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(57) Abstract

The invention provides an improved valve closure for pinch-type valves which comprises a pair of jaws adapted to be moved towards each other by means of a pair of inflatable diaphragms associated with the jaws which, when moved towards each other, pinch a sleeve within a housing accommodating the jaws.

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This invention relates to valve closure means and is particularly directed to providing means adapted for closure of pinch-type valves.

According to the invention, a valve closure means includes a housing adapted at least partly to embrace a deformably resilient valve sleeve; at least two co-acting jaw members within the housing and disposed transverse the valve sleeve; inflatable diaphragm means associated with each jaw member and adapted in a first or deflated configuration, to allow its jaw member to rest upon an outer peripheral zone of the valve sleeve and in a second or inflated configuration, to drive its jaw member towards its co-acting jaw member so as to pinch the valve sleeve between the jaws.

Also according to the invention, each inflatable diaphragm displays a substantially triangular cross section and is located in a complementally shaped cavity in the housing of the closure means.



2.

Further according to the invention each jaw member displays a half-dumbbell shape in end elevation; the rounded ends of the dumbbell allowing compression of the valve sleeve by the jaws without crushing of the valve sleeve to the point of fracture or delamination of the elements of its construction.

In order to illustrate the nature of the invention an example will be described in detail with reference to the accompanying drawings but without limitation of the inventive concept.

Figure 1 illustrates a side elevation of the closure disposed about the valve sleeve in the fully open configuration;

Figure 2 is a side elevation of the closure about the valve sleeve in the fully pinched configuration;

Figure 3 is an end elevation of a jaw pair in the open configuration;

Figure 4 is an end elevation of a jaw pair in the fully pinched configuration and showing the dumbbell shape;

Figure 5 is an isometric view of the closure in the open position without a valve sleeve interposed; in each of the drawings, the same numeral shall have the same value.

Referring to the drawings, numeral 10 indicates a deformably resilient valve sleeve having a reinforcing braid element interwoven into the body of the sleeve 10; and the whole being retained in a metal housing 12 which is provided with a pair of jaw slots 13 and 14 adapted to allow jaws 15 and 16 to impinge upon peripheral zones 17 and 18 of the sleeve 10.

Jaws 15 and 16 are associated with diaphragms 19 and 20 which are adapted to be inflated through nozzles 21 and 22 from the deflated position shown in figure 1 to the inflated configuration shown in figure 2. Diaphragms 19 and 20 are contained within a substantially triangularly shaped cavity shown generally by numerals 23 and 24 which cavities are created by reinforcing members 25 and 26 which form part of the closure housing 27 which is adapted at least partially to embrace valve sleeve 10.

In a presently preferred form of the invention, diaphragms 19 and 20 are constructed from flat transmission belting reinforced by spring seal plates 28 and 29.

In figure 2 sleeve 10 is shown in the pinched configuration when jaws 15 and 16 have been driven towards each other by expansion of the diaphragm elements 19 and 20 to the extent that the diaphragms 19 and 20 occupy substantially the whole of the triangular cavities 23 and 24 as illustrated. Simultaneous reference to figure 4 indicates the dumbbell shape shown at 30 and 31 created by the particular configuration of the jaws 15 and 16 and the purpose of which is to minimise crushing effect upon sleeve 10 when in the pinched configuration.

It will be apparent to those skilled in this art that the design and construction of the closure member as illustrated herein with reference to the drawings results in a positive closure of a pinch-type valve and it has been found in practice that the particular design of the diaphragm members 19 and 20 in association with the substantially triangular cross section cavity arrangement 23 and 24 allows the use of almost any closure fluid such as air, gas, water, oil or even grease and that the actual fluid volume required is only approximately half of that



required to effect closure of the same stroke and force as in conventional known air and hydraulic pistons and cylinders. In addition, there are considerable advantages in the actual construction of the closure whereby, for example, it does not need honed internal cylinder walls and chromed and micro-ground piston shafts and the like. It also does not require fluid piston seals and glide rings, shaft seals or the like and nor does it require filtrational lubrication of the actuating fluid amongst others.

The closing jaws are provided with well rounded areas at each end illustrated at 30 and 31 in figures 3, 4 and 5 to eliminate or substantially reduce the crushing effect which develops when the valve sleeve is compressed which is a serious defect in many of the pinch valves already in use. Other advantages of the invention will spring readily to the mind of those skilled in the art.



Having now particularly described and
ascertained my said invention and in
what manner the same may be performed
I/we declare that it is complete.

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CLAIMS:

1. A valve closure means including a housing adapted at least partly to embrace a deformably resilient valve sleeve; at least two co-acting jaw members within the housing and disposed transverse the valve sleeve; inflatable diaphragm means associated with each jaw member and adapted in a first or deflated configuration, to allow its jaw member to rest upon an outer peripheral zone of the valve sleeve and in a second or inflated configuration, to drive its jaw member towards its co-acting jaw member so as to pinch the valve sleeve between the jaws.
2. A valve closure means according to Claim 1 in which each inflatable diaphragm displays a substantially triangular cross section and is located in a complementally shaped cavity in the housing of the closure means.
3. A valve closure means according to Claim 1 or Claim 2 in which each jaw member displays a half-dumbbell shape in end elevation; the rounded ends of the dumbbell allowing compression of the valve sleeve by the jaws without crushing of the valve sleeve to the point of fracture or delamination of the elements of its construction.



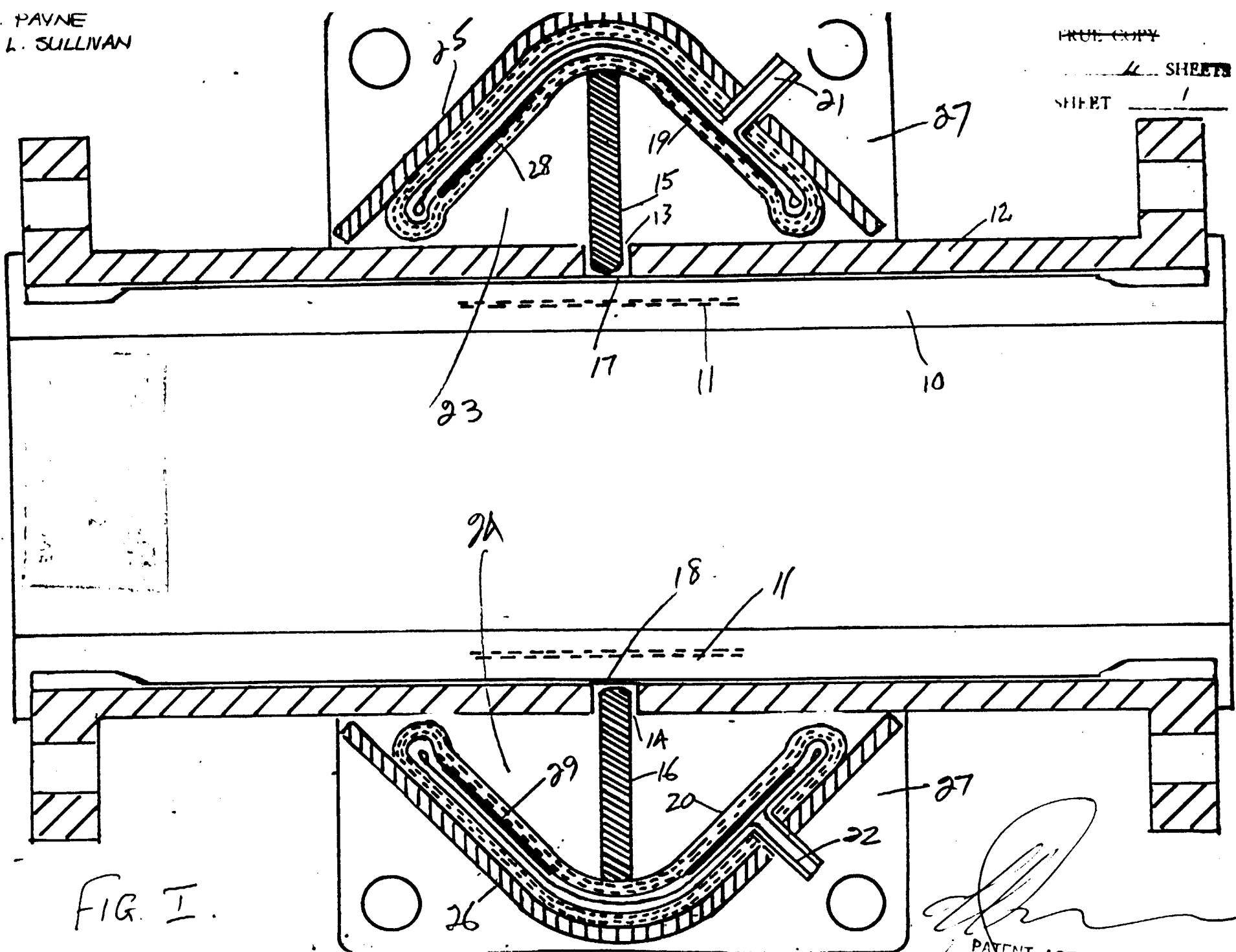
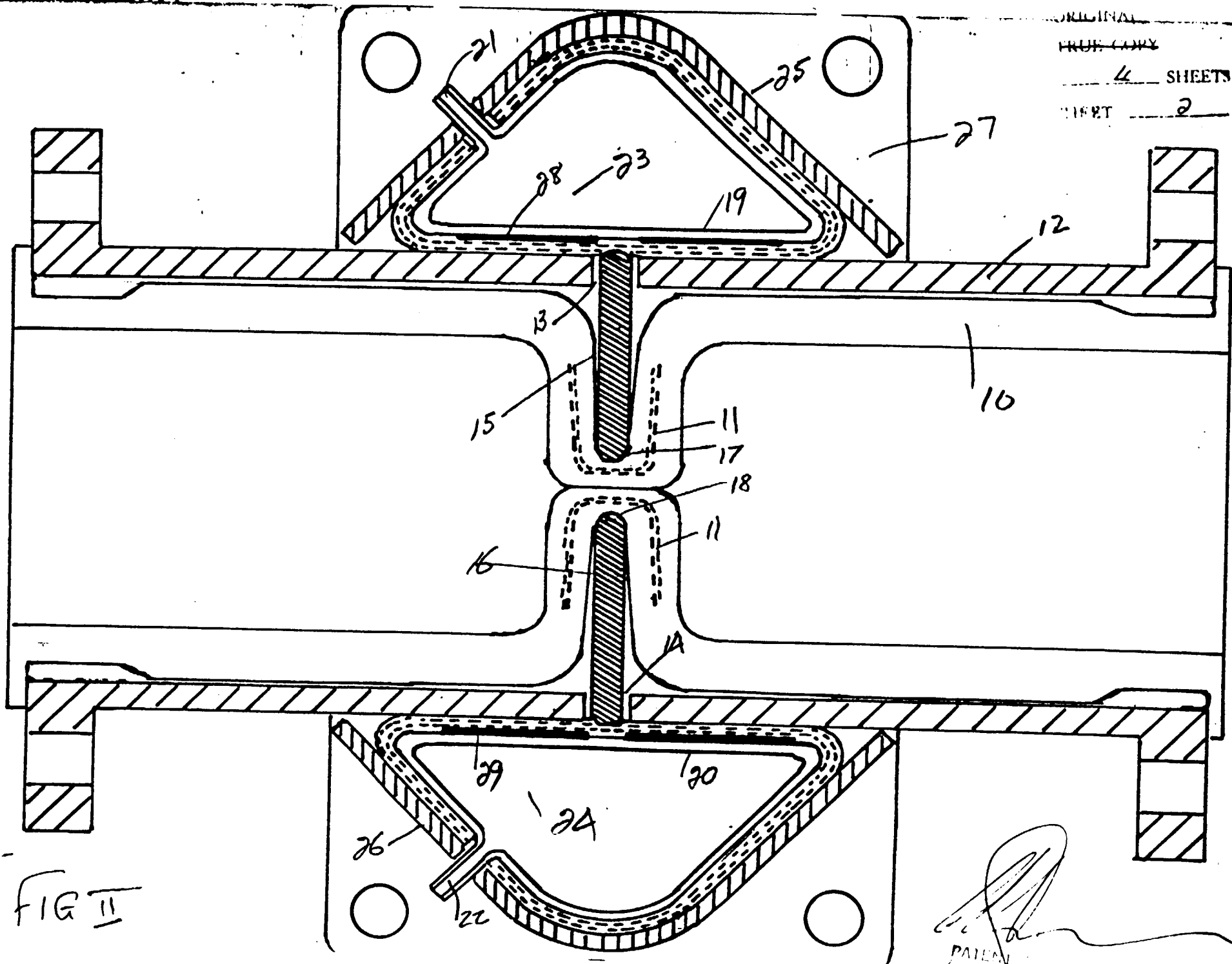


FIG. I.

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PATENT AGENT FOR THE ABOVE



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FIG II

[Signature]
PATMAN

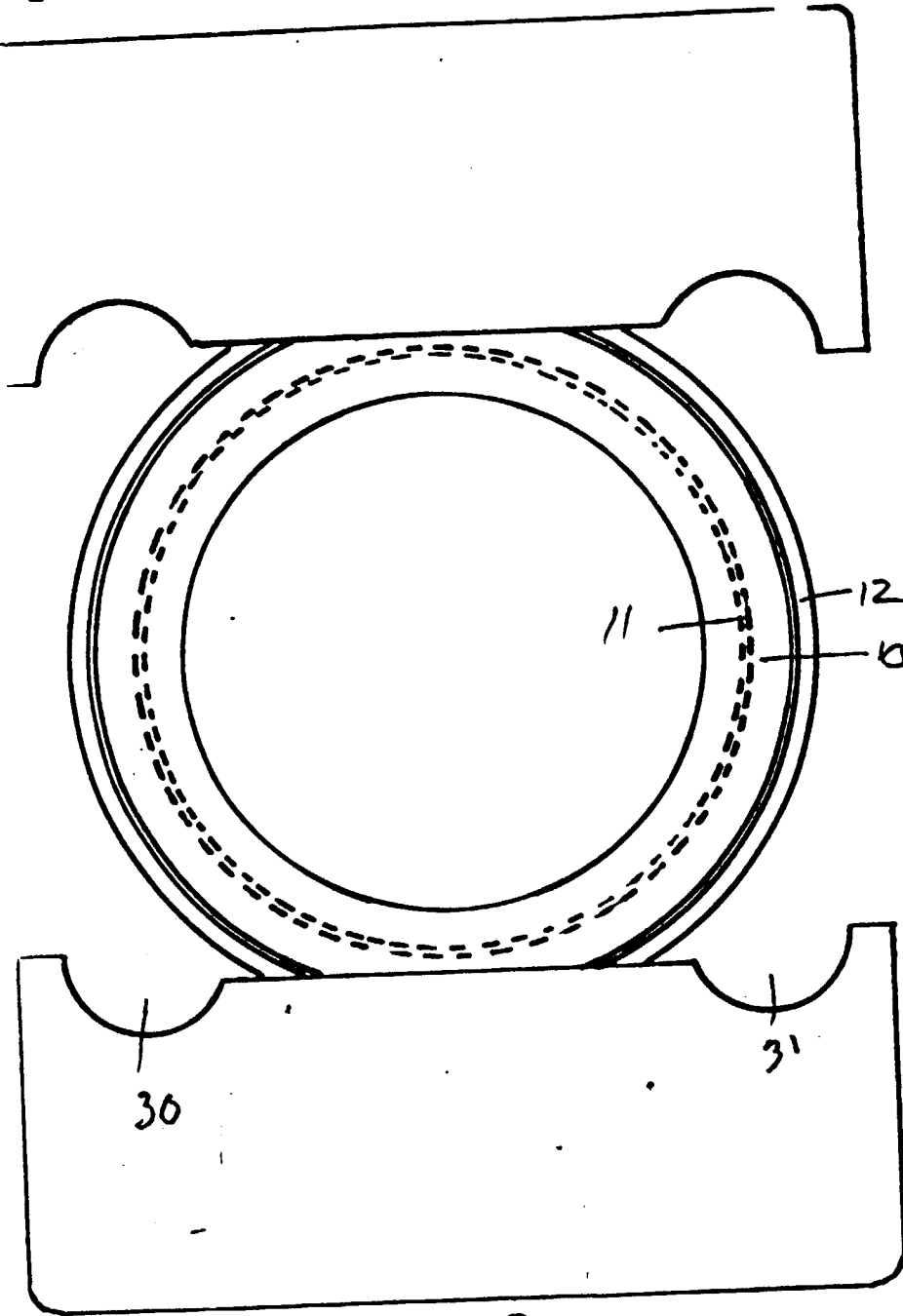


FIG. III

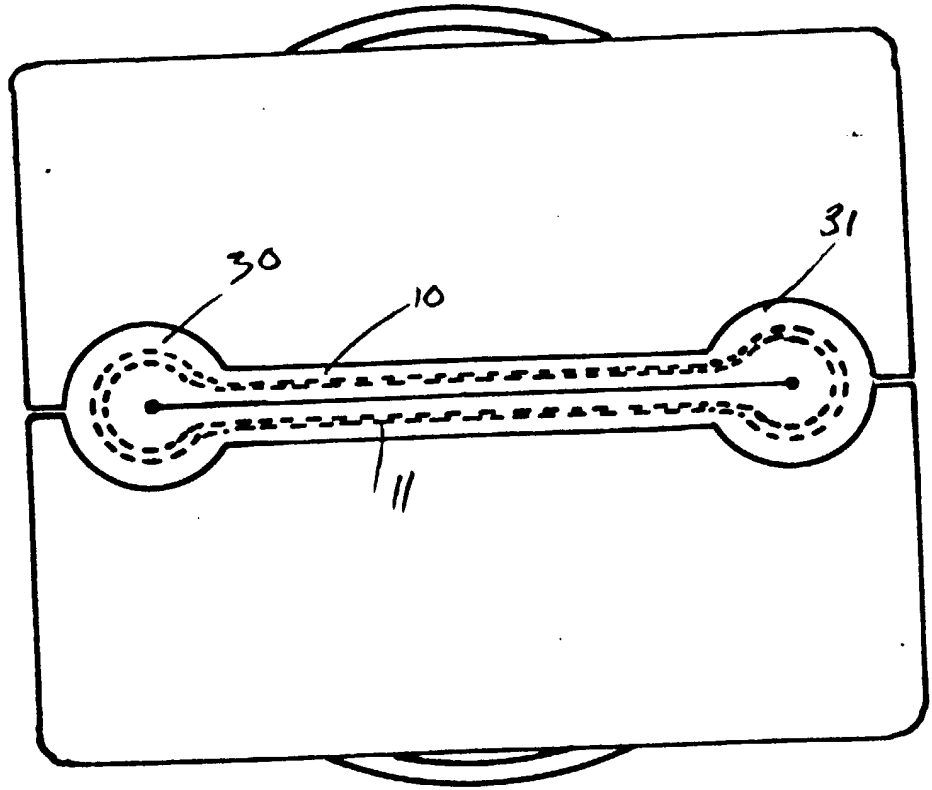


FIG. IV

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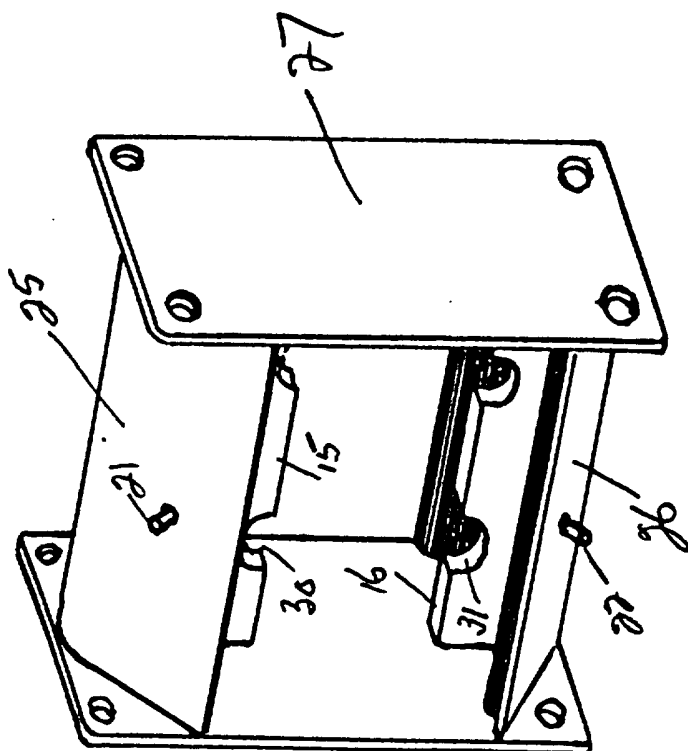
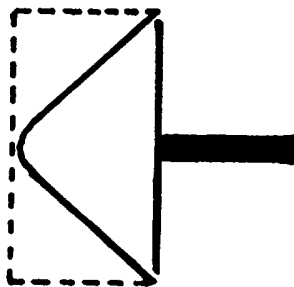
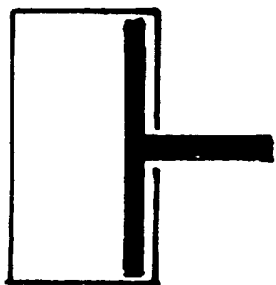
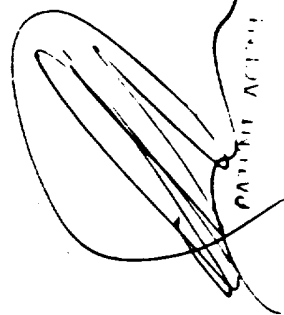


FIG V



PAYNE AND SULLIVAN