG. 5; and
(4) FIG. 6.

Embodiments 1, 2, and 3 differ from each other as to the character and construction of the flexible tubular element which forms the sealing element per se of the device. Embodiment 4 differs from those of embodiments 1 and 2 as to the location of the sealing element relative to the wall of the chamber to which it is affixed, and also as to the mechanism by which the sealing element is selectively contracted and expanded.

Turning now to the first embodiment, there is shown in FIG. 1 the rear or exit end **10** of the cooling chamber proper of a continuous vulcanizing apparatus such as that above described. An extension **11** to the cooling chamber, which functions as a part of the cooling chamber itself, is attached thereto by a flanged joint **12**. The rear or exit

end of chamber portion 11 has an end wall 14 secured thereto as by welding. A sheathed cable 15 is shown travelling to the right in FIG. 1 through cooling chamber portions 10 and 11, the cable being pulled by capstan means, not shown.

Chamber portion 11 contains an exit seal, generally designated 16, which incorporates as the main sealing element thereof a flexible collapsible sleeve member 17. The rear end of sleeve member 17 is secured to a threaded bushing or sleeve 19 which has threaded engagement with a central threaded opening in wall member 14. The forward end portion 21 of bushing 19 is unthreated and is of reduced diameter. The rear end of sleeve 17 is telescoped over end 21 of the bushing, and is secured thereto by a clamp in the form of a split band, as shown at 22.

Disposed inwardly of wall member 14 is a member 25 in the form of a cross-head guided for reciprocation along the axis of chamber portion 11. Member 25 is secured to the inner ends of spaced rods 26 which lie parallel to the axis of part 11 and which are substantially sealingly guided within bushings 27 in wall member 14, as shown. The forward end of sleeve 17 extends through a central opening 28 in member 25. Sleeve 17 is secured and sealed to member 25 by being flanged outwardly to overlie the forward face of such member around opening 28 therein, and by being clamped between said face and an annular retainer 29 which is secured to member 25 by a plurality of screws 30.

The rods 26 are reciprocated longitudinally of chamber part 11 by mechanism including an outer cross head 32 secured to the outer ends of rods 26, and by fluid actuated motors 34 which may be secured, for example, to chamber portion 11. Motors 34 have piston rods 35, the outer ends of which are secured to cross head 31. Cross head 31 has an opening 32 therethrough so as to allow the passage of cable 15 out of the apparatus.

The flexible sleeve 17 may be made in a number of ways and a number of different materials. The material used should be flexible, should be substantially impervious to liquid, should possess substantial strength, and should have appreciable abrasion resistance at elevated temperatures on the order of 200° F. A multilayer circularly woven hose made of cotton has proved to be satisfactory for use as such sealing sleeve. Another material which may be successfully employed is a high temperature resistant rubber-like material such as "neoprene" in which strengthening strands made of cotton, nylon, glass fiber, and the like are imbedded. In some instances, it may be desired to make sleeve 17 of such construction that the friction between it and the cable is reduced to some extent. For this purpose the material making up the body of sleeve 17 such as cotton or glass fiber and/or a rubber-like impregnating material, if such as used, may be impregnated with a resin such as tetrafluoroethylene. Such last, non-sticking resin may, for example, be applied to the sleeve in finely divided form such as a suspensoid. If the body of sleeve 17 is to be formed of high temperature resistant material such as fiber glass, it may be coated or impregnated with a tetrafluoroethylene suspensoid, and then heated to a temperature on the order of 650° F. to cause such resin to coalesce. It is to be understood that the above examples of the construction of sleeve 17 and the materials from which it is made are illustrative only.

In the first embodiment of the apparatus, the sleeve 17 is of such construction that the passage therethrough may be selectively increased and decreased in diameter by causing the member 25 relatively to approach and be retracted from the wall member 14. This function of the sleeve 17 is made possible by the fact that it is initially twisted somewhat by initially turning bushing 19, as shown most clearly in FIGS. 2 and 3, and that it is relatively inextensible longitudinally, since it is made up of a plurality of strong strands which in this case form the body of the sleeve itself. Thus when member 25 lies

nearest wall member 14, the wall of sleeve 17 tends to form spiral outwardly extending accordian pleats, whereby the diameter of the passage therethrough substantially exceeds the diameter of cable 15. When, however, member 25 is thrust to the left (FIGS. 2 and 3) the sleeve 17 tends to collapse and to pull inwardly toward the axis, because the various fibers extending helically thereabout tend to dispose themselves in the shortest path between the points of attachment of their ends. Such action of sleeve 17, when it has been initially twisted to a desired degree by turning bushing 19 in wall member 14, makes it possible to attain a substantial seal between the pull-through leader 36 (FIG. 2) during the initial portion of the vulcanizing operation, as well as forming an effective seal with cable 15 after the joint 37 between the pull-through leader and the cable has passed through the seal, as shown in FIG. 3. Considered geometrically, the sleeve 17 in its initial relaxed state is generally circular cylindrical. The (geometrical) surface elements of the circular cylinder defined by the relaxed sleeve lie parallel. After the sleeve has been twisted as described, the points which formerly lay in the respective parallel surface elements of the relaxed sleeve now lie in parallel helical lines extending about the twisted sleeve.

If desired, the bushing 19 may be selectively turned in reverse directions by a suitable reversible motor drivingly connected to the bushing. In such manner the degree of twist in sleeve 17 may quickly and easily be changed as desired. Thus in some instances, for example, the pull-through leader 36 will be provided with a tell-tale or distinctively appearing zone sufficiently in advance of joint 37 to warn the operator to increase the size of the passage through the seal. He will then turn bushing 19 to remove some of the initial twist therefrom, so that the tapered joint 37 may readily expand the sleeve as it enters thereinto. Following the emergence of the leading end of cable 15 from the chamber, the operator may then cause bushing 19 to rotate in the reverse direction, thereto further to tighten sleeve 17 upon the cable, if such is required to maintain an effective seal.

It is to be understood that the twisted sleeve 17 may not, nor is it expected to, completely seal the exit end of the chamber from the leakage of fluid. As is conventional in the art, a sump will be disposed beneath the exit end of the chamber to receive cooling liquid which escapes past the seal and outwardly, for example, between the pull-through leader (FIG. 2) or the cable 15 (FIG. 3) and the sealing sleeve and thus out through the central passage in bushing or sleeve member 19. The liquid thus caught in the sump may either be directed to the sewer or, if desired, may be returned to the cooling zone of the apparatus by a high pressure pump, not shown.

The twisted sleeve when forcibly engaging either the pull-through leader or the cable forms a long sealing zone in which portions of the sleeve engage either of such elongated members at random locations. The sleeve thus functions as a labyrinth seal in which numerous eddy-currents are developed whereby progressively to decrease the pressure within the seal from its entering to its exit end.

In FIG. 4 there is shown a second embodiment of the seal of the invention which may be preferred for some applications. Such seal, designated 16', has a sleeve 17 of the character above indicated, such sleeve, however, during operation preferably being in untwisted condition. About the sleeve 17 is an elongated helically disposed strand 39 which may be, for example, in the form of a wire having its opposite ends disposed close to the ends of the sleeve and fastened, respectively, to members 25 and 19. Strand 39 has one or more turns, so that when the members 25 and 19 are moved away from each other, as shown in FIG. 4, the wire 39 is drawn tightly about the sleeve and carries the sleeve inwardly into right, substantially sealing engagement with the elongated member passing therethrough. Although wire 39 is described

as lying outside the body of sleeve 17, it is to be understood that, if desired, the wire may be woven with the body of the sleeve or may pass repeatedly inwardly and outwardly through the wall of the sleeve whereby the described interaction of the wire and sleeve is obtained when the ends of the wire are pulled axially apart. It will be seen that the action of wire 17 is substantially the same as that of strengthening fibers running generally longitudinally of the sleeve in those embodiments of the invention wherein the sleeve is initially twisted.

In FIG. 5 there is shown somewhat schematically a third embodiment of the invention. In such embodiment the sealing sleeve, generally designated 40, may be of the character described above in connection with either the first or second embodiments of the invention. Such sleeve has its opposite ends attached to members 19 and 25, and is given an initial twist about its axis before the apparatus is placed in operation. Intermediate the length of sleeve 40 and inwardly thereof there is disposed a rigid ring 42 made, for example, of metal which keeps the sleeve in distended open condition at all times. Outwardly of the sleeve, and confronting member 42, there is a split clamp 44 which forcibly retains the portion of sleeve 40 at such location in engagement with member 42.

Members 44, sleeve 40, and member 42 are provided with a plurality of aligned holes 45, 46, and 47, whereby the cooling liquid under pressure in the cooling chamber has ready access to the interior of sleeve 40 at the rear end of a first twisted zone 41 thereof and at the forward end of a second twisted zone 41' thereof. The described construction thus provides for the penetration of liquid under pressure into one zone intermediate the length of the sealing sleeve. There is thus provided a construction which not only provides two sealing zones in tandem but eliminates water hammer which might be caused by stratification of fluids within the chamber.

In FIG. 6 there is shown a fourth embodiment of the sealing means of the invention. The main difference between the construction of FIG. 6 and that of the embodiments previously described is that whereas in the previous embodiments the seal in effect is disposed inwardly of the cooling chamber and the embodiment of FIG. 6 the seal is disposed exteriorally of the cooling chamber. As a result, whereas in the first described embodiment the pressure within the cooling chamber is directed upon the outer surface of the sealing sleeve, in the embodiment of FIG. 6 the pressure within the cooling chamber is first directed to flow between the elongated material and the seal and thence outwardly through the sealing sleeve. Thus with the construction of FIG. 6 the pressure within the cooling chamber presses the sealing sleeve with decreased force against the elongated member and thus decreases the pressure of engagement of the sleeve upon the material. The seal provided by the construction of FIG. 6, however, is sufficient to yield only a controlled leakage of the fluid under pressure therepast, the leakage being such that it can readily be handled by the sump and pump system above described.

The parts of the apparatus in FIG. 6 which are similar to the parts of the first described embodiments are designated by the same reference characters. In FIG. 6 a cross member 49 welded to the exit end of housing 11 constitutes the end wall of the cooling chamber. A tubular extension 50 is secured to wall member 49, and houses the means for securing and adjusting the position of the outer end of a sealing sleeve 17. Housing extension 50 has an end closure member 51 attached thereto, member 51 serving to guide inwardly extending rods 55 to which a cross-head 54 reciprocable longitudinally of member 50 is attached. An elongated sleeve or bushing 57 has its unthreaded outer end portion loosely extending through a central passage 59 in member 51. The inner end of sleeve 57 is threaded at 60 and tightly fits within a threaded opening 61 in member 54, whereby turning of member 57 will impart a desired initial twist to sleeve 17.

The inner end of member 57, inwardly of member 54, is of reduced diameter and unthreaded, and has the rear exit end of sleeve 17 secured thereto by a split clamp 22. An outer cross-head member 56 has the outer ends of rods 55 secured thereto, member 56 being reciprocated longitudinally of the chamber piston rods 35 secured thereto and extending from reversible fluid actuated motors 34.

It will be seen that in the construction of FIG. 6 the cooling fluid under pressure within housing member 11 tends to penetrate between sleeve 17 and the elongated material passing therethrough. Some of such material will seep outwardly through the sleeve whereby substantially to fill housing 50 with liquid under reduced pressure. The combined effects of such two bodies of liquid under different pressure, taken with the sealing effect exerted by the extension of the twisted sleeve 17, will form an effective seal between the sleeve and the elongated material. Housing 50 may be substantially sealed, as shown, or it may be provided with an adjustable fluid bleeding valve (not shown) on its peripheral wall or its forward wall 51, whereby the pressure within housing 50 may be maintained at a desired valve below that in the cooling zone of chamber 11.

It will be seen that in all of the described embodiments the sealing sleeve is maintained in operative extended condition by the force exerted thereon by the fluid motors 34. It is preferred that such motors be supplied with fluid under such pressure that when a lump or enlargement on the pull-through leader and/or cable is presented to the seal, the additional force thus exerted on the sealing sleeve will momentarily cause the piston rods 35 to move sufficiently to permit enlargement of the sealing sleeve so that the lump may safely pass therethrough. During such action a substantial seal between the sleeve and the elongated material is preserved at one or more zones throughout the length of the sleeve. After the enlargement has passed the sleeve, the fluid motors 34 again return the sleeve to its then fully extended operative sealing condition.

Although only a limited number of embodiments of the invention have been illustrated in the accompanying drawings and described in the foregoing specification, it is to be especially understood that various changes, such as in the relative dimensions of the parts, materials used, and the like, as well as the suggested manner of use of the apparatus of the invention, may be made therein without departing from the spirit and scope of the invention as will now be apparent to those skilled in the art.

What is claimed is:

1. A device for effecting a seal between the wall of a chamber containing fluid under pressure and elongated material passing through the wall, comprising a first material-receiving passage through the wall, a member confronting the wall and spaced therefrom, a second material-receiving passage in the member, means mounting the member so as to maintain the second passage aligned with the first passage, a flexible, elongated generally fluid-impervious sleeve through which the material passes disposed between the wall and the member, one end of the sleeve being sealingly attached to the wall around the edge of the passage therethrough, the other end of the sleeve being attached to the member at the passage therein, the sleeve being so constructed and arranged that the passage therethrough may be contracted markedly from its initial relaxed diameter by relative movement between the wall and the member whereby the sleeve may be contracted sealingly to cooperate with the material, and means to move the member relative to the wall whereby selectively to contract and to expand the diameter of the passage through the sleeve.

2. In continuous vulcanizing apparatus for treating elongated vulcanizable material, the combination including a material-treating chamber containing fluid under

pressure, said chamber having a wall with a first material-receiving passage through the wall, a member confronting the wall and spaced therefrom, a second material-receiving passage in the member, means mounting the member so as to maintain the second passage aligned with the first passage, a flexible, elongated generally fluid-impervious sleeve through which the material passes disposed between the wall and the member, one end of the sleeve being sealingly attached to the wall around the edge of the passage therethrough, the other end of the sleeve being attached to the member at the passage therein, the sleeve being so constructed and arranged that the passage therethrough may be contracted markedly from its initial relaxed diameter by relative movement between the wall and the member whereby the sleeve may be contracted sealingly to cooperate wtih the material, and means operable from outside the apparatus while the apparatus is in operation to move the member relative to the wall whereby selectively to contract and to expand the diameter of the passage through the sleeve.

3. A device for effecting a seal between the wall of a chamber containing fluid under pressure and an elongated material passing through the wall, comprising a first material-receiving passage through the wall, a member mounted spaced from said wall, a second material-receiving passage in the member aligned with the first passage, a flexible, elongated generally fluid-impervious sleeve through which the material passes disposed between the wall and the member, such sleeve being so constructed and arranged that the passage therethrough may be markedly decreased in diameter upon twisting of the sleeve about its longitudinal axis so that the sleeve then sealingly cooperates with the material, one end of the sleeve being sealingly attached to the wall around the edge of the passage therethrough, the other end of the sleeve being attached to the member at the passage therein, and means to twist the sleeve between its two ends whereby to decrease the diameter of the passage through the sleeve.

4. A device for effecting a seal between the wall of a chamber containing fluid under pressure and an elongated material passing through the wall, comprising a first material-receiving passage through the wall, a member movable toward and away from said wall, a second material-receiving passage in the member, means mounting the second member so as to maintain the second passage aligned with the first passage, a flexible, elongated generally fluid-impervious sleeve through which the material passes disposed between the wall and the member, one end of the sleeve being sealingly attached to the wall around the edge of the passage therethrough, the other end of the sleeve being attached to the member at the passage therein, the sleeve being so constructed and arranged that the passage therethrough expands radially when the sleeve is longitudinally collapsed by movement of the member toward the wall and that the passage therethrough markedly decreases in diameter so that the sleeve sealingly cooperates with the material when the sleeve is longitudinally extended by movement of the member away from the wall, and means to move the member toward and away from the wall to expand and contract the passage through the sleeve, respectively.

5. A device for effecting a seal between the wall of a chamber containing fluid under pressure and an elongated material passing through the wall, comprising a first material-receiving passage through the wall, a member guided for movement toward and away from said wall, a second material-receiving passage in the member aligned with the first passage, a flexible, elongated generally fluid-impervious sleeve through which the material passes disposed between the wall and the member, such sleeve being so constructed and arranged that the passage therethrough expands radially when the sleeve is longitudinally collapsed and that the passage therethrough markedly decreases in diameter so that the sleeve sealingly cooperates with the material when the sleeve is longitudinally extended, one end of the sleeve being sealingly attached to the wall around the edge of the passage therethrough, hte other end of the sleeve being attached to the member at the passage therein, the sleeve having at least one longitudinal element associated therewith and extending helically about the sleeve, said longitudinal element tending to straighten and to lie closer to the axis of the passage through the sleeve when the sleeve is extended, and means to move the member toward and away from the wall.

6. A device for effecting a seal between the wall of a chamber containing fluid under pressure and an elongated material passing through the wall, comprising a first material-receiving passage through the wall, a member guided for movement toward and away from said wall, a second material-receiving passage in the member aligned with the first passage, a flexible, elongated generally fluid-impervious sleeve through which the material passes disposed between the wall and the member, such sleeve being so constructed and arranged that the passage therethrough expands radially when the sleeve is longitudinally collapsed and that the passage therethrough markedly decreases in diameter so that the sleeve sealingly cooperates with the material when the sleeve is longitudinally extended, one end of the sleeve being sealingly attached to the wall around the edge of the passage therethrough, the other end of the sleeve being attached to the member at the passage therein, the sleeve having at least one strong elongated strand extending generally helically of the sleeve and presenting a longitudinal passage therethrough, the strand overlying at least longitudinally spaced portions of the sleeve, the respective ends of the strand being secured to the wall and the member adjacent the ends of the sleeve, whereby when the member is moved toward the wall the longitudinal passage through the turns of the helically disposed strand is enlarged in diameter and the sleeve may expand radially, and when the member is moved away from the wall the longitudinal passage through the turns of the helically disposed strand is decreased in diameter and the sleeve is contracted upon the material passing therethrough, and means to move the member toward and away from the wall.

7. A device as claimed in claim 6 wherein the strand lies radially outwardly of the sleeve and overlies the sleeve.

8. A device as claimed in claim 6 wherein the strand is a wire which is disposed radially outwardly of the sleeve and overlies the sleeve.

9. A device as claimed in claim 6 wherein the strand is incorporated in the body of the sleeve.

10. A device as claimed in claim 9 wherein the sleeve is formed of woven fibrous material and the strand is woven into the body of the sleeve.

11. A device as claimed in claim 6 wherein the sleeve in its initial relaxed state is generally circular cylindrical and the surface elements of the relaxed sleeve lie parallel, and wherein in use the sleeve is twisted so that said surface elements thereof of the relaxed sleeve are disposed helically about the twisted sleeve.

12. A device as claimed in claim 6 wherein the sleeve includes a rigid annular reinforcing member disposed therewithin intermediate its length, and means in the sleeve and the reinforcing member for providing access of the fluid in the chamber therethrough into contact with the material passing through the sleeve.

13. A device as claimed in claim 4 wherein the sleeve and member are disposed interiorally of the chamber, and the external surface of the sleeve is exposed to the pressure existing within the chamber.

14. A device as claimed in claim 4 wherein the sleeve and member are disposed exteriorally of the chamber, and the external surface of the sleeve is exposed to a pressure substantially lower than that existing in the chamber.

15. A device for effecting a seal between the wall of a chamber containing fluid under pressure and an elongated

material passing through the wall, comprising a first material-receiving passage through the wall, a member guided for movement toward and away from said wall, a second material-receiving passage in the member aligned with the first passage, a flexible, elongated generally fluid-impervious sleeve through which the material passes disposed between the wall and the member, such sleeve being so constructed and arranged that the passage therethrough expands radially when the sleeve is longitudinally collapsed and that the passage therethrough markedly decreases in diameter so that the sleeve sealingly cooperates wtih the material when the sleeve is longitudinally extended, one end of the sleeve being sealingly attached to the wall around the edge of the passage therethrough, the other end of the sleeve being attached to the member at the passage therein, means on the device for twisting the sleeve, and means to move the member toward and away from the wall.

16. A device as claimed in claim 4 wherein the means for moving the member comprises fluid pressure means operatively connected to the member so that during operation of the device the fluid pressure means constantly urges the member toward its terminal, sleeve-extending position.

17. A device as set forth in claim 16, wherein the member is located at the end of the sleeve through which the material enters, and comprising means for supplying said fluid actuated means with fluid under a predetermined pressure, whereby the member may move in the direction of the material upon the development of an undue force in the direction of movement of the material between the material and the sleeve.

References Cited in the file of this patent

UNITED STATES PATENTS

2,446,620 Swallow et al. ---------- Aug. 10, 1948

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,032,812 May 8, 1962

Jurian W. Van Riper

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 8, line 58, strike out "thereof".

Signed and sealed this 21st day of August 1962.

(SEAL)
Attest:

ESTON G. JOHNSON
Attesting Officer

DAVID L. LADD
Commissioner of Patents