

March 11, 1941.

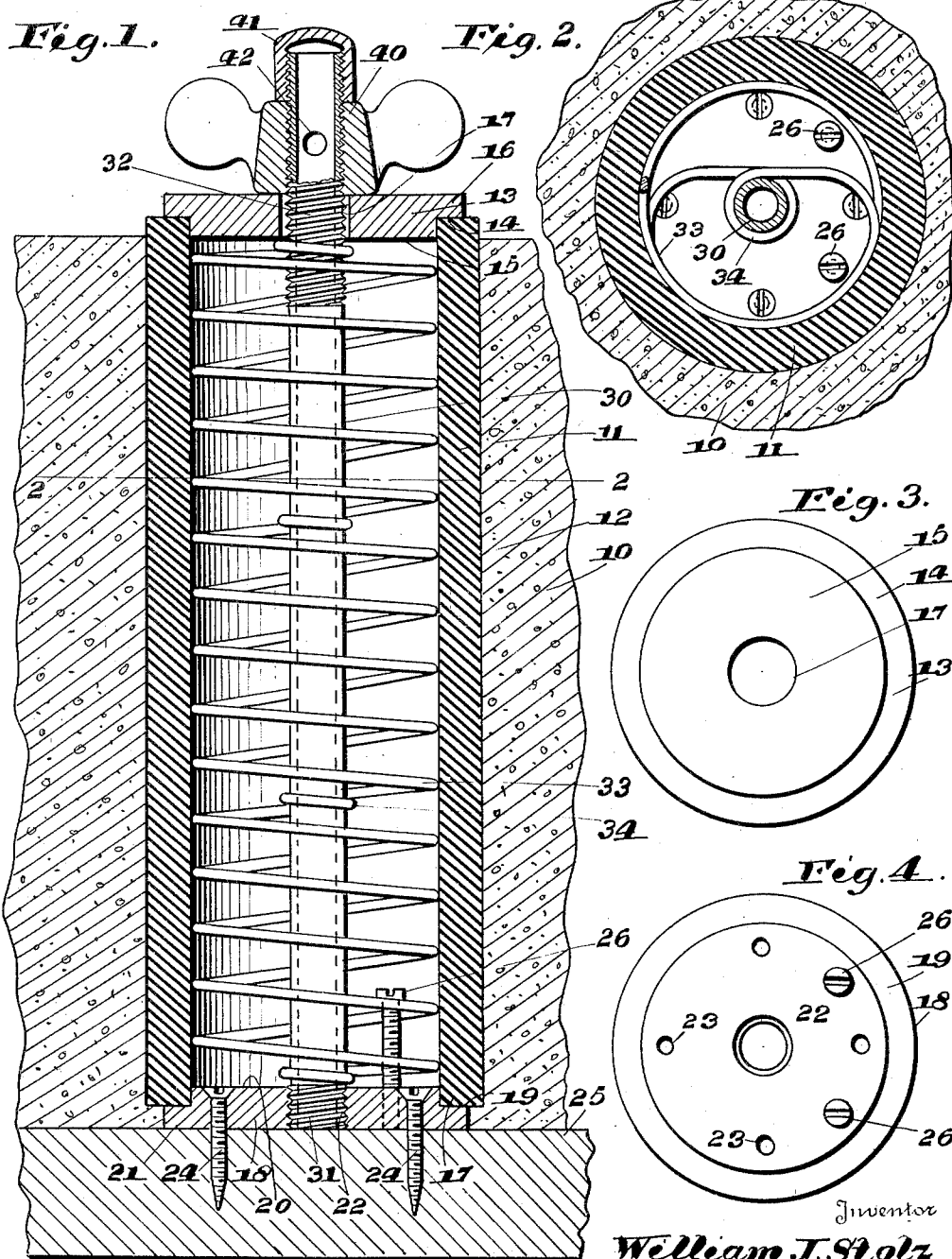
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2,234,784

DEVICE FOR FORMING PASSAGES IN CONCRETE

Filed Sept. 23, 1939

2 Sheets-Sheet 1



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Fig. 5.

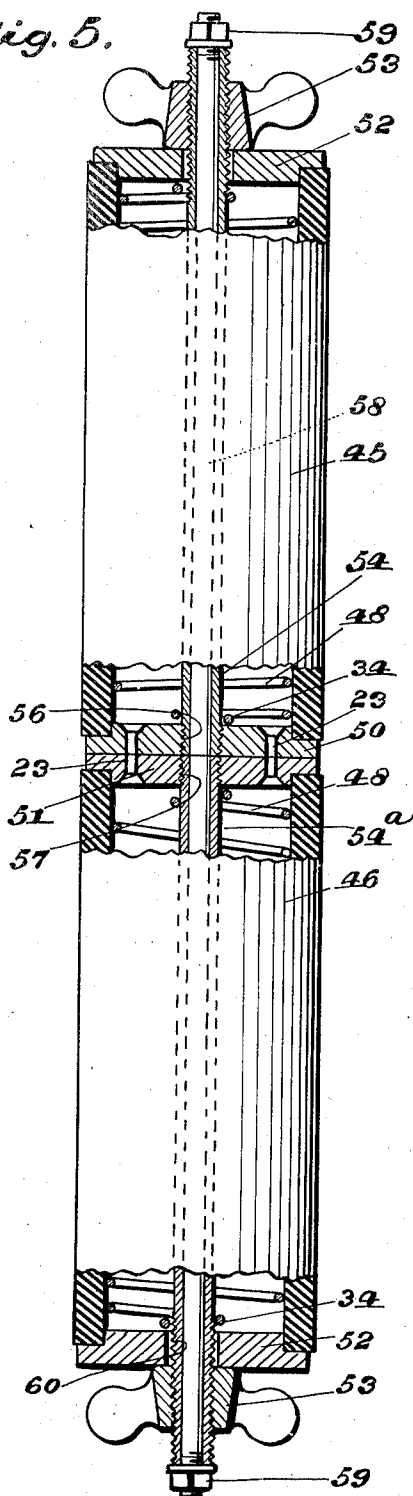


Fig. 6.

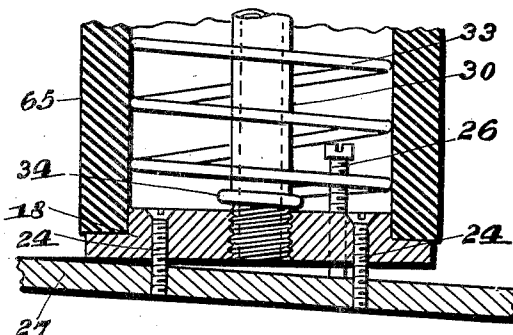


Fig. 7.

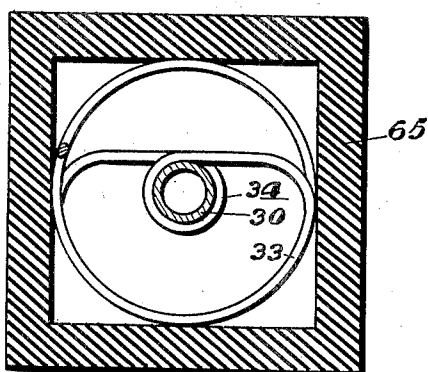
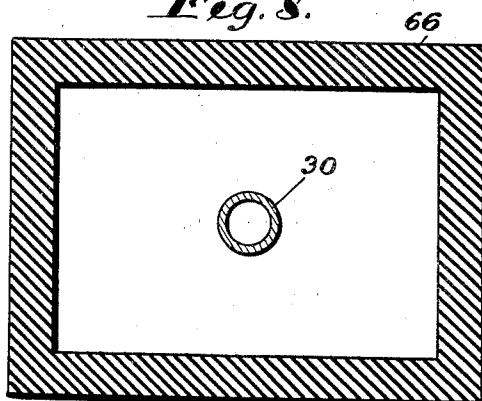


Fig. 8.



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UNITED STATES PATENT OFFICE

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DEVICE FOR FORMING PASSAGES IN
CONCRETE

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Application September 23, 1939, Serial No. 296,301

4 Claims. (Cl. 25—128)

This invention relates to a removable pipe sleeve.

It has been proposed to form passages in floors or walls in reinforced concrete buildings through which pipes of various types are passed and these passages are formed by constructing wooden boxes in connection with steel and conductor pipes filled with sand which must be carefully attended when the concrete is poured and during the setting of the concrete. All of these elements, however, must be destroyed before they can be removed which causes added expense for labor and material.

It is an object of the present invention to provide a removable form for constructing passages in concrete used in buildings so that pipes of various kinds employed for plumbing, heating and other equipment may be inserted through the passages, the removable form including a rubber or elastic sleeve which is expanded internally by a coil spring when pressure is exerted upon the opposite ends of the spring, the spring, sleeve and associated elements being removable from the passage after the poured concrete has set for use many times thereafter.

Another object of the invention is the provision of a device for forming openings in the walls of buildings when concrete is employed in which an expansible sleeve is secured in position at the desired point with internal means for expanding the sleeve so that after the concrete has been poured and set around the sleeve the same may be retracted and withdrawn to leave a passage of suitable diameter for the insertion of various kinds of pipes.

A further object of the invention is the provision of a passage forming device in concrete walls or floors in which an elastic and expansible sleeve is first positioned by plates, a centrally disposed pipe and an internally disposed spring or other expansible means for causing the sleeve to be expanded while nuts or other suitable devices are employed for causing the closures or plates at the opposite ends of the sleeve to be forced towards each other.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawing forming a part of the specification; nevertheless, it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications as define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a vertical section of a device constructed in accordance with the principles of my invention,

Figure 2 is a horizontal section taken on the line 2—2 of Fig. 1,

Figure 3 is a top plan view of one closure plate,

Figure 4 is a bottom plan view of another closure plate employed at the opposite end of an expansible sleeve,

Figure 5 is a view in elevation partly in section of a modified form of a passage-forming device,

Figure 6 is an enlarged vertical section showing means for maintaining the horizontal position of the lower closure plate when the device is set in position,

Figure 7 is a modified form showing the tube square in section, and

Figure 8 is a horizontal section of another form showing the tube as rectangular in cross section or the tube may be oblong with rounded corners.

Referring more particularly to the drawings, 10 designates a section of a concrete of a building structure through which a passage must be formed for the insertion of one of the various pipes used in connection with the building such as the waste pipe, water pipes of the heating system or electric conduits.

These openings are ordinarily formed by a construction which must be torn down after the concrete has been set and the material is then discarded and new ones must be built for other openings.

The passage-forming device includes a sleeve 11 which may be made of any elastic material such as rubber or a composition product and the external diameter of the sleeve is substantially the same diameter of a pipe which is adapted to be inserted through an opening 12 in the concrete.

A metal plate 13 has an annular groove 14 at its underface and at the periphery to provide a shoulder 15 which is received by the upper end of the sleeve 11. This annular groove also provides an annular flange 16 which rests upon the upper end of the sleeve. The plate is further provided with a centrally disposed opening 17.

The lower end 11 of the sleeve is closed by a metal plate 18 which also has an annular groove 19 at its inner face and at the periphery to form a shoulder 20 which is received by the lower end of the sleeve. The groove also provides a flange 21 upon which the outer lower end of the sleeve rests. The plate 18 has a central threaded opening 22 which is in line with the threaded opening 17 in the plate 13.

The bottom plate 18 is provided with passages 23 to receive screws 24 for securing the plate to a work form 25 which is employed for holding temporarily the concrete around various reinforcements or beams until the concrete has set. These forms are employed for constructing the walls or floors of a reinforced building.

When the part to which the plate 18 is adapted to be secured is not horizontally disposed, levelling screws 26 are used, as shown in Figs. 1, 4 and 7, for raising a portion of the plate 18 until it is located in a horizontal plane. Where it is necessary to locate the center of the pipes in the steel arch pans 27 (Fig. 7) the levelling screws are ordinarily required. However, where the wood form has not been properly levelled these set screws are screwed downwardly until the plate 18 is located in a horizontal plane.

A hollow tube 30 is located longitudinally of the sleeve 11 and along the longitudinal axis thereof and the lower end, as shown at 31, is screwed into the threaded opening 22 in the plate 18 while the upper threaded end, as shown at 32, extends through the opening 17 in the plate 13 and beyond said opening.

A spiral spring 33 is located within the sleeve 11 so that the outer portions of the convolutions of the spring will be substantially in engagement with the inner walls of said sleeve and this spring extends normally between the top and bottom plates 13 and 18, respectively, and is neatly fitted therein without exerting any pressure on the side walls of said sleeve. At spaced points portions of certain of the coils are closely wound around the pipe 30, as at 34, to not only center the spring and for maintaining the same in position but for providing rigidity. The portions 34, however, have a sufficient diameter so that the spring may be readily inserted over the pipe and also may be readily slipped off the pipe.

A wing nut 40 is screwed onto the outer threaded end 32 of the tube 30 for exerting a pressure on the plate 13. A cap nut 41 is screwed onto the outer extended end of the tube to prevent concrete from getting into the threads of the tube.

The pipe 30 is provided with diametrically disposed openings 42 into which may be inserted a screw driver or other suitable device for turning the same when the pipe is either screwed into or out of the pipe opening 32 in the bottom plate 18.

The device is assembled as follows: The bottom plate 18 is screwed onto the form 25 at a point where it is desired to have a passage in the concrete for the insertion of a pipe so that the center of the opening 22 is in a line with the center of the opening to be formed. Screws are then passed through the plate and forced into the member 25 to secure the plate in position. The sleeve 11 is then placed upon the plate 18 so that its lower end will receive the shoulder 20 of said plate. The pipe or tube 30 is then screwed into the opening 22 whence the spring 30 is slipped over the pipe.

The plate 13 is then positioned on top of the tube so that the projecting end of the pipe will be received by the opening 17 in said plate. The thumb nut 40 is then screwed downwardly onto the plate 13 and the compressed spring 33 will cause the elastic walls of the sleeve to bulge outwardly and uniformly throughout its length. The cap nut 41 is then screwed into place. The concrete is then filled into the form around the sleeve 11 and allowed to set after which the elements of the passage-forming device may be

separately removed, leaving the passage or opening 12 in the concrete.

In disassembling the device the cap nut 41 and the wing nut 40 are removed as will be the plate 13. The coil spring 33 is then withdrawn.

A suitable tool (not shown) in the shape of a fork is pressed downwardly so that the legs of the fork will straddle the walls of the tube 11 both on the inside and outside of the tube. The fork is then twisted by a suitable handle so that the tube will be rolled up after which it may be withdrawn.

The screws 24 are removed and by drawing on the tube 30 the plate 18 will then be removed.

As has been previously explained in those cases where that part of the concrete form to which the plate 18 is applied is not level or in a horizontal or in a vertical plane the levelling screws are threaded in the passage in the plate 18 for moving one end of the plate until the plate is in proper position.

Referring more particularly to Fig. 5 it will be seen that a modified form of the invention is disclosed in which a pair of sleeves 45 and 46, shown in Fig. 1, are aligned end to end.

A coiled spring 48 is located in each sleeve with the inner ends abutting the plates 50 and 51 while the outer ends abut the respective closures 52. Wing nuts 53 are screwed onto the outer threaded ends of the tubes 54 and 54a. These tubes are threaded into the respective centrally disposed passages 56 and 57 in the plates 50 and 51 so that the inner ends of these tubes are in alignment.

A rod 58 is passed through the aligned tubes 54 and 54a until the outer threaded ends of the rods project beyond the projecting ends of said tubes. Nuts 59 are screwed onto the outer threaded ends of the rod for drawing the tubes 54 and 54a in rigid alignment. The outer threaded ends of the tubes 54 and 54a pass through openings 60 located centrally of the plates 52. Before the concrete is poured into the form around the sleeves 45 and 46 the wing nuts 53 are screwed onto the rod so that the plates 52 will exert a pressure on the coil springs 48 and thereby cause the sleeves 45 and 46 to be expanded. After the concrete has been poured and set the nuts 59 are removed whence the rod 58 and likewise the wing nuts 53 are then removed and the remaining parts are then disassembled in the manner explained above. The elastic sleeves 45 and 46 are rolled up into a compact mass of smaller diameter than the original diameter.

While the sleeves in Figs. 1 to 6, inclusive, are shown as round they may be made square, as shown at 65 in Fig. 7, or they may be made oblong, as shown at 66 in Fig. 8. The compression of the spring in both of the forms shown in Figs. 7 and 8 will cause the sleeve to be expanded whence the concrete is then poured in and these sleeves are removed in the manner previously described.

The closely wound spiral spring maintains the elastic tube in extended expansion and prevents collapse of said tube.

I claim:

1. A device for forming passages in concrete structural work comprising an elastic sleeve around which concrete is adapted to be poured and which forms a passage in the concrete, a coil spring retaining said sleeve in extended position during the pouring and setting of the concrete, and means for expanding the spring

against the walls of the sleeve for expanding the sleeve before the concrete is poured.

2. A device for forming passages in concrete structural work comprising an elastic sleeve, a
5 coil spring in the sleeve for expanding said sleeve transversely and evenly throughout the length thereof, the material of the sleeve being pliable so that it may be rolled into a unit of reduced diameter and readily removed from the
10 completed passage, and means supported by the ends of the sleeve for compressing the spring and expanding it against the walls of said sleeve.

3. A device for forming passages in concrete structural work comprising an elastic sleeve
15 around which concrete is poured and which is adapted to form a passage in the fixed concrete, a bottom plate adapted to be secured in position to a wall of a form for the concrete and having a shoulder received by one end of the sleeve, a
20 coil spring in the sleeve having the convolutions

thereof in engagement with the walls of the sleeve, a plate for the other end of the sleeve, and means drawing the plates towards each other for compressing the spring and expanding the elastic sleeve.

4. A device for forming passages in concrete structural work comprising an elastic sleeve around which concrete is poured and which is adapted to form a passage in the fixed concrete, a bottom plate adapted to be secured in posi-
10 tion to a wall of a form for the concrete and having a shoulder received by one end of the sleeve, a coil spring in the sleeve having the convolutions thereof in engagement with the walls of the sleeve, a plate for the other end of the sleeve,
15 means drawing the plates towards each other for compressing the spring and expanding the elastic sleeve, and means for raising or lowering one side of the bottom plate.

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