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Schwing

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[54] SQUEEZE PUMPS FOR DELIVERING CONCRETE

[76] Inventor: Friedrich Schwing, Rathausstrasse 126, 468 Wanne-Eickel, Germany

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Feb. 11, 1971 Germany 2106560

[52] U.S. Cl. 417/477, 417/900
[51] Int. Cl. .. F04b 43/08, F04b 43/12, F04b 45/06
[58] Field of Search 417/477, 475, 476, 900, 417/214; 92/13.2

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Primary Examiner—William L. Freeh
Assistant Examiner—Richard E. Gluck

[57] ABSTRACT

A squeeze or peristaltic pump for delivering concrete in which the concrete is transported along a cylindrical segment with an elastic squeeze member and squeeze rollers rolling thereon. The rollers are mounted on a rotor revolving in a housing, in which said squeeze member consists of a flat, rubber elastic belt defining a squeeze chamber, together with a rigid outer wall curved in accordance with the cylinder segment, and two parallel walls perpendicular to the outer wall. The belt is constrained at its ends and held tight in all rolling phases without elastic over stretch and has a longitudinal reinforcement and a transverse reinforcement of mutually parallel cross bars. The elastic rubber material surrounds the reinforcements and is concentrated on the inside of the squeeze pin.

7 Claims, 11 Drawing Figures

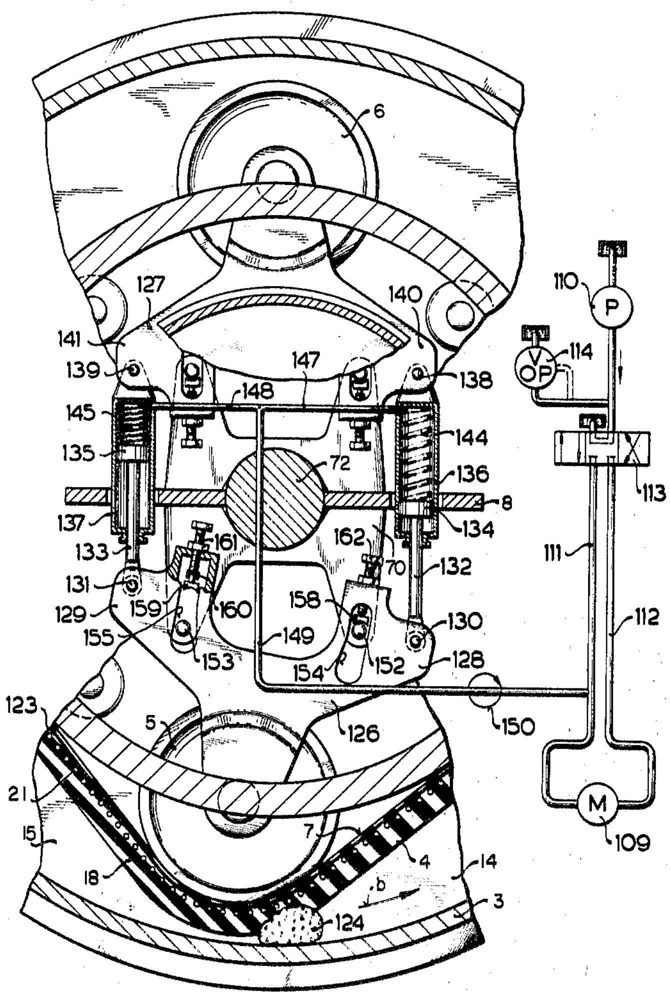
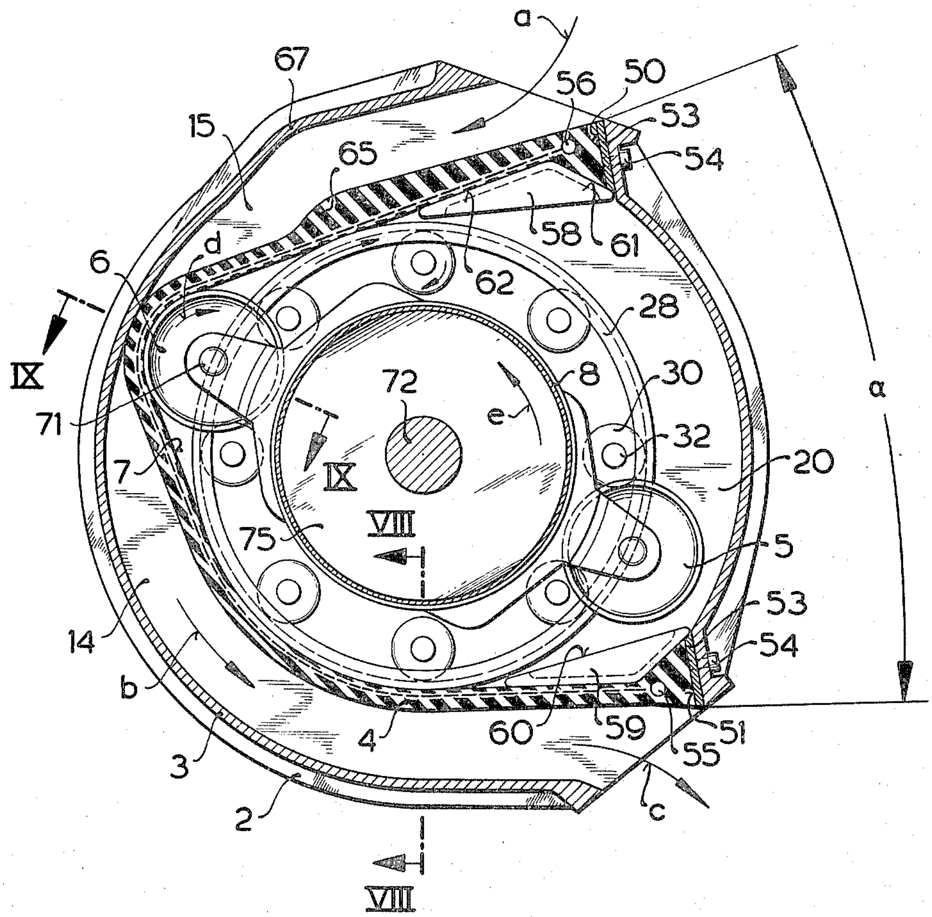


FIG.1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67
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d
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IX
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α

FIG. 2

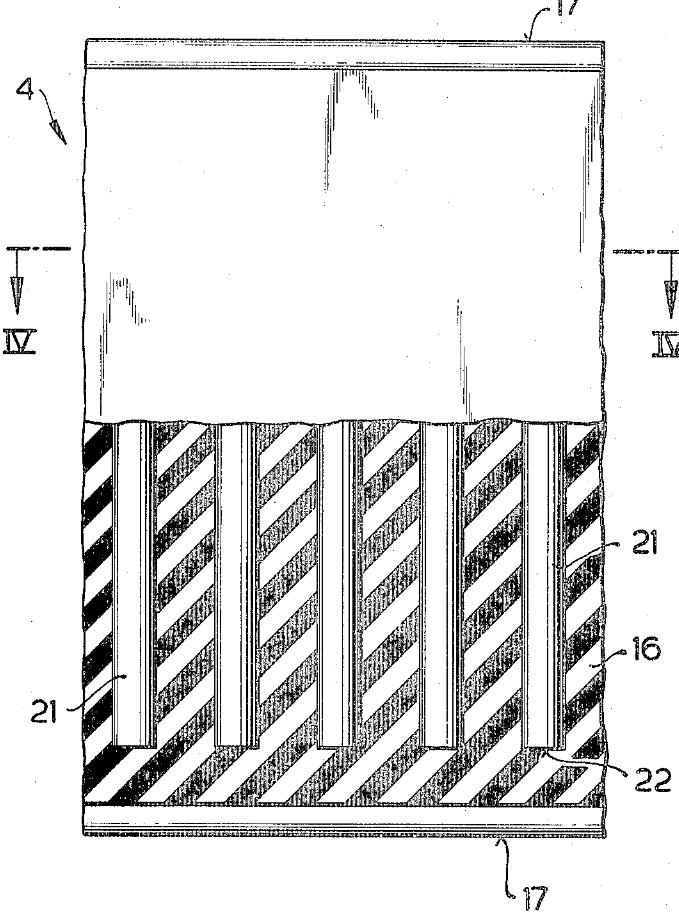


FIG. 3

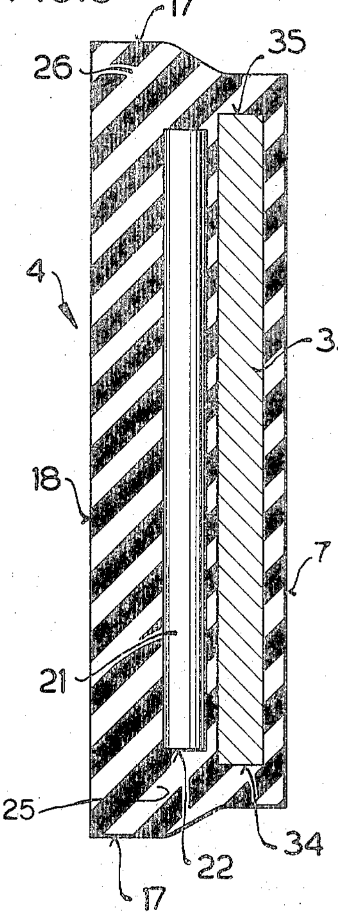


FIG. 4

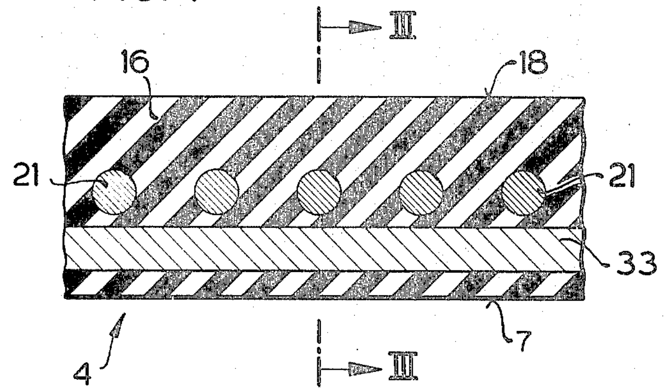


FIG.5

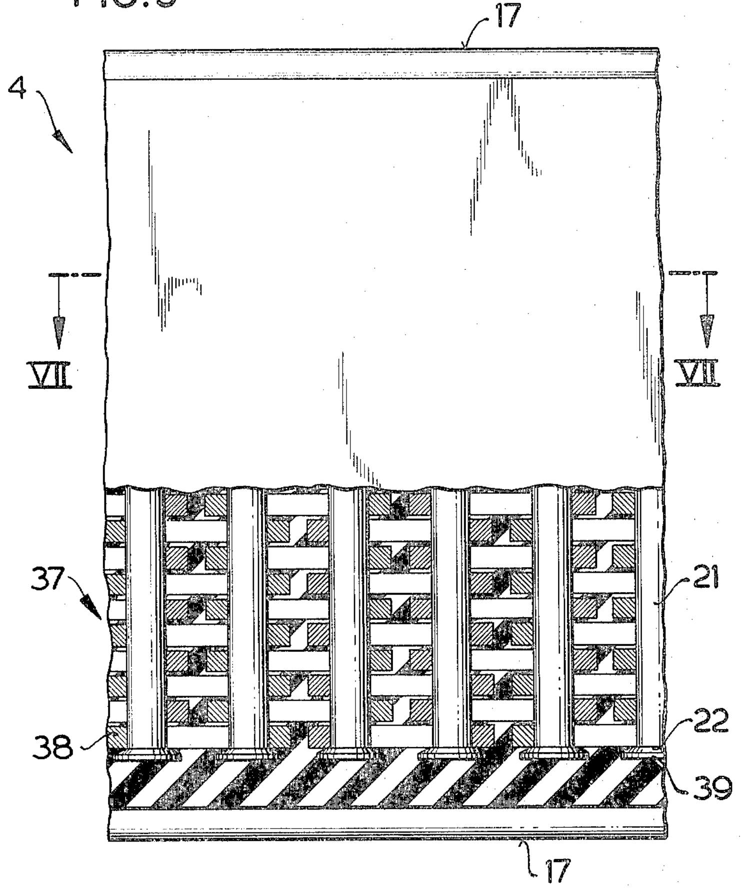


FIG.6

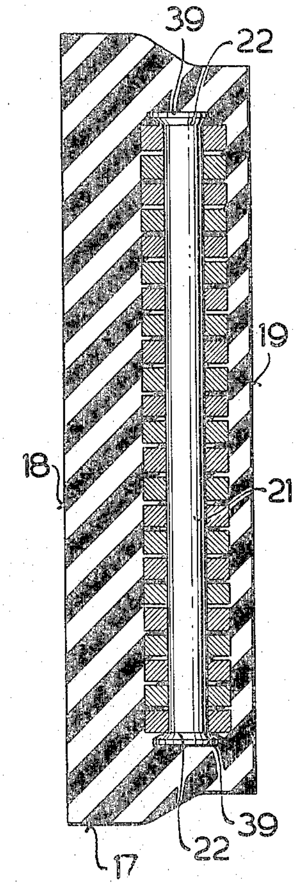


FIG.7

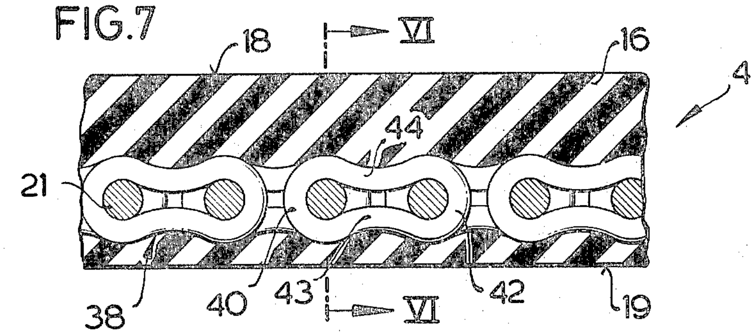
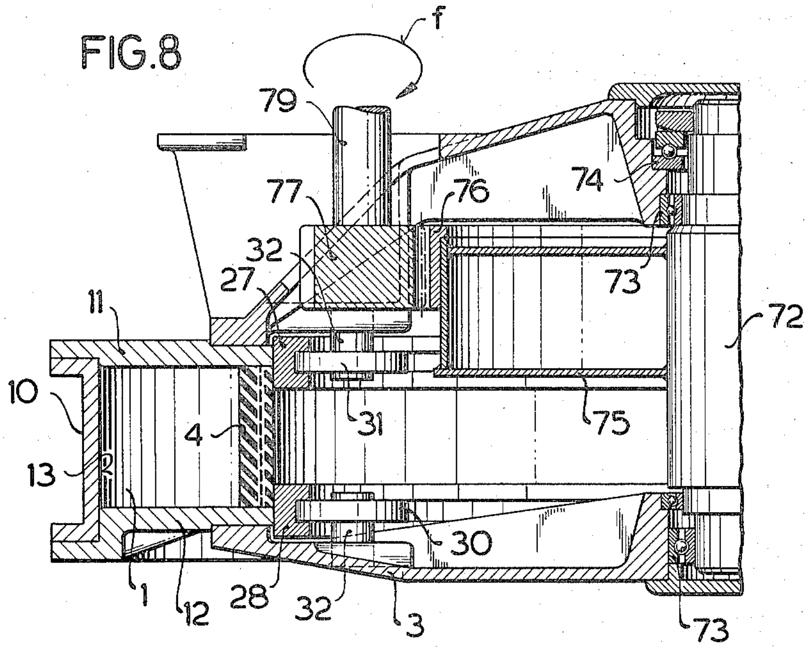


FIG.8


f
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77
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74
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28
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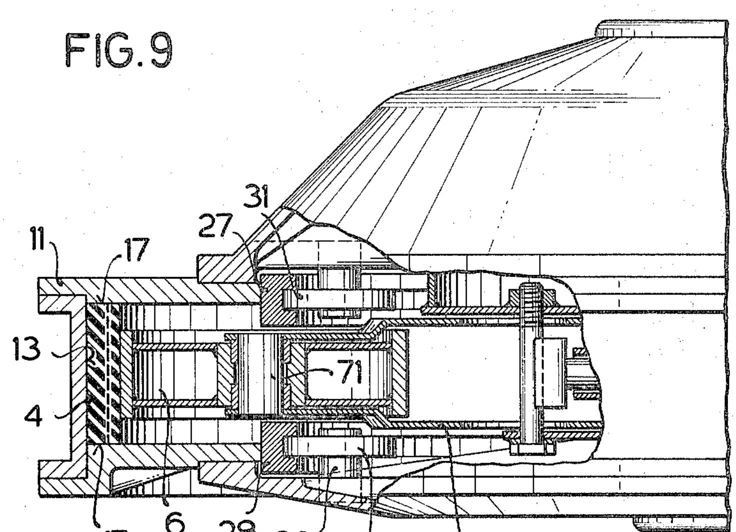
FIG.9


31
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71
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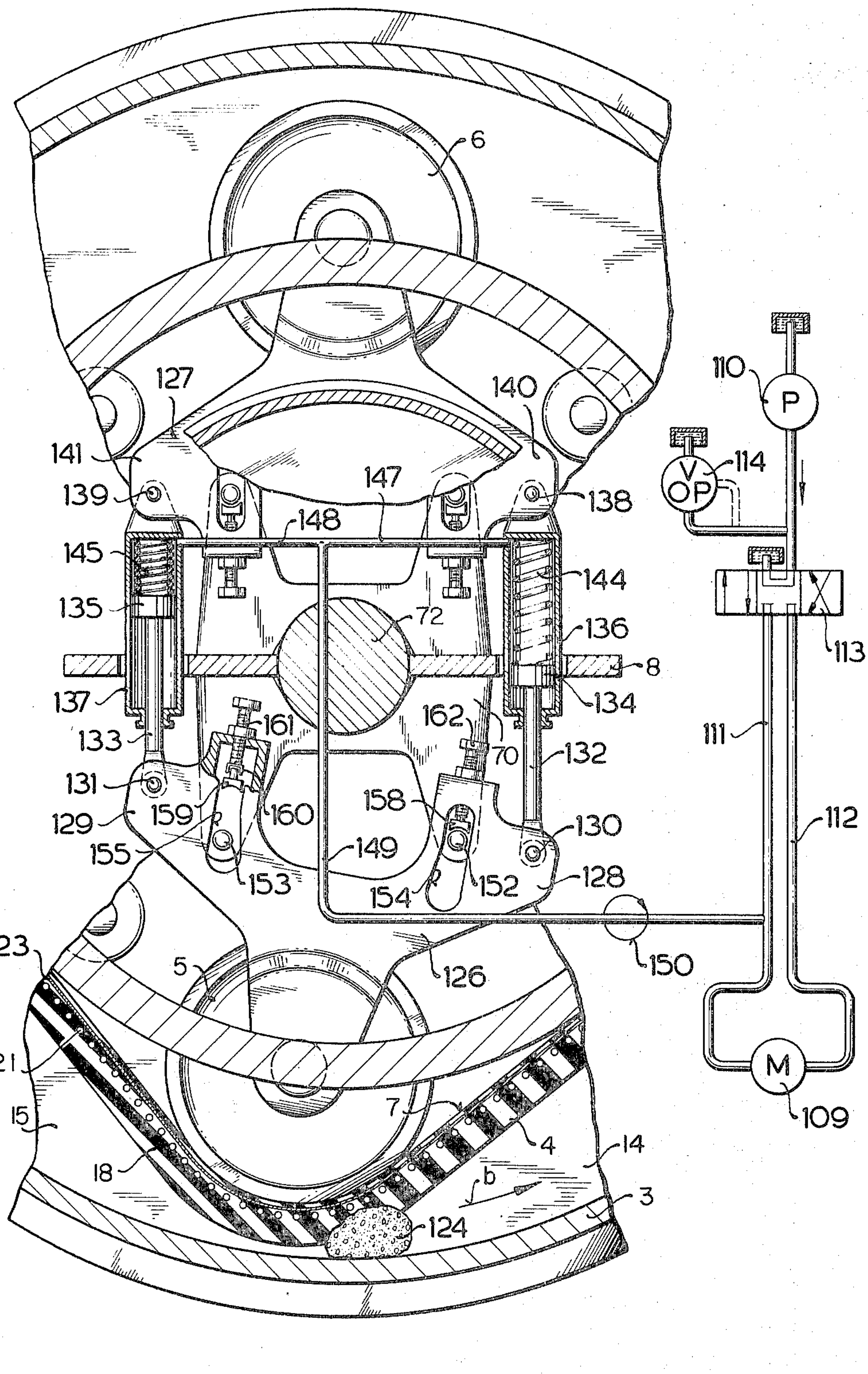
FIG.10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112
129
130
155
149
153
152
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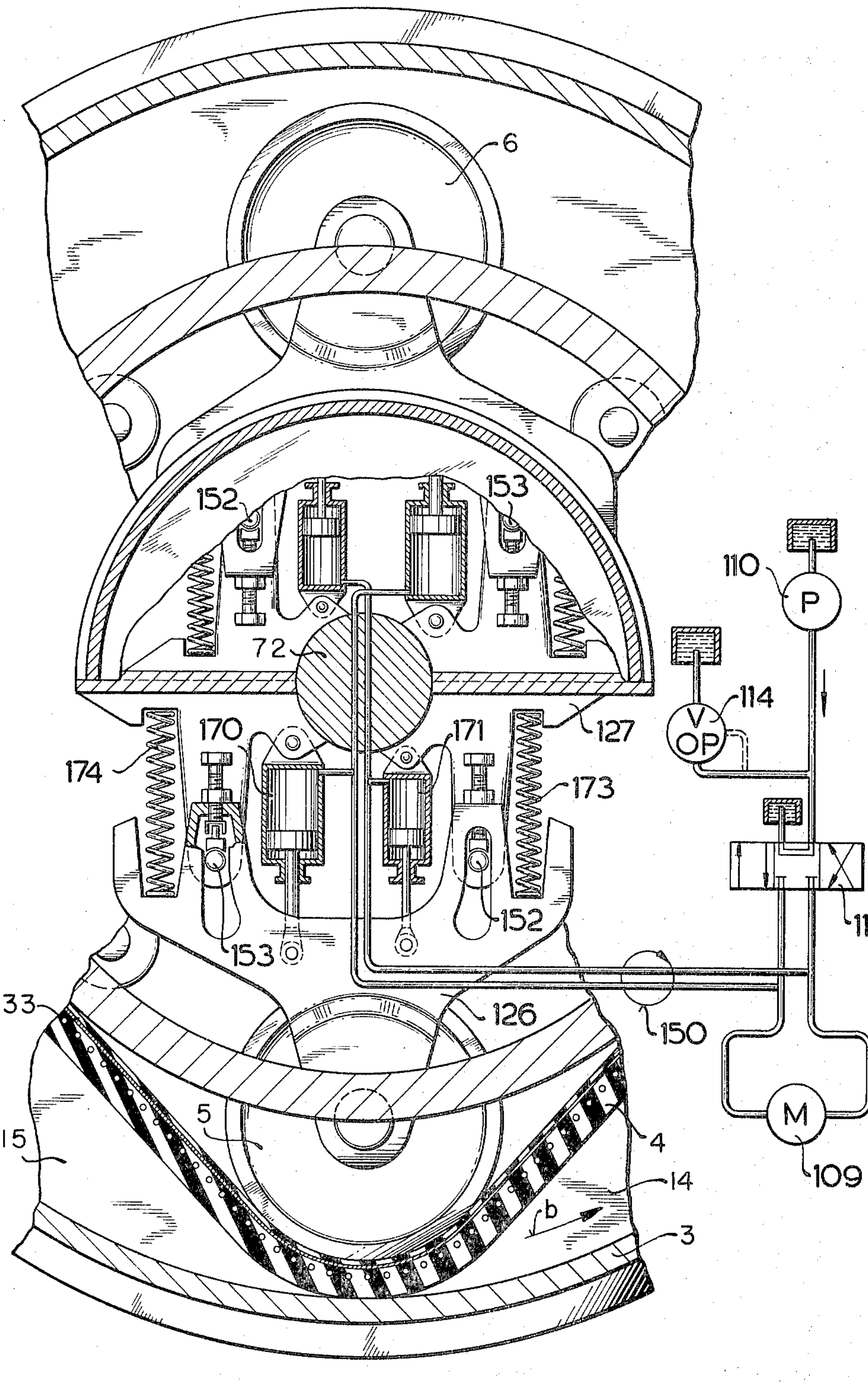
123
5
126
21
M
109
15
7
4
14
18
b
3
124

FIG.11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SQUEEZE PUMPS FOR DELIVERING CONCRETE

BACKGROUND OF THE INVENTION

This invention relates to a squeeze pump for delivering concrete, in which the concrete is delivered along a segment with cylindrical surface, with an elastic squeeze member and squeezing rollers rolling thereon and mounted on a rotor revolving in a housing.

The delivery of concrete by means of pumps is a mechanization feature which has the object of replacing the intermittent delivery by skips and cranes. It enables the concrete to be transported to finished, reinforced parts of buildings by means of a conduit consisting of individual lengths of pipes, and provided at its delivery end with a hose. This hose is handled by one or more operators in order to distribute the concrete to the part of the building to be cast. The pump should make possible as uniform a delivery of the concrete as possible, because otherwise the concrete column would be greatly accelerated. This would result in vibration of the concrete conduit and in diverting of the hose. Where the concrete conduit is mounted on a mast, the vibration might also impair the stability of this mast. Furthermore, diverting of the conduit may damage the reinforcement and present a danger to the operators engaged in distributing the concrete.

The type of pump most commonly used for delivering concrete is the hydraulically driven cylinder-piston pump with one or more cylinders. Such pumps use valves or slides for controlling the concrete during the induction and delivery. These elements are exposed to substantial wear and represent, in addition, a considerable technical expenditure. If, for the reasons indicated above, the delivery of the concrete should be largely continuous, substantial additional expenditure must be incurred. This might entail an enlargement of the length of the cylinders or an improvement of the control of the hydraulic actuating medium.

It is already known to replace such pumps by a hose pump. The hose pump known for delivering concrete operates without valves and with a hose positioned along a segment with cylindrical surface. This segment represents an elastic squeeze member which surrounds the squeeze chamber. The hose is regularly deformed by two squeezing rollers offset on a rotor about a half-circle, in such a way that two mutually sealed chambers are formed which move along the hose. The leading pressure chamber has a wedge-shaped, convergent end in the zone of the squeezing roller. The trailing suction chamber must reform from the wedge-shaped configuration behind the squeeze roller to the cylindrical cross-section of the hose for drawing in the concrete. For this purpose, the hose forming the squeeze chamber is located in an evacuated housing. However, these pumps have such disadvantages that they have been used hitherto economically only for delivering particularly suitable concrete mixes.

The wedge-shaped restriction of the pressure chamber leads to pulling in coarse grain over which the squeeze roller must roll in order to effect delivery during the next stroke of the pump. This is possible only by using a large quantity of elastic material which can be deflected by the grain. For this purpose, the squeeze rollers are provided with thick rubber linings and the hose has a thick rubber lining along the cylindrical surface of the segment. Nevertheless, when the roller rolls over large particles, the reinforcement of the hose may be locally over-stretched and a resulting weakening of the hose may result in bursts. During this, concrete is drawn into the evacuated housing which fouls the drive elements located in the housing, making continued pumping possible only after complicated cleaning operations and after replacing the squeeze rollers. Thus, in spite of their comparatively simple construction and the almost continuous delivery of concrete, these hose pumps can be used only for grades of concrete with small unbroken grain.

SUMMARY OF THE INVENTION

The invention has the object of solving the problems occurring in the delivery of concrete with squeeze pumps by providing the parts of the pump dividing the squeeze chamber with deflecting possibilities for larger grains of foreign bodies contained in the concrete, which, in addition to the elasticity of the rubber elastic material, prevents the destruction of the squeeze member by such grain or foreign bodies.

According to the invention, this object is realised in that the squeeze rollers are, as known in the art, mounted resiliently on the rotors and the springs provide a fraction of the force necessary to produce the squeezing force of the squeeze rollers, wherein the difference is provided hydraulically by means of working cylinders.

A rotary piston pump is already known, but this has not yet been used for delivering concrete and is also unsuitable for this purpose. This pump has on the inside of its housing a track belt and a rotatable roller body which presses during its rotation the contacting part of the track belt and of the lining towards the outside against the pump housing. The rollers are guided displaceably with their bearings on the hub of the rotor and the bearings rest on thrust springs. This has the disadvantage that the bias of the springs must be so high that a deflection of the roller bearings is possible only above the maximum operating pressure. This results from the necessity of providing a pressure-tight closure between the delivery and inlet chambers of the squeeze chamber. Since the resistance of the delivery of concrete varies, this arrangement has the result of providing an excess bias of the springs with low delivery resistances. With low operating pressures this results in an increased danger to the elastic squeeze member by pointed foreign bodies.

The sliding guide for the squeeze roller bearings realised in the known rotary piston pump has also the additional disadvantage that the resulting frictional resistance not only changes the compressive force necessary to provide a certain squeezing force, but may also lead to the movable roller bearings becoming jammed. For avoiding these drawbacks each squeeze roller is, according to a further feature of the invention, preferably pivotably mounted on a roller carrier mounted pivotably on the hub of the rotor and resting with its ends on the springs or on the pistons of the working cylinders. In this manner, the danger of intrinsic jamming of the roller carrier is prevented.

One embodiment of the invention uses a roller carrier with multiple bearings. In this case every roller carrier has a mounting having two parallel pivoting axes of which one each is associated with one direction of rotation of the rotor. In this manner, a reversal of the rotor for reversing the direction of pumping may be accommodated.

In order to produce lever arms of different lengths for biassing the springs or working cylinders associated with every pivoting sense of the roller carrier, the distances of these parts from the pivoting centre of the roller carrier may be different. Instead of changing the lever arms, the same object may also be realised by springs and/or working cylinders of different dimensions for every rotational direction of the rotor.

A compact construction of a pump may be achieved by housing the springs in the working cylinders.

The simplification of the total construction of the pump may be carried further by the rotor which comprises, as known, two squeeze rollers offset relative to each other by a half circle, supporting the roller carriers necessary for mounting the squeeze rollers on common springs and/or working cylinders. By means of this mounting of the pivotable roller carriers, the squeeze rollers squeeze with any delivery pressure the squeeze member only with the force necessary at the time, and the squeeze rollers can deflect only against comparatively small forces.

In the case of rotary piston pumps, it is known in principle to adjust the roller bearings by means of spindles. Here, it is important to protect the spindles substantially from the operational loads.

According to the invention the pivoting axes are realised with bearing pins located transversely to the roller plane and mounted on both sides of the pivoting centre of each roller carrier on the roller. Adjustable pivot bearings are located on the roller carriers which move during the adjustment the roller carrier against the force of its springs and/or working cylinders towards the inside and limit the spring travel towards the outside. If the pivot bearings are mounted on spindles, the spindles are largely protected from the pressure forces of the squeeze rollers.

On the other hand, the spindles have the advantage that the spindle travel is comparatively large. This enables the squeeze rollers to be withdrawn for dismantling the squeeze member.

For delivering concrete with piston pumps it has been found useful to rinse the side of the piston, remote from the material to be delivered with depressurised rinsing water. In the squeeze pump according to the invention, the internal chamber in which the rotor with the squeeze rollers moves is filled with a rinsing agent, and preferably with water.

A further possibility for solving the problems mentioned above in accordance with the present invention consists in that the squeeze member consists, as known in the art, of a flat rubber elastic belt which defines together with a rigid outer wall, curved in accordance with the cylinder segment, and two parallel walls, perpendicular to the rigid outer wall, a squeeze chamber and which has at its ends a fixed longitudinal reinforcement and transverse reinforcement of parallel rods keeping the belt tight without elastic overstretch, wherein the rubber elastic material envelopes the reinforcement and is concentrated on the inner side of the squeeze chamber. Although so-called belt pumps are known in which a resiliently elastic belt is pressed by pressure rollers against a housing wall and a liquid or gas performs work or is delivered, such pumps are intended for the chemical industry and are unsuitable in their known construction for the delivery of concrete.

This is due to the peculiarities of the composition of concrete which does not form a liquid. Known belt pumps cannot travel over larger particles in the working medium.

According to the invention, the rigid outer wall of the squeeze chamber of a belt pump, having, according to a further feature of the invention, a frictional resistance smaller than that of the belt, is used for pushing coarser grain in the part of the pressure chamber in the direction of delivery, because this grain slides on the rigid outer wall and is not inducted into the wedge where the roller has to travel over it. In addition, individual grains which are drawn in owing to their particularly unfavourable shapes, can be travelled over by the pressure rollers without damage to the belt which opens under its own tension the suction chamber behind the squeeze roller, thereby eliminating the necessity of maintaining a vacuum in the pump housing. This is made possible particularly by the combination of a longitudinal and a transverse reinforcement, wherein the division of the transverse reinforcement into transverse bars makes possible the concentration of the elastic material in the cross-section of the belt necessary for accommodating a coarser grain.

In addition, the transverse reinforcement prevents the belt from bending through in the zone of the pressure chamber in front of the squeeze roller. This makes it possible to generate the high pressure necessary for the delivery of concrete.

Such a squeeze pump has the advantage that, it requires no valves in the same way as the known pumps and that its construction is comparatively simple. In addition, it makes possible an almost continuous delivery of concrete at the required high pressures. The belt defining the squeeze chamber is a wear part which is easily exchanged and not very expensive.

On the one hand, this belt should be as thin as possible in order to adapt itself to the squeeze roller without permanent deformation. On the other hand, the belt must remain free between its supporting lines to permit the passage of the squeeze rollers. For kinematic reasons the belt moves during every passage of a squeeze roller also in the direction of the circumference by a certain amount opposite the direction of delivery. This movement in the direction of the circumference must also take place with the pressurised zone of the belt. It is, therefore, necessary to reduce the friction between the supporting surfaces of the belt and the housing.

For this purpose, according to the invention, the side edges of the belt are mounted on supporting rings which are closed and supported on rollers fixed in the housing. The supporting rings roll on the rollers in accordance with the movement of the belt and the friction is reduced to an irrelevant value.

The longitudinal reinforcement of the belt consists preferably of a reinforcing fabric located radially inwardly in the belt, whilst the cross bars of the transverse reinforcement are mounted in the belt spaced apart from the reinforcing fabric. The reinforcing fabric may be a steel, textile or plastic mesh adapted to take up tensile stresses. The bars have the object of preventing the belt from bending. They have the additional function of protecting the reinforcing fabric against damage by particles of the concrete with sharp edges during the work of the squeeze rollers.

In another embodiment of the invention, the reinforcement of the belt is formed by a chain, the links of which form the longitudinal reinforcement and of which several are positioned side by side and are fitted in the longitudinal direction of the belt in the spaces between adjacent chain links, wherein the cross reinforcing bars connect the chain links. However, preferably the chain links have such a construction that, compared with chains with the same breaking load, they can stretch beyond the normal extent. To this end, in order to increase the elastic deformation of the chain links in the longitudinal direction of the belt, the chain links have non-parallel webs between the round ends.

Whilst, in the pump according to the invention, a rolling over coarser grain in the concrete does not generally take place over the major part of the belt, this roller action must be accommodated on the suction side of the pump. This is due to the fact that at this point, the dipping roller must first form the tight closure of the delivery chamber against the suction chamber. To this end, the invention provides that the end of the belt located on the intake side of the squeeze member has on its inside an accumulation of the rubber-elastic material, extending over the length of the squeeze chamber along which the squeeze rollers dip thereinto.

Over this extent of the belt, there is so much of the rubber-elastic material that granular constituents of the concrete can be travelled over by the roller without damage to the belt.

The belt according to the invention also has the further advantage that the squeeze chamber may be sealed in the direction of the squeeze rollers, thereby further simplifying the pump. For this purpose, the belt has, along its longitudinal side edges, accumulations of material, consisting of the rubber-elastic substance, and which provide a bias corresponding to the sealing pressure on the side walls of the squeeze chamber.

As is apparent from the preceding description of the function of the belt according to the invention, it is essential that the belt should neither be slack nor overstretched in any position of the squeeze rollers. For this purpose, according to one embodiment of the invention, at the ends of the squeeze chamber, the ends of the belt are arranged, in the case of a rotor fitted with two squeeze rollers offset through a half-circle, in such a way that they include an angle of an arc of about 20°.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be further described, with reference to the accompanying drawings, showing various embodiments, and in which:

FIG. 1 is a plan view in cross-section of a pump according to the last described embodiment of the invention;

FIG. 2 is a plan view, partly broken away, and showing the elastic belt used in the pump according to FIG. 1;

FIG. 3 is a cross-section along the line III—III in FIG. 4;

FIG. 4 is a cross-section along the line IV—IV in FIG. 2;

FIG. 5 shows a modification of the belt in a view similar to FIG. 2;

FIG. 6 is a cross-section along the line VI—VI in FIG. 7;

FIG. 7 is a cross-section along the line VII—VII in FIG. 5;

FIG. 8 is a cross-section along the line VIII—VIII in FIG. 1;

FIG. 9 is a cross-section along the line IX—IX in FIG. 1;

FIG. 10 is a cross-section, partially broken away, and showing a squeeze pump in accordance with the first described embodiment, and indicating diagrammatically the hydraulic circuit; and

FIG. 11 is a modified embodiment of the squeeze pump according to the invention in a representation similar to that of FIG. 1.

DESCRIPTION OF PREFERRED EMBODIMENTS

The squeeze pump shown in FIG. 1 serves for pumping concrete which is drawn in in the direction of the arrow *a*, as described further below, through a squeeze chamber 1 in the direction of an arrow *b*, and delivered by the pump in the direction of arrow *c*. The pump has a housing 2 in which the concrete is conveyed along a cylindrical segment or outer wall 3 by means of a squeeze member in the form of a belt 4, by squeeze rollers 5 and 6 rolling along the inside 7 of the belt, as shown with regard to roller 6 which rotates in the direction of the arrow *d*. Rollers 5 and 6 are mounted on a rotor 8 revolving in the direction of the arrow *e*. In the embodiment shown, the two rollers 5 and 6 are offset on the rotor through a half circle relative to each other.

FIGS. 8 and 9 illustrate, in conjunction with FIG. 1, how the pumping action is achieved.

If the rotor rotates as shown in FIG. 1, the roller 6 moves the belt 4 at this point radially towards the outside. The belt forms the squeeze chamber 1 together with a rigid outer wall 3 curved in accordance with the cylinder segment, consisting in the embodiment shown, of steel and being, therefore, rigid, and with two mutually parallel walls 11 and 12, perpendicular to the outer wall 3. When the belt rests under the action of the squeeze roller 6 on the inside 13 of the wall 3, a pressure chamber 14 is formed which moves in the direction of the arrow *b* and is sealed by the belt 4 against a suction chamber 15.

The belt forming the squeeze member consists in the embodiment shown in FIGS. 2 and 4 for the major part of a rubber-elastic material 16 and has straight longitudinal edges 17 and two parallel and flat main surfaces 18 and 7, of which the surface 18 cooperates with the inside 13 of the wall 3, whilst the surface 7 faces the interior 20 of the housing 3 of the pump.

The largest accumulation of rubber-elastic material 16 is adjacent to the surface 18 of the belt. However, the rubber-elastic material also comprises a cross reinforcement consisting of individual cross bars 21 located in the belt parallel to each other and in spaced apart relationship. The ends 22 of the cross bars 21 terminate at a certain distance from the longitudinal edges 17 of the belt.

In the relieved state of the belt, i.e., with the belt not fitted, the longitudinal edges 17 are not flat. This is the consequence of material accumulations of the rubber-elastic material in the zones 25 and 26 which result in the production of a bias, corresponding to the sealing pressure against the side walls 11 and 12 when the belt is fitted.

On the other hand, the ends **22** of the bars **21** forming the cross reinforcement, are so near the longitudinal sides **17** of the belt that they bridge the distance between two closed rings **27** and **28** necessary for rolling the squeeze rollers **5** and **6** along the outside **7** of the belt. These rings support the belt **4** and are mounted on rollers **30** and **31** located on shafts **32** which are mounted on the housing **3**.

In addition to the transverse reinforcement formed by the cross bars **21**, the belt has a longitudinal reinforcement consisting of a reinforcing fabric **33** whose side edges **34** and **35** reach as far as the cross bars and are located in the embodiment of FIGS. **2** to **4** even beyond the ends **22** of the cross bar **21**. As viewed from the cross bars **21**, this reinforcing fabric **33** is located radially inwardly and spaced apart from the cross bars.

According to a further embodiment of the invention, the reinforcement of the belt **4** is provided by a chain **37** surrounded by the rubber-elastic material **16**. This chain consists of individual chain links **38** of which several are arranged side by side, whilst chain links consecutive in the longitudinal direction of the belt are fitted between chain links which are located side by side. The bars **21** used as cross reinforcements serve to connect the chain links and have for this purpose enlarged heads **39** at their ends **22**.

As shown in FIG. **7**, the chain links **38** have two round portions **40, 42** and webs **43, 44**. These webs are not parallel. This results in an increased elastic capacity of the chain to deformation, because under tensile stresses the webs **43** and **44** can be elastically deformed until they are almost parallel.

At its ends **50, 51**, the belt **4** has fixing plates **53** (FIG. **1**) which are mounted by screws **54** to appropriate walls of the housing. The reinforcement of the belt terminates in the immediate vicinity of the ends **50, 51** as at **55** and **56**.

On the inside of the belt and in the zone of the ends **50** or **51**, there are guide segments **58** or **59** of generally triangular shape. The triangle has a base **60**, a shorter side **61**, and a longer side **62** which rests on the reinforced zone of the belt **4**.

The suction side of the squeeze member, indicated by the arrow a comprises one end **50** of the belt having on its inside an accumulation **65** of rubber-elastic material. This accumulation extends over the length of the squeeze chamber along which the squeeze rollers **5** and **6** dip into the squeeze chamber. For this reason, this point is provided with an outwardly directed deflection **67** of the wall **10** of the squeeze chamber.

In this manner, the conditions are created under which coarser grain or particles present in the concrete can be passed over by the squeeze rollers **5, 6** without damage to the belt **4**.

In the embodiment shown, the rotor **8** comprises two idling squeeze rollers **5** and **6**. For this purpose, the rotor has a hub **70** carrying the mounting **71** for the squeeze rollers **5** and **6**. The hub is located on a shaft **72** running in bearings **73** and **74**, and having on a further hub **75** a toothed rim **76** which meshes with a pinion **77** located on a drive shaft **79** which involves in the direction of the arrow *f*.

The belt is guided over the squeeze rollers up to its ends in such a way that it is held tight without elastic overstretch in all overroll phases. To this end, the belt includes in the embodiment shown an angle of about 20°.

The concrete which is to be transported by means of the pump shown in the drawings, is located in a pressure chamber **14** (FIG. **10**) which is defined on the one side by an outer wall **3** curved in accordance with the cylinder segment, and on the other side by an elastic squeeze member **4**, whilst squeeze rollers **5** and **6** run on the inner side **7** of the elastic squeeze member **4**; the squeeze rollers are mounted on a rotor **8** whose shaft **72** is driven in the embodiment shown by a hydraulic motor **109**. The drive of the hydraulic motor **109** is provided by a pump **110** which operates, according to the direction of delivery, on controlled conduits **111** or **112**, controlled by a slide valve **113** and secured by an overpressure or relief valve **114**.

The pressure chamber **14** is normally tightly closed against a suction chamber **15** when the elastic belt **4** is deflected by the squeeze roller **5**, wherein the suction chamber **15** is behind the pressure or delivery chamber **14** in the direction of delivery of the concrete as indicated by arrow *b* in FIG. **10**.

The belt **4** which forms the elastic squeeze member, is provided on its outer side at **18** with a rubber elastic material which surrounds the cross reinforcements consisting of individual rods **21**, and a further fabric reinforcement **33** which takes up tensile stresses.

In FIG. **10** it has been assumed that a grain **124** with sharp edges has been introduced into the wedge-shaped end of the chamber **14** and the squeeze roller **5** must roll over this grain **124**.

Both squeeze rollers **5** and **6** are mounted according to FIGS. **10** and **11** on pivotably located roller carriers **126** or **127**. The ends **128** and **129** of the roller carrier **126** carry pivots **130, 131** which are parallel to the drive shaft **72** and serve to support articulately mounted piston rods **132, 133** whose pistons **134** and **135** are located in working cylinders **136** and **137** which are supported by pivots **138** and **139** on ends **140** and **141** of the roller carrier **127**.

Within the cylinders **137**, there are compression springs **144** and **145** respectively. In addition, the chambers of the working cylinders receiving the compression springs **144** and **145** communicate through conduits **147, 148** and a central conduit **149** containing a rotary bypass **150** with the conduit **111**.

The springs **144, 145** are so dimensioned that they provide only a fraction of the compression force necessary for producing the squeezing force of the squeeze rollers **5, 6** on the pivotal roller carriers **126** or **127**. The difference is provided hydraulically through the conduits **147** to **149** by the working cylinders **136, 137**.

In consequence, the pressure exerted by the squeeze rollers **5** or **6** is always large enough to provide a reliable sealing of the pressure chamber **14** against the suction chamber **15**.

Every roller carrier has two parallel pivoting axes, obtained by pivots **152, 153** extending on both sides of the center plane of the shaft **72** and parallel to this shaft. The pivots **152** and **153** are mounted on the hub of the rotor. Curved guide slots **154, 155** are provided for the pivots in the roller carriers **126, 127**.

In addition, each roller carrier **126** and **127** has adjustable pivot bearings **158** and **159** which are arranged on the ends **160** of spindles **161**. These spindles can be rotated by means of heads **162** located at their other ends by means of spanners.

During their adjustment they displace the roller carrier towards the inside against the force of the springs **144** or **145** and/or the resistance offered by the working cylinders. They, therefore, limit the spring travel towards the outside.

The adjustment of the spindles **161** should be so large that the squeeze rollers should be capable of being retracted, thus enabling the belt **4** to be dismantled. For this purpose, it is necessary, with the rotors stationary, to pull the belt **4** over the squeeze rollers **5** or **6** along the wall **3**, including the thicker end portion of the belt **4** not shown in FIGS. **10** and **11**.

In the embodiment of FIG. **11**, there are again two squeeze rollers **5** and **6** which are mounted on pivotable roller carriers **126** and **127**. As in the embodiment of FIG. **10**, these roller carriers are associated with pivots **152** or **153** for either sense of rotation of the roller. However, the lever arms, associated with the different rotations of the rotor (forward and reverse) are different in the embodiment of FIG. **11**, contrary to the embodiment of FIG. **10**. In addition, every pivotable roller carrier **126** or **127** has a separate working cylinder **170** or **171** for every pivoting direction, wherein these cylinders have different cross-sections and can, therefore, provide different pressures. Accordingly, also the springs **173** and **174** separately associated with every rotor, have different dimensions.

The dimensions are so chosen that for pumping concrete in the direction of the arrow *a* a larger force is necessary for deflecting the squeeze rollers **5** or **6**, and this is supplied by the spring **174** together with the working cylinder **170**. If the rotor revolves in the opposite direction, the squeeze rollers **5** or **6** may be deflected against a comparatively weaker force of the springs **173** or working cylinders **171** to which are also added the different lever lengths.

I claim:

1. A squeeze pump for delivering concrete and comprising a housing, an essentially cylindrical segment in said housing, an elastic squeeze member, a rotor rotatably mounted in said housing, an hydraulic motor for driving said rotor and having a main pressure pipe, at least two squeeze rollers mounted on said rotor, resilient mounting means for said squeeze rollers respectively, said squeeze rollers being operative to force said elastic member against the cylindrical segment and the squeezing force of said squeeze rollers being provided by said resilient mounting means, and hydraulic means cooperating with said resilient means, said hydraulic means comprising hydraulic piston and cylinder assemblies connected to said main pressure pipe and operative to assist said resilient mounting means in providing squeezing force to said squeeze rollers.

2. A squeeze pump as claimed in claim **1**, comprising a hub for said rotor, a squeeze roller carrier for each roller mounted for pivotal movement on said hub, ends of said roller carrier resting on said piston and cylinder assemblies.

3. A squeeze pump as claimed in claim **2**, in which each roller carrier has two mutually parallel pivoting axes of which one each is associated with one direction of rotation of said rotor.

4. A squeeze pump as claimed in claim **1**, in which springs are housed in the piston and cylinder assemblies.

5. A squeeze pump as claimed in claim **1**, in which the rotor carries pivotable roller carriers located mutually offset thereon through a half circle and supported on common springs and hydraulic cylinders.

6. A squeeze pump as claimed in claim **5** comprising pivot bearings for each roller carrier, said pivot bearings being mounted on spindles, the spindle travel of which enables the squeeze rollers to be retracted for dismantling the squeeze member.

7. A squeeze pump as claimed in claim **1**, in which the pump housing is filled with a rinsing agent and preferably with water.

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