

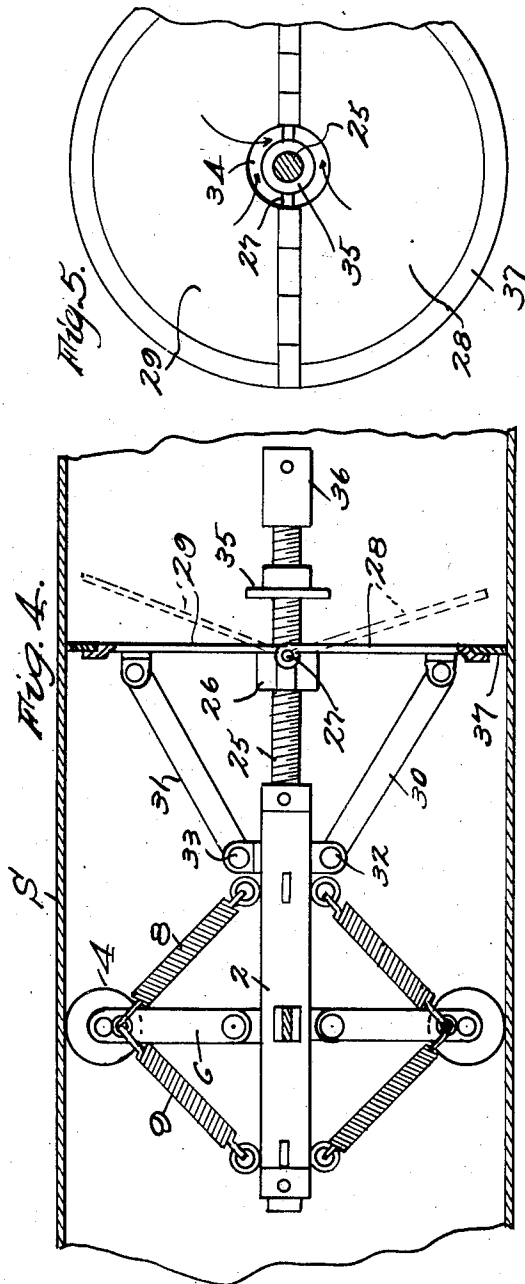
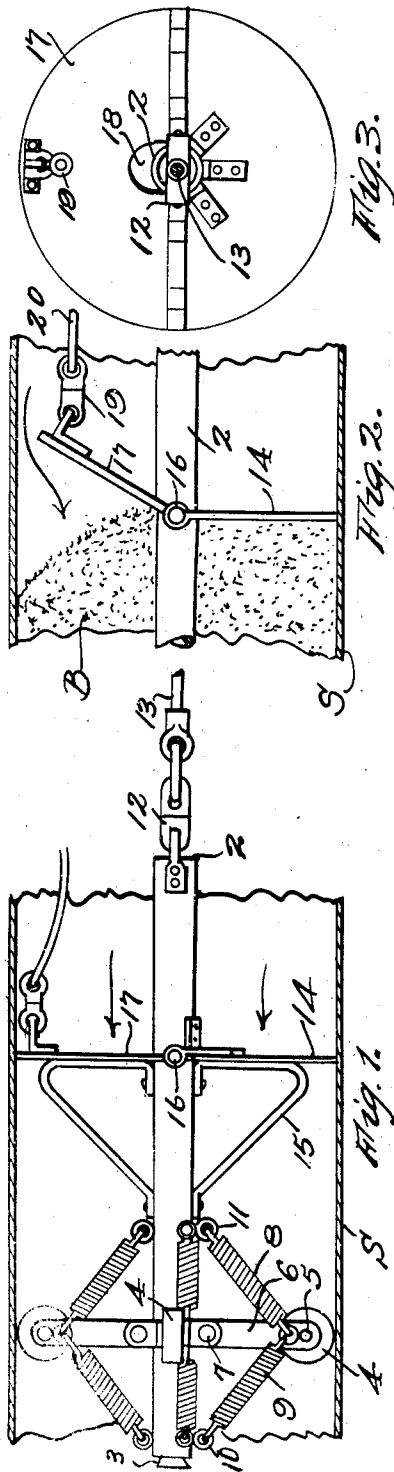
Aug. 31, 1943.

H. R. CRANE ET AL

2,328,060

SEWER SAND WASHER OR DESANDER

Filed Aug. 31, 1938



Inventors,
H. R. Crane and
W. D. Osborn;
By their atty,
Frederick E. Maynard.

UNITED STATES PATENT OFFICE

2,328,060

SEWER SAND WASHER OR DESANDER

Hubert R. Crane and William D. Osborn,
Los Angeles, Calif.

Application August 31, 1938, Serial No. 227,771

11 Claims. (Cl. 15—104.30)

This invention is a kite-like device in the form of a wheeled unit for bodily introduction into the bore of a sewer pipe or other conduit for the hydraulic removal therefrom of sand or other detritus as may be encountered in the conduit.

It has been the old practice to place a canvas or other pliant bag in a sewer pipe or the like and build up a hydrostatic head on one side of the bag to drive it along the sewer bore and at the same time to spray a jet of water from the bag into the detritus ahead of the bag to flush it from the line.

Such bags are not very efficient and are subject to rapid wear, and are difficult to handle.

It is an object of the present invention to provide a substantial, practical and all-metal sand washing or removing unit incorporating a foldable or somewhat collapsible partition or head device which is adapted to be set up in a given size line bore for lineal drive by a head of water in the bore.

Also, an object is to provide a steady carriage for the washer whereby to facilitate the forward drive of the unit by the water head and to hold the head or kite-part of the unit in a trans-axial position in the sewer line.

An object is to provide a foldable or collapsible kite-head device having provision for the repeated partial collapsing and the ready re-setting of the head, while the device is in operation in a sewer line, or other conduit bore in a given case.

An additional object is to provide a sewer kite or sand washer having a steady wheel carriage wherein the running wheels are capable of a yielding function in either of opposite directions for safely traversing obstacles encounterable in the bore passage.

The invention consists of certain advancements in this art as will be set forth in the ensuing disclosure and having, with the above, additional objects and advantages as hereinafter developed, and whose construction, combinations and details of means, and the manner of operation will be made manifest in the description of the herewith illustrative embodiments; it being understood that modifications, variations and adaptations may be resorted to within the spirit, scope and principle of the invention as it is more directly claimed herebelow.

Figure 1 is a side elevation of the sewer desanding unit as in operation in a given sewer line. Figure 2 is a detail edge view of the kite-head element partly collapsed to allow washing water to flow past the head to a sand barricade.

Figure 3 is an obverse face elevation of the head in fully open position.

Figure 4 is a side elevation of the device incorporating a mechanical means for collapsing and expanding the head element positively in each function. Figure 5 is an obverse face elevation of the kite disc of Fig. 4.

The device as shown in Figs. 1 to 3 inclusive, embodies a stiff, tubular, axial or body member 2 whose leading end is provided with a suitable nozzle 3 for the discharge of a spray of water into the bore of the conduit or sewer line S to be de-sanded, as the case may be. The leading end of the member 2 is automatically centered in the bore by an annular set of pilot wheels 4 on transverse spindles 5 in the outer ends of respective radial arms 6 having transverse pivots 7 on the body member 2, whereby to allow the wheels to have a to and fro swing on the bore axis. The arms 6 are normally held in perpendicular radial position to the member 2 by opposed tension springs 8—9 attached to the outer ends of the arms and to opposite points 10—11, at opposite sides of the arm pivots 7, on the member 2. It will be seen that the arms 6 can yieldably swing in either direction as their rollers or pilot wheels 4 may engage an obstruction during axial shift of the device.

To one end of the body member 2 there is attached by a swivel 12 a retracting cable or other suitable means 13 for pulling back the unit in case it cannot go forward in the bore of sewer S to a desired out-let or man-hole. Between the pilot wheels 4 and the swivel hitch the body member 2 is provided with a means to form a substantial kite or piston head for the accumulation of a head of water in the sewer S to drive the wheeled unit to the left, Fig. 1, while water is being jetted at the nozzle 3 into the open or sanded end of the bore. The piston head here includes a disc having a stiff section 14 rigidly fixed to the body member 2 and of a diameter to about easily slidably fit a given sewer bore and disposed perpendicular to the member 2; a stiff brace 15 being secured to the member 2 to stay the reverse face of the disc part 14. On the diametrical edge of the piston section or disc part 14 there is hinged at 16 a complementary section 17 or half-disc with a central aperture 18 to clear the near part of the member 2 for a suitable forward folding or tilting of the section 17, as in Fig. 3, at times when it is desired to permit a large volume of the head water to wash out a bridge of sand B, as may accumulate.

For the purpose of pulling open the swinging, valve-forming section 17 of the piston or kite head disc device there is attached thereto at its outer swinging edge portion a swivel link 19 with a pull cable 20, which with the main retracting cable 13 is extended to the mouth of the water filled man-hole at which operations are being conducted. It will be seen that the water pressure accumulating on the obverse face, Fig. 3, of the installed unit, will if permitted, drive the wheeled unit forward in the sewer, and that the valve cable 20 may be pulled up tight from time to time to open the disc part 17 of the piston disc to pass water for washing down sand or other bridging matter in advance of the unit.

In the form of the invention shown in Figs. 4 and 5, there is turnably supported in the tubular member 2 a screw stem 25 on which there is mounted a nut 26 on which there is diametrically hinged at 27 a pair of piston disc sections 28—29 to fit a given bore of pipe or sewer. Each swinging section 28—29 is attached near its outer swinging side to the outer end of a respective link 30—31, which links converge toward and connect at 32—33 with the near end of the main body 2; this being provided with centering or pilot wheels 4, as above set forth. The piston disc 28—29 is provided at its center with a suitable water jet hole 34 about the nut 26 for spraying water to the bore, and the screw stem 25 has a valve nut 35 which may be run up at will to close the hole 34 if desired. The screw stem 25 may be turned at will to cause the nut 26 of the disc 28—29 to move toward or from the carriage body 2, to open, that is to spread, the disc parts to fit the bore of the sewer S, or to somewhat collapse, as shown in dotted lines, to by-pass water ahead, or to facilitate retraction, as by means of a draft and rotating means attached to the rod coupling 36 fixed on the end of the screw stem 25.

Where it may be desired in certain operations of the kite or de-sander the rim of the disc may have a plant, resilient and renewable packing or rubber rim 37.

What is claimed is:

1. A bore cleaner of the class described and including an elongate body member provided with a fluid driven piston or kite head having relatively collapsible, discal sections, a screw operatively connected to said member and to facilitate bodily retraction of the cleaner, a nut on said screw carrying a pivot on which the head is diametrically foldable, and a brace means pivoted on said body and connected to and for supporting the head sections against pressure and to hold the nut and the head against rotation as the screw is rotated.

2. A de-sanding tool of the class described and including a central, elongate body structure, a muck pushing kite head consisting of a pair of semi-disc parts hinged together on a diametrical line of the head and which line is normal to the axis of said body structure, a yieldable centering means on said structure forward of the head as to axial direction of pressure of tool operating fluid, a pull back means at the opposite end of the body structure and movable axially as to said structure and connected to a part of the head to collapse the head on its hinge, and a set of radial, rigid brace members connected at inner ends to said structure forwardly of the head and engaging distal swinging margins of the head parts, and one of said head parts being rigidly fixed to the body structure.

3. A sewer de-sanding tool as in claim 2, and in which one piston part is rigid on the body structure and the other is attached to said axially movable means for collapsing action.

4. A sewer de-sanding tool of the class described and having an elongate body member, a piston head consisting of a pair of diametrically hinged, discal parts, and a rotary tool retracting device attached to the said member and having means operative by rotation of said device to fold or spread and being connected to said parts and brace means connecting said body and said sections.

5. A sewer washer or de-sander including a self-piloted, central structure having a centering means at its forward end, a pair of diametrically hinged half-discs forming a fluid actuated piston around the said structure and the hinge axis being perpendicular to the axis of said structure, a tool retracting, draft device attached to said structure at its rear end, and means to effect a relative collapse of the piston halves by a motion relative to said structure and independent of structure retracting motion; said structure extending through the piston, and the piston having a central passage for water flow to the sand in front of the piston and a set of rigid compression braces connected to and carried by said central structure and engaging outer margins of the half discs to sustain them in open position.

6. The washer of claim 5 and said structure including a swivelled, rotative, threaded part and said collapsing means including a nut on said threaded part and to which nut the piston halves are attached at their hinge with the axis of the hinge perpendicular to the axis of the said structure; said braces being hinged at their ends to a non-rotary part of the central body structure and to relative half-discs.

7. In a sewer and conduit cleaning device, an axial body comprising a sleeve, a rod extending through and arranged for rotation within said sleeve, said rod having a threaded portion, a nut seated on the threaded portion of said rod, a collapsible head comprising a pair of substantially semi-circular parts hinged to each other and to said nut and links connecting the parts of said collapsible head and said sleeve.

8. In a sewer and conduit cleaning device, an axial member comprising a sleeve and a rod passing through said sleeve and arranged for rotation therein, a collapsible head comprising a pair of semi-circular parts hinged to each other, links between the sleeve and the parts of said head and means actuated by rotary movement of the rod with respect to said sleeve for tilting the parts of the head upon their hinge.

9. In a sewer and conduit cleaning device, an elongated, axial body including a forward end part and a draft device, means connecting the said draft device and said part for direct action without relative axial shift of the said draft device with respect to the latter when the latter is pulled back, a collapsible head comprising a pair of substantially semi-circular wings hinged to one another on a diametrical line, which passes through the said body transversely, means including an oblique brace, having its inner end attached to said body, interposed between the elongated body and the said wings near the outer edge thereof to substantially restrict movement of said outer edge when subject to fluid pressure driving the cleaning device while the said head is in a relatively expanded position, and a wing operating means connected

to a hinged wing of the head whereby to effect a relative collapse of the head wings.

10. A sewer washer or de-sander including a shaft-like body having relatively movable, front and rear sections, piloting and centering means attached to one of said sections, a pair of diametrically divided, semi-disc members forming a hydraulic piston having a central passageway for flow of fluid to the front of the piston and the body passing through said passageway, a washer retracting, draft device attached to the body, braces hinged to one section of the

body and to the piston to buttress the latter, and a hinge means connecting the diametrical edges of the piston and mounted on and operative by the other section of the body upon such relative motion of the two body sections.

11. The tool of claim 10, and said hinge means including a nut to which the piston halves are connected and a threaded part on one section of the body operative to shift the nut when the other section is relatively turned.

HUBERT R. CRANE.
WILLIAM D. OSBORN.