

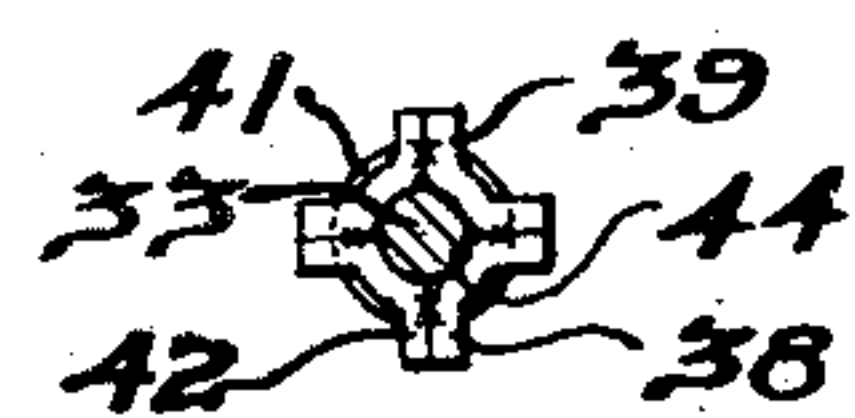
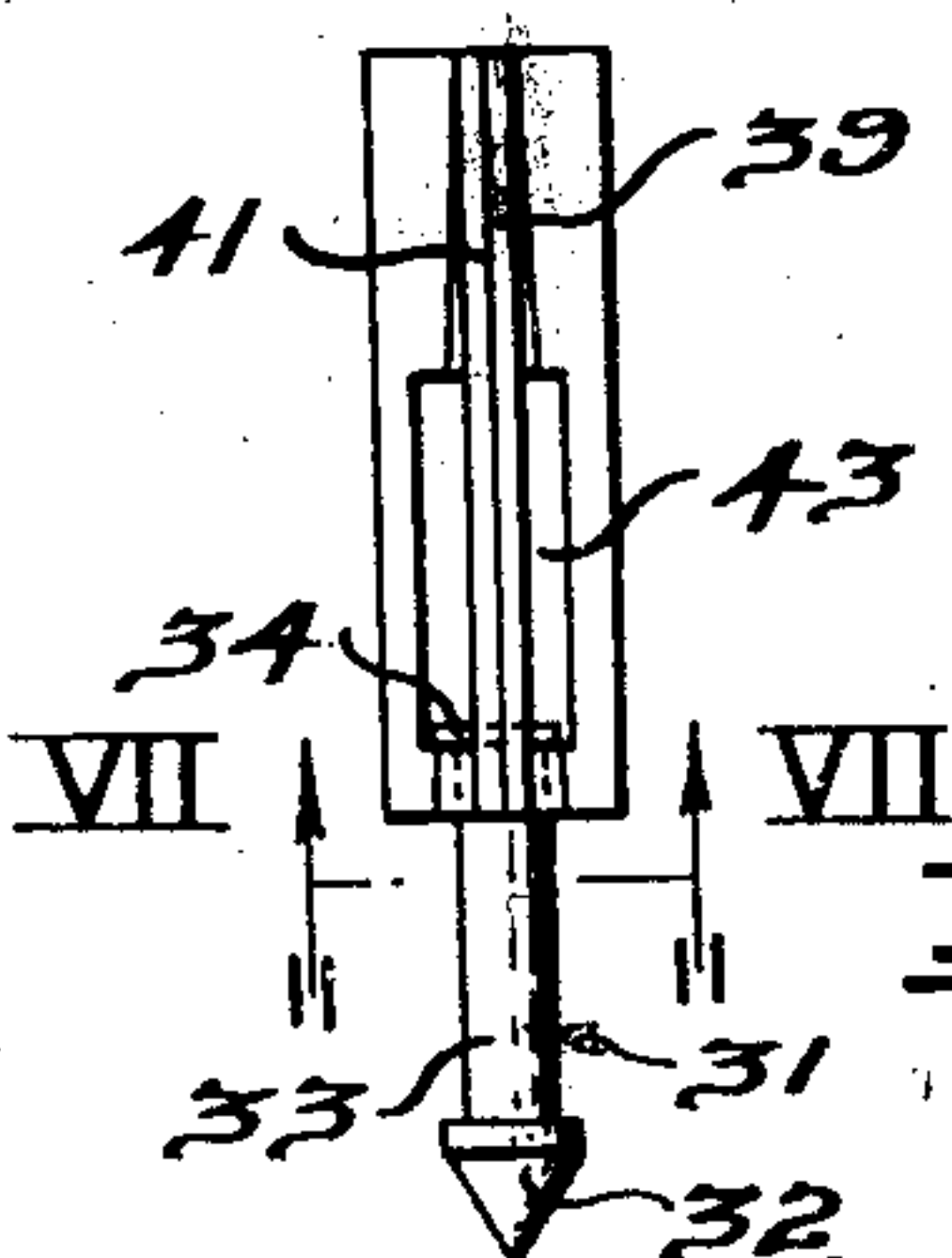
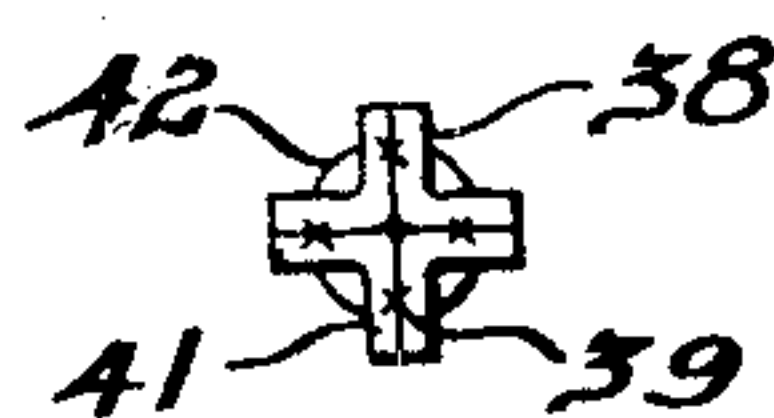
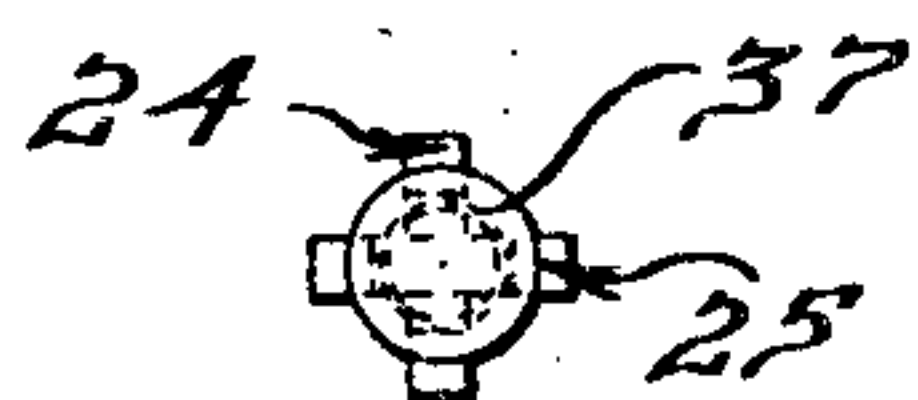
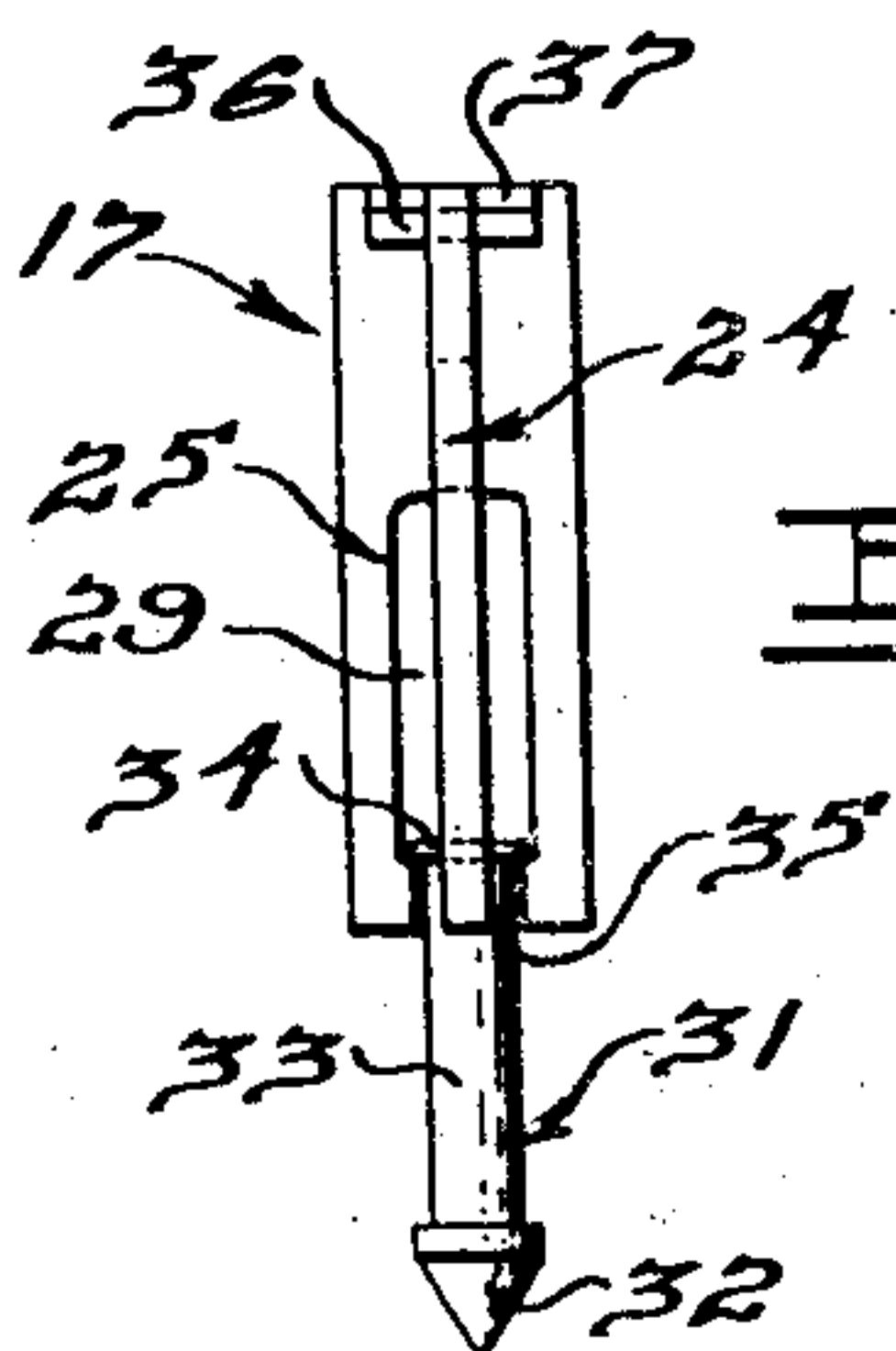
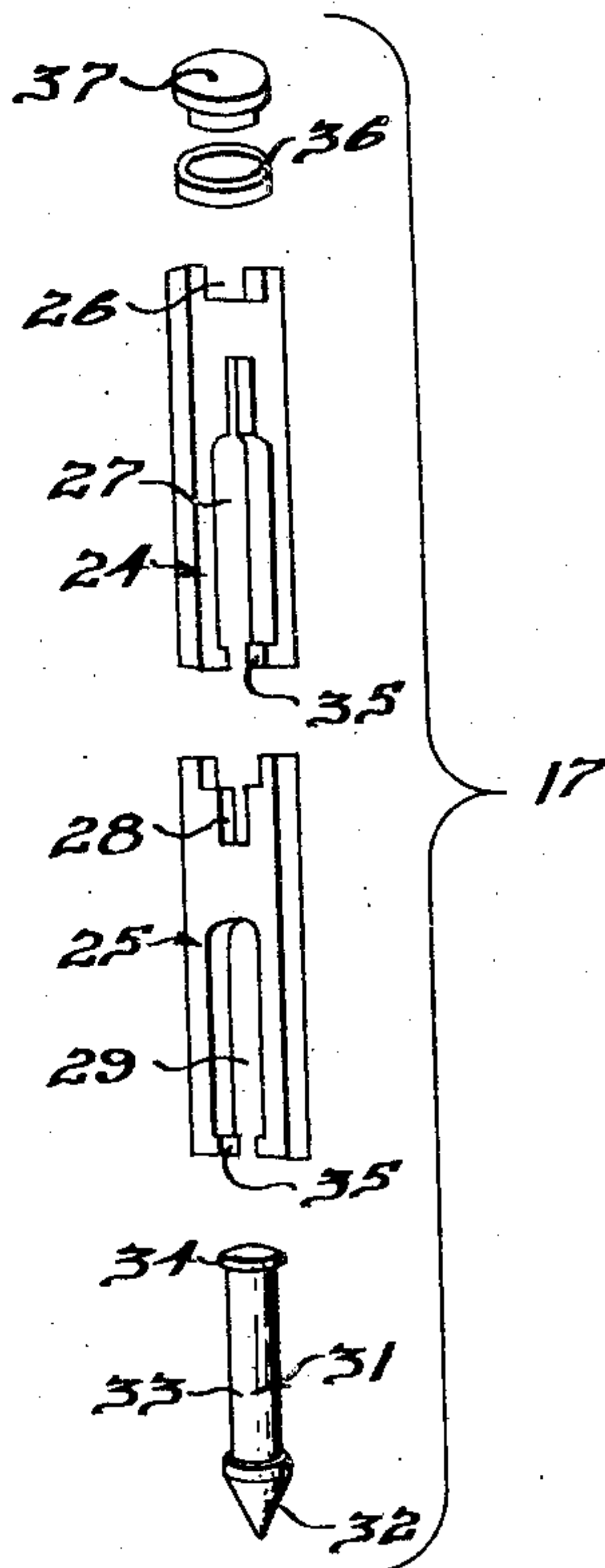
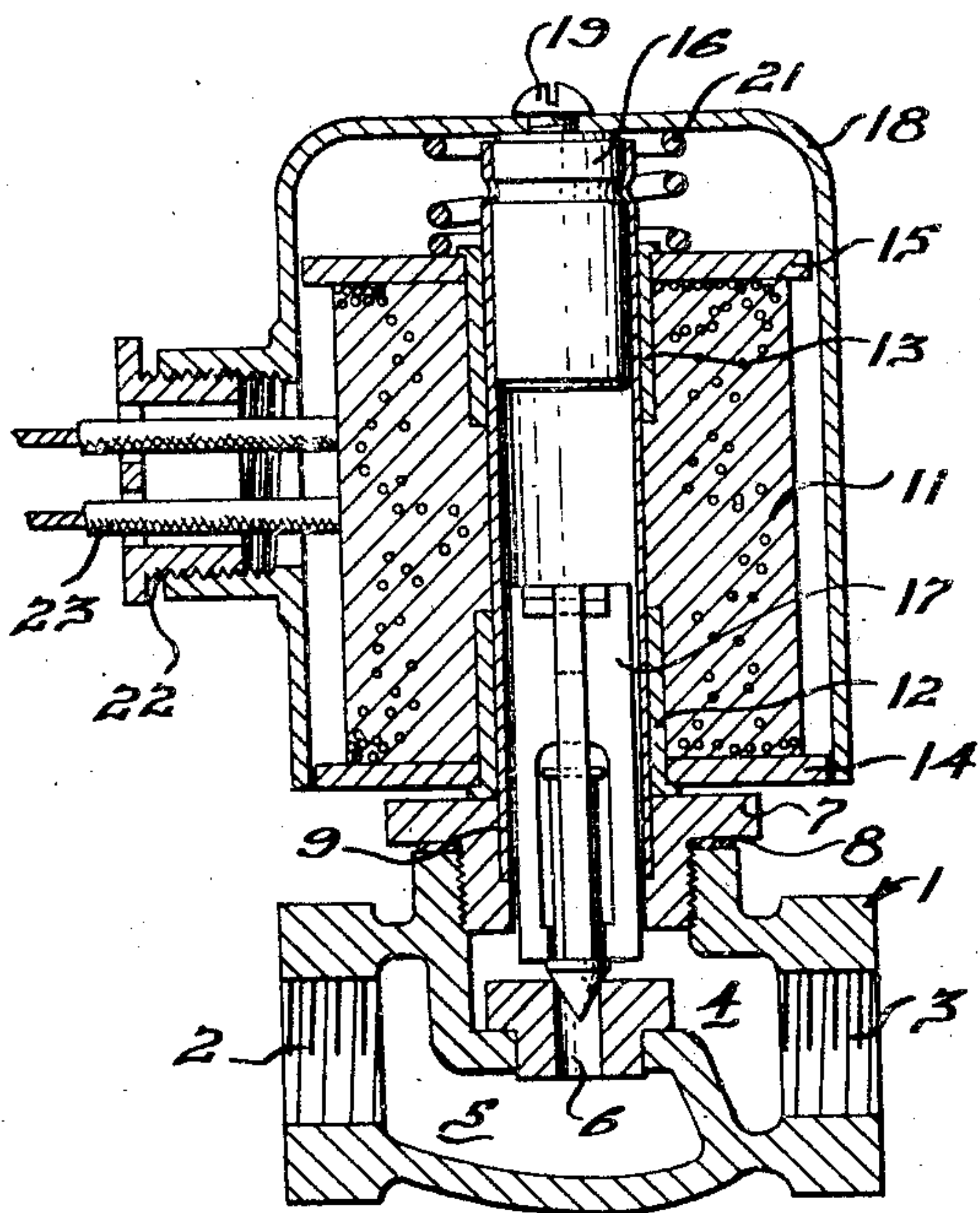
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2,343,806

VALVE

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2,343,806

VALVE

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4 Claims. (Cl. 137—139)

This invention relates to valve construction and more particularly to electromagnetically operated valves of the type known as solenoid valves.

One object of the present invention is to provide in an electromagnetically operated valve an improved form of valve actuator.

Another object of the present invention is to provide a movable armature or plunger formed of simple stampings and providing for lost motion connection to a valve pin having an integral abutment head.

Other objects and features of the invention will be readily apparent to those skilled in the art from the specification and appended drawing illustrating certain preferred embodiments in which:

Figure 1 is a vertical sectional view of the solenoid valve according to the present invention.

Figure 2 is a front elevational view of the armature member.

Figure 3 is a top view of the armature member.

Figure 4 is an exploded view in perspective of the armature member.

Figure 5 is a front elevational view of a modification of the armature member.

Figure 6 is a top view of the modification.

Figure 7 is a sectional view taken on the line VII—VII of Figure 5.

The valve, as illustrated in the drawing, is in its deenergized or closed position, and comprises a valve casing 1 having an inlet 2 and an outlet 3, and communicating passages 4 and 5 therebetween. A valve seat 6 is threadedly secured within the casing 1 between chambers 4 and 5. Threaded into the casing 1 and positioned directly above the valve seat 6 is a bushing 7 which is removable to permit access to within the casing. At the outer junction of the bushing 7 with casing 1, there is disposed a gasket 8 to prevent leakage.

A non-magnetic tube 9 is fitted into the opening in the top of bushing 7 and is rigidly secured therein as by soldering or brazing. An energizing coil 11 is disposed about the tube 9 together with a pair of magnetic sleeves 12 and 13 and a pair of magnetic washers 14 and 15, the sleeves and washers being mounted at either end of the coil. The coil 11 rests upon the lower washer 14 which is supported upon an annular seat provided by the lower magnetic sleeve 12, the sleeve 12 in turn resting upon the upper face of the bushing 7. Rigidly secured, as by soldering, within the upper portion of the tube 9 is a plug

member 16, against which a plunger or armature member 17 is adapted to abut upon energization of the coil 11. A cover 18 of magnetic material is disposed about the coil 11 and the washers 14 and 15 and is supported by the plug member 16. The plug 16 is interiorly threaded at the top thereof to receive a holding screw 19 to secure the cover 18 in place. Disposed between the cover 18 and the upper magnetic washer 15 is a spring 21 exerting its bias to securely hold the elements disposed about tube 9 in assembled position. An opening 22 in the side of the cover 18 permits the passage of lead-in wires 23 for the energizing coil 11.

The plunger 17 is disposed within the tube 9 and is reciprocally movable therein upon energization and deenergization of the coil 11. The plunger or armature 17, shown in detail in the exploded view of Figure 4, comprises two flat stampings 24 and 25, stamping 24 being provided with slots 26 and 27, and stamping 25 being provided with slots 28 and 29 as shown. The upper slot 28 in stamping 25 and the lower slot 27 of the stamping 24 are so shaped as to provide for an interlocking engagement of the stampings with one another and at right angles longitudinally to one another. The stampings are held in their interlocked position by welding or in any other well known manner. Within the space provided between the defining edges of the elongated slots 27 and 29 in the interlocked position of the stampings there is slidably disposed a unitary valve pin 31 comprising a valve plug 32, a shank 33 and an integral head portion 34, with the shank 33 being extendible beyond the lower extremities of the stampings and adapted to be moved within the space defined. Engagement of the integral head 34 with ledge portions 35 provided at the lower extremities of the members 24 and 25 prevents disengagement of the valve pin from the stampings. This construction, as described, provides a lost motion connection between the interlocked stamped members 24 and 25 and the valve member.

A shading coil 36 is carried by the stamped members 24 and 25 fitting into the slots 26 and 28 when the members are interlocked. A plug member 37 is secured to the stamped members 24 and 25 as by welding and maintains the shading coil 36 in position. The shading coil is used for the well known purpose of obviating undesired movements of the plunger within the tube 9 induced by the reversal of direction of alternating current twice during each cycle. The sec-

ondary flux provided by the shading coil furnishing a holding force upon the armature 17 which is sufficient to prevent vibration thereof.

Assembling of the armature or plunger 17 into final form is a relatively simple matter. Valve pin 31 is fitted between the defining edges of slots 27 and 29 when the stampings are in semi-assembled position, the head of the pin being then easily movable into the space between the slot defining edges. With the movement of the stampings 24 and 25 into final position, the edges of the elongated slots 27 and 29 will define an enclosure about the valve member 31 and the ledge portions 35 being engageable with the integral head 34 of the valve member 31 prevents its being removed therefrom. The shading coil 36 and the plug member 37 are then inserted within the upper slots 26 and 28. The members 24 and 25 and the plug member 37 may then be welded to maintain the parts in assembled position.

A modification is illustrated in Figures 5, 6, and 7. This embodiment of the invention comprises four stamped members 38, 39, 41 and 42 differing from stamped members 24 and 25 in that they are slotted only as at 43. Each of the members is bent longitudinally upon itself to form a substantially right angled configuration. The lower portion of the stamped members are bent in such a manner as to leave an opening 44 through which the lower portion of the valve member 31 may extend. The members are maintained in position as by welding.

While certain preferred embodiments of this invention have been specifically disclosed, it is understood that the invention is not limited thereto, as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims.

What is claimed is:

1. An armature member for an electromagnetically operated valve comprising a plurality of stamped members, each of said stamped members including a pair of spaced, elongated leg portions, said stamped members being interengageable and having the leg portions thereof similarly directed, a valve member, an integral head thereon, said leg portions of said stamped members cooperating with one another to define a substantially enclosed space within which said head is disposed and is axially movable, and means provided by said leg portions to retain said head therebetween thereby effecting a lost motion connection between the valve member and said stamped members.

2. An armature member for an electromagnetically operated valve comprising a pair of stamped members, each of said stamped members including a pair of spaced, similarly directed, elongated leg portions and each member having a slot therein, which slots extend from opposite edges of said stamped members whereby said members may be interfitted, a one piece valve member having an enlarged portion serving as a

head therefor, said leg portions of said stamped members cooperating with one another to define a substantially enclosed space within which said head is disposed and is axially movable, a projection provided at the end of each of said leg portions of said stamped members, the projection on one leg portion of a stamped member being directed toward the projection on the opposite leg portion, said projections operating to retain said head of said valve member within said enclosed space to provide a lost motion connection between said stamped members and said valve member.

3. An armature member for an electromagnetically operated valve comprising a pair of substantially rectangular stamped members, each of said stamped members including a pair of spaced, similarly directed, elongated leg portions, and each of said stamped members having a slot therein centrally located with respect to its width and extending from opposite edges of said stamped members whereby said stamped members may be interjoined at substantially right angles to one another, a valve member, a head portion integral therewith, said leg portions of said stamped members being adapted to embrace said head portion of said valve member and to define a substantially enclosed space within which said head portion is axially movable, means to retain said head portion between said leg portions to provide a lost motion connection between said valve member and said stamped members.

4. An armature member for an electromagnetically operated valve comprising a pair of substantially rectangular stamped members, each of said stamped members including a pair of spaced, similarly directed, elongated leg portions, and each of said stamped members having a slot therein, the slot in one stamped member extending from the space defined by the pair of legs thereof, and the slot in the other of said stamped members extending from an edge thereof and being oppositely directed to said first slot, said stamped members being interjoined by means of said slots and at right angles to one another, a one piece valve member comprising a shank and an enlarged portion, said enlarged portion providing a head therefor, said leg portions of said stamped members being adapted to embrace said head and being spaced about the periphery thereof substantially equidistant from one another, said leg portions defining a substantially enclosed space within which said head portion is axially movable, a projection provided upon each of said leg portions, the projections on one pair of leg portions being oppositely directed to one another, said projections operating to retain said head of said valve member within said substantially enclosed space but permitting the movement of the shank of said valve member therebetween, to thereby provide a lost motion connection between said valve member and said stamped members.

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