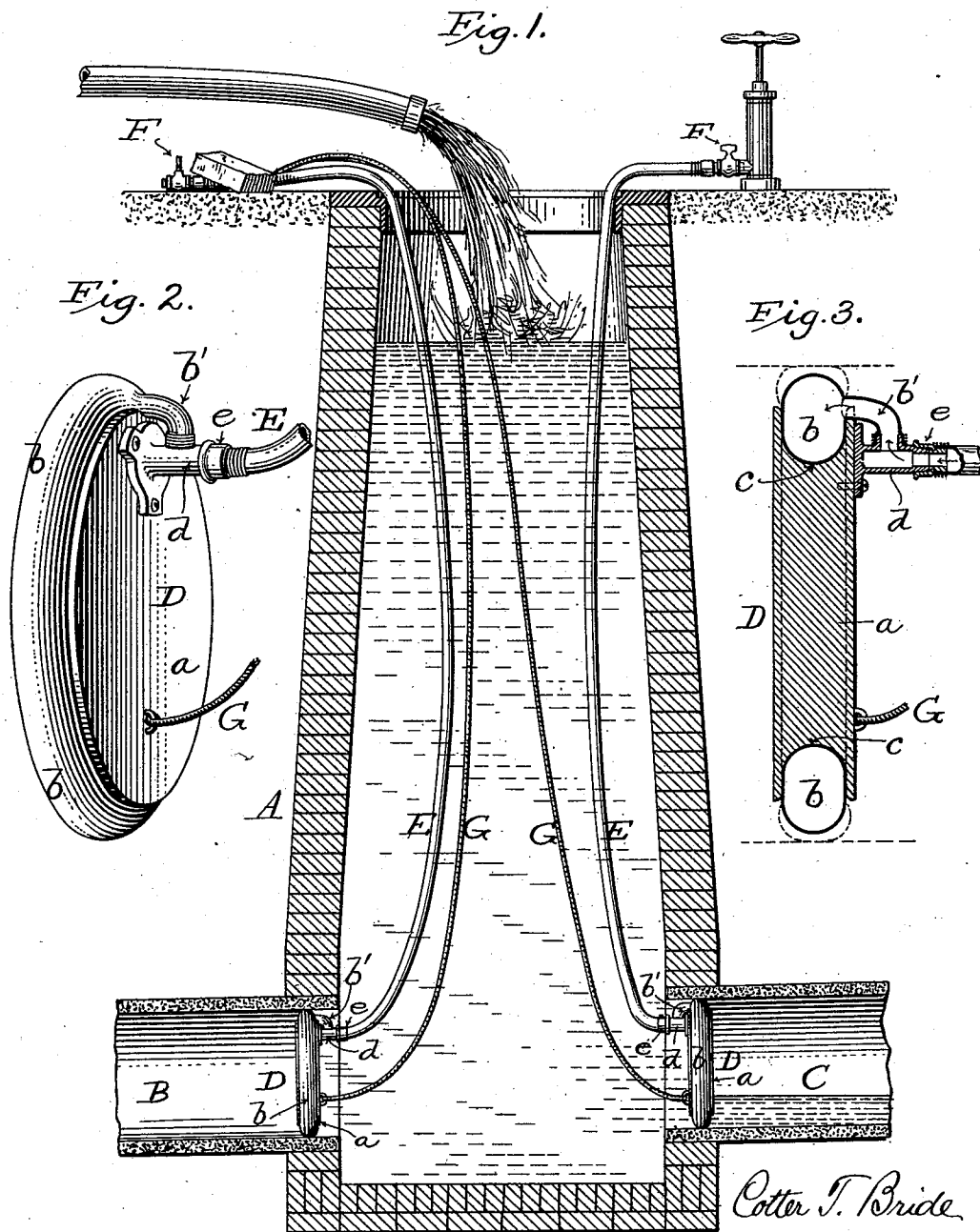


(No Model.)

C. T. BRIDE.
CLOSURE FOR SEWERS, PIPES, &c.

No. 539,568.

Patented May 21, 1895.



WITNESSES
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UNITED STATES PATENT OFFICE.

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CLOSURE FOR SEWERS, PIPES, &c.

SPECIFICATION forming part of Letters Patent No. 539,568, dated May 21, 1895.

Application filed August 4, 1894. Serial No. 519,470. (No model.)

To all whom it may concern:

Be it known that I, COTTER T. BRIDE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Closures for Sewers, Pipes, &c., of which the following is a specification.

My invention consists in a novel closure or dam for sewers, pipes, conduits and drains, and is designed particularly for use in flushing sewers, though applicable also to other purposes.

Briefly described, the device consists of a circumferentially-grooved or recessed disk, encircled by an inflatable ring or packing, the inflation of which causes it to closely fit and fill the interior of the sewer, pipe or passage within which it is placed. The disk gives strength to the structure and support to the ring, and also permits proper attachment of the air pipe, controlling rope, &c., besides reducing the requisite capacity of the ring or inflatable member, and precluding passage of water through distortion of said ring.

In the accompanying drawings, Figure 1 is a vertical sectional view of a sewer and manhole tower or shaft, showing two of the dams or closures in use. Fig. 2 is a perspective view of the closure, and Fig. 3 a sectional view of the same.

A indicates the ordinary manhole tower or shaft, and B and C pipes or branches of a sewer communicating therewith in the ordinary way. The tower A is commonly of considerable height, and is capable of holding a large body of water if the pipes communicating with it be sealed.

D indicates my improved closure or dam, which is employed to close the pipes or branches opening into the manhole tower or shaft, one such closure being used in each pipe or branch, as indicated in Fig. 1.

The closure D comprises a central disk or body *a*, of wood or other suitable material, which is circumferentially grooved, as shown in Fig. 3, and an annular bag or packing ring *b*, of rubber, rubber cloth, or other flexible and preferably elastic material.

The ring or packing *b*, which is preferably

elliptical in cross section, is seated in the groove *c* of disk or body *a*, with its major axis radial to the center of the disk, as shown in Fig. 3,—though it is to be understood that the form and dimensions are optional, and those illustrated are merely suggestive.

By seating the ring or packing in the groove *c* I insure its retention in place upon the circumference of the disk or body *a*, and at the same time give it adequate support to a point near its bearing within the pipe or conduit in which it is placed.

E indicates an air pipe communicating with the interior of the ring or packing *b*, and designed to be connected with an air pump F, of any suitable type. In order that there may be no strain upon the ring or packing through its connection with the air-pipe, I preferably interpose between the two a metallic coupling or connection, *d*, which is firmly secured to the disk or body *a*, and is formed with two communicating tubular necks, as shown in Figs. 2 and 3. To one of these necks is secured a short tube *b'* communicating with the interior of the ring,—while the other is threaded to receive the coupling *e* of air pipe E,—ordinary hose being commonly used for such pipe. By this construction and arrangement I provide for ready attachment and removal of pipe E, and effectually guard against strain upon the ring *b* or its charging tube *b'*.

The pipe E is furnished with a cock F, by which the pipe may be sealed to prevent escape of air and preclude collapse of the ring or packing while the manhole tower or shaft is being filled with water.

G indicates a rope, secured at one end to the disk or body *a*, preferably near the lower side thereof as the device stands when in use. The purpose of this rope is to suddenly tip the disk *a* at the proper time, so that only its thickness shall impede the flow of water through the pipe,—a further pulling of the rope serving to withdraw the closure completely from the pipe or passage. Practically, the device is withdrawn in one quick movement, though ordinarily the initial portion of the movement will be a tipping one, about a horizontal axis.

Measureably good results can be attained through the use of a flexible ring or packing of the form shown, but devoid of elasticity or expansibility beyond its normal size,—provided it be large enough to completely fill the pipe or passage in which it is to be used; but it is better to employ an elastic ring capable of more or less expansion beyond its normal limits, as a closer and better joint or closure is thereby effected.

The disk and ring or packing may be of any desired form and size, according to the passage to be closed,—and while I prefer wood for the disk and rubber for the ring, it is to be understood that iron or other rigid material may be used for the disk or body *a*,—and canvas, leather or other flexible material may be employed for the ring. So too the ring may be inflated or expanded by gas, water or other fluid or liquid.

A very important feature of my invention, and one which distinguishes it from all others of which I have knowledge, is the relatively small capacity of the ring as compared with the diameter of the entire device. This is of importance in that it enables the user to quickly fill and empty the ring or packing, the pressure of the water in the shaft causing it to collapse instantly upon the opening of cock F. It is further important in that there is far less chance for the air to shift and permit indentation or collapse of the ring at some one point, thus allowing the escape or passage of water at such point.

I am aware that it has been proposed to employ a flexible bag as a closure for sewers during preparation for flushing, the bag to be expanded by water, under hydrostatic pressure, and I make no claim thereto. Such a closure requires elevation of the mouth of the charging pipe to a considerable height above the top of the manhole shaft in order to expand the bag and hold it expanded against the water pressure in the shaft,—and necessitates the lowering of the pipe to the bottom of the shaft in order to permit collapse of the bag, which will then be slow. Moreover, the large bag necessarily used will empty and collapse slowly, and remaining in the passageway will impede the flow of water to such an extent as to preclude prompt and thorough flushing, to which the rapid rush of a large volume of water is essential.

I am further aware that it has been proposed to provide the pistons of steam engines with a metallic packing ring, and to expand said ring by the inflation of an expansible ring interposed between the periphery of the piston and said metallic ring. Such construction is unsuited to the purposes of my device, for the reason that a metallic ring such as used for piston packings, cannot adapt itself accurately to the inequalities and irregulari-

ties of sewers and make a tight joint therewith. Even terra cotta pipes are more or less irregular in form, owing to distortion in burning or before, and their surfaces are somewhat rough, while brick sewers are still more irregular, and a metallic packing ring would be practically useless therein.

Finally, I am aware that a flood gate for sewers has been proposed, consisting of a disk having a beveled edge and a packing sheet to cover said edge and aid in closing the sewer,—the gate in such case being retained in operative position by a toggle brace. In this also the capability of adaptation to irregularities of any considerable extent is lacking, and a shoulder within the sewer for the brace to rest against is essential.

By my invention I am enabled to close openings of marked irregularity, and differing materially in form and dimensions from the disk or rigid body of the closure, and this without the aid of braces or supports of any kind.

The operation of the device is obvious, each opening being duly closed by one of the dams or closures,—the shaft being filled to proper level; and then the cock of one or more of the pipes E being opened to permit escape of air from and collapse of the packing ring,—after which the rope is pulled to tip and withdraw the closure. Of course only the valves of those closures will be opened, which control the particular passages to be flushed.

While it is deemed preferable to seat the packing ring in a groove in the circumference of the disk, it is obvious that the groove may be omitted and the ring be cemented or otherwise made fast to the disk. So too, the closure may be used for openings generally.

Having thus described my invention, I claim—

1. A dam or closure for pipes, conduits, &c., consisting of an imperforate central disk or body, and a hollow expansible ring or packing extending around the disk, adapted to be expanded by the introduction of fluid, and arranged to come directly into contact with and to fit itself accurately to the walls or boundaries of the opening to be closed, substantially as and for the purposes set forth.

2. A dam or closure for pipes, conduits, &c., consisting of an imperforate central disk or body, and a hollow or tubular packing ring of elastic material encircling said disk, exposed at its outer periphery, and adapted to be expanded by fluid pressure, whereby the packing is caused to adapt itself accurately to all irregularities of the surrounding walls, and by pressure thereagainst to secure the closure firmly in position.

3. A dam or closure for pipes, conduits, &c., consisting of a circumferentially grooved imperforate disk or body, and a hollow packing ring of flexible material seated in the groove

of the disk, projecting beyond the periphery thereof, adapted to be expanded by fluid pressure and exposed at its outer surface, whereby it is adapted to close the space between the disk and the walls of the pipe, conduit, or opening.

4. The herein described dam or closure for pipes, conduits, &c., consisting of disk or body *a*, hollow packing ring *b* provided with tube *b'*, and metallic hose-coupling or connection

d, secured rigidly to the disk or body *a* and communicating with tube *b'*, whereby said tube is relieved from strain, substantially as set forth.

In witness whereof I hereunto set my hand 15
in the presence of two witnesses.

COTTER T. BRIDE.

Witnesses:

WILLIAM W. DODGE,
WALTER S. DODGE.