

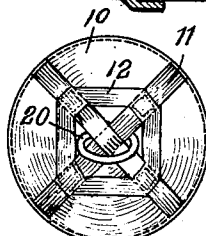
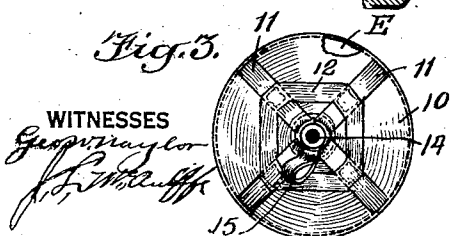
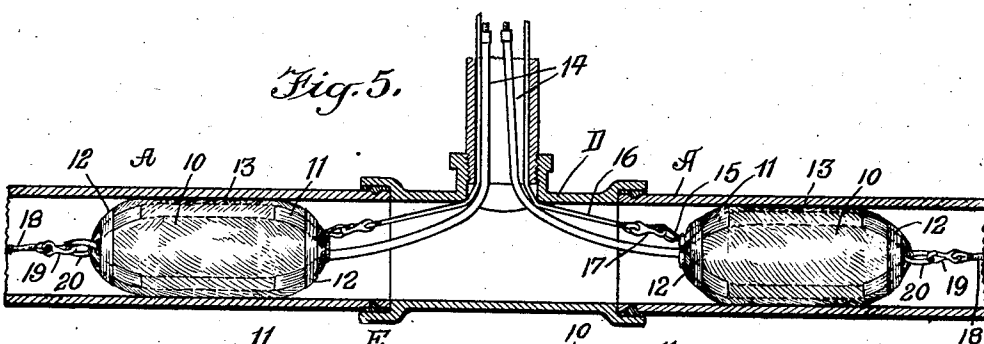
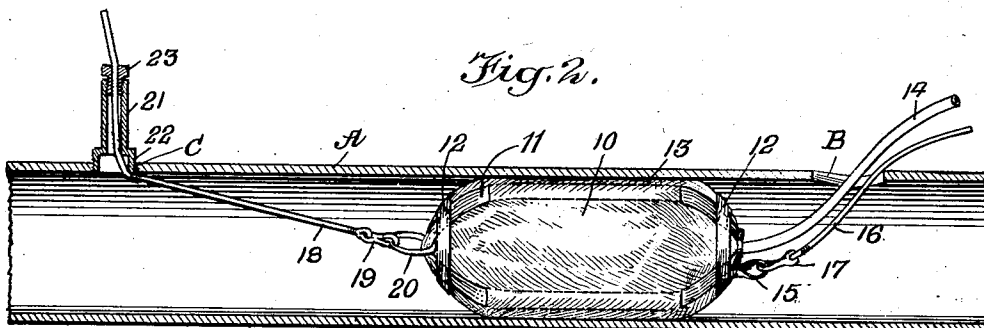
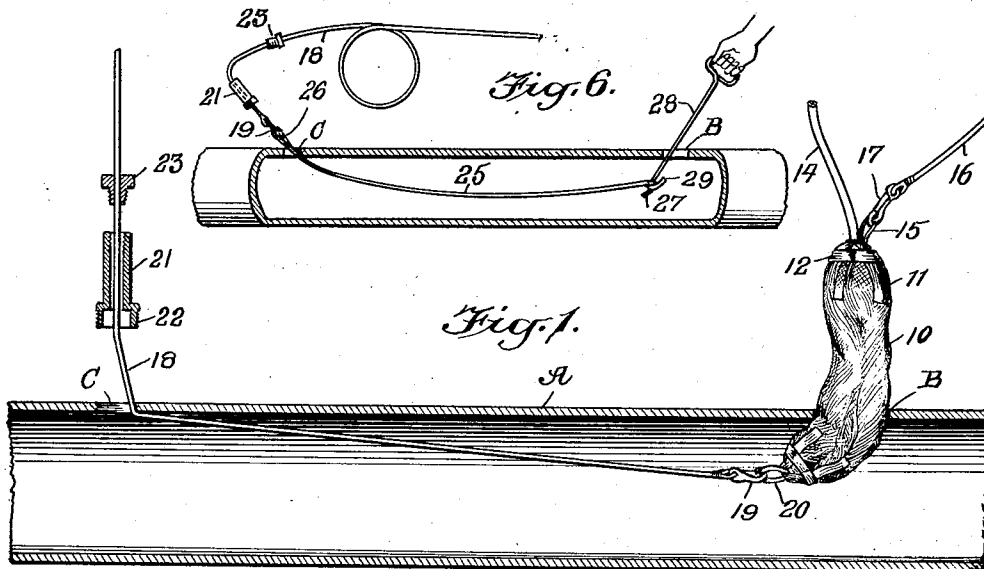
May 27, 1930.

P. GOODMAN

1,760,750

STOPPER FOR GAS AND WATER MAINS

Filed April 25, 1928



WITNESSES
George Taylor
J. L. McLaughlin

INVENTOR
 Patrick Goodman
 BY *Crumley*
 ATTORNEY

UNITED STATES PATENT OFFICE

PATRICK GOODMAN, OF BROOKLYN, NEW YORK

STOPPER FOR GAS AND WATER MAINS

Application filed April 25, 1928. Serial No. 272,792.

My invention relates to a stopper to be employed in gas mains or water mains, and more particularly relates to an inflatable stopper.

5 The general object of my invention is to provide an inflatable stopper which will be effective in forming a complete closure for the main and the proper emplacement of which will not be prevented by buckling and
10 deformation of the stopper after its insertion in the main.

A more specific object of the invention is to provide means at one end for the inflation and removal of the stopper, and means
15 at the other end of the stopper for positively drawing the stopper into position in the main in the emplacement of the stopper.

A further object of the invention is to provide a flexible stopper possessing increased
20 strength and durability.

The nature of my invention and its distinguishing features and advantages will more clearly appear as the description proceeds.

25 Reference is to be had to the accompanying drawings forming a part of this specification, it being understood that the drawings are merely illustrative of one example of the invention.

30 Figure 1 is a side elevation of my improved stopper showing the same partially inserted in a main and ready to be completely drawn into the main;

35 Figure 2 is a view similar to Figure 1 with the stopper emplaced in position in the main and inflated;

Figures 3 and 4 are end views showing, respectively, the opposite ends of the stopper, the inflating and deflating tube, and the cable
40 or flexible element for drawing the stopper into place and for withdrawing the stopper from the main being omitted;

45 Figure 5 is a view similar to Figure 2 but showing the employment of a pair of the stoppers for closing a main at both sides of a fitting interposed in the main.

50 Figure 6 is a partly sectional side elevation of a section of a main showing means to facilitate the emplacement of the stopper in the main.

In the illustrated example of the invention and its use, the letter A indicates a main, either a gas or a water main, B the hole formed in the main to receive the stopper
55 10 generally of elongated bag form, C a second hole tapped into the main A and a pull cable or the like hereinafter described, and D (Figure 5) indicates a T-fitting connection interposed between the sections of the
60 main A.

The stopper 10 is given as stated the general form of a bag inflatable to receive a bladder E. In the emplacement of stoppers of the general type to which the invention relates the proper placing of the bag within
65 the main presents practical difficulties, because of the fact that the bag is liable to buckle when partially inflated in a manner to prevent the perfect emplacement of the stopper and its proper contact with the main
70 in a manner to act as a stop or closure to the main. Longitudinal strengthening tapes 11 are provided on my improved stopper 10 which cross at the ends of the stopper as
75 best seen in Figures 3 and 4. At the ends of the bag the stopper 10 is reinforced by continuous reinforcing tapes 12 normally rectangular and which are of strong woven material and flexible to conform themselves to
80 the shape of the inflated stopper.

Looking to the proper contact of the stopper at all sides of the main, I run longitudinal reinforcing tapes 11 to the interior of the inflated bag constituting the stopper
85 10 so that the outer material of the bag covers the tapes 11, as indicated at 13, so that the smooth surface of the outer material of the stopper is presented to the main A. Thus the reinforcing tapes 11 lie between the bladder E and the outer material of the stopper
90 10 for the major portion of said tapes.

An inflating tube 14 leads to the interior of the stopper 10 and communicates with the bladder E for inflating the stopper. Also at the same end is a loop 15 with which a haul
95 cable or cord 16 connects by a snap hook 17 or the like.

For the purpose of preventing the buckling of the partially inflated stopper within the main A, I provide for positively drawing the
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stopper into its proper position in the main after passing through the inlet hole B, for which purpose I provide a haul cable 18 suitably connected with that end of the stopper 10 opposite that end to which the removal cable 16 is attached. In the illustrated example the cable 18 is provided with a snap hook 19 engageable with a ring 20 on the stopper 10.

The cable 18 before attachment to the stopper 10 is led through a nipple 21 with a threaded base 22 which is screwed into the hole C, there being a capped nut 23 on said nipple through which the cable 18 is led.

For emplacement of the haul cable 18 I attach thereto in practice a strip 25 of bendable metal, the example shown illustrating an eye 26 on said strip 25 engageable by snap hook 19. The opposite end of the strip 25 has a hook 27 thereon adapted to be engaged by a hooked fishing device 28 adapted to be passed through the hole B.

In practice the strip 25 is passed through the hole C and toward the hole B, the fishing tool 28 being passed inwardly through hole B and engaged with the hook 27, as illustrated in Figure 6. Said strip 25 is then drawn outwardly through the hole B and detached from the snap hook 19, said snap hook 19 being then engaged directly with ring 20 on the stopper 10. The collapsed stopper is then passed inwardly through the hole B as shown in Figure 1 to a position between the holes B and C. Inflation by forcing air through the tube 14 may now be proceeded with, the cable 18 being employed to exert a pull on the adjacent end of the stopper to prevent it from inflation or deformation in a manner that would cause the stopper to bind in the main before being fully inflated. When it is desired to remove the stopper 10 the air is exhausted through the tube 14 and a pull on the out-haul cable 16 serves to pull the deflated stopper outwardly through the hole B.

I would state furthermore that while the illustrated example constitutes a practical embodiment of my invention, I do not limit myself strictly to the exact details herein illustrated, since, manifestly, the same can be considerably varied without departure from the spirit of the invention as defined in the appended claims.

I claim:

1. In a conduit stopper including an elongated flexible inflatable element having a flexible inflating and deflating tube attached to and communicating with one end of said element, a reinforcing means therefor comprising tapes extending longitudinally of said element and crossing at the ends thereof and end reinforcing tapes crossing the longitudinal tapes at the ends of the stopper and secured to the longitudinal tapes and means carried by the crossed tape ends for connection with haul cables.

2. In a conduit stopper including an elongated flexible inflatable element having an outer covering, tapes extending longitudinally of the stopper and crossing at the ends thereof, said tapes for the major portion of their length between the opposite ends of the stopper being disposed between the inflatable element and the outer covering so as to present a smooth unbroken outer surface for contact with the inner periphery of the conduit.

PATRICK GOODMAN.