

No. 636,526.

Patented Nov. 7, 1899.

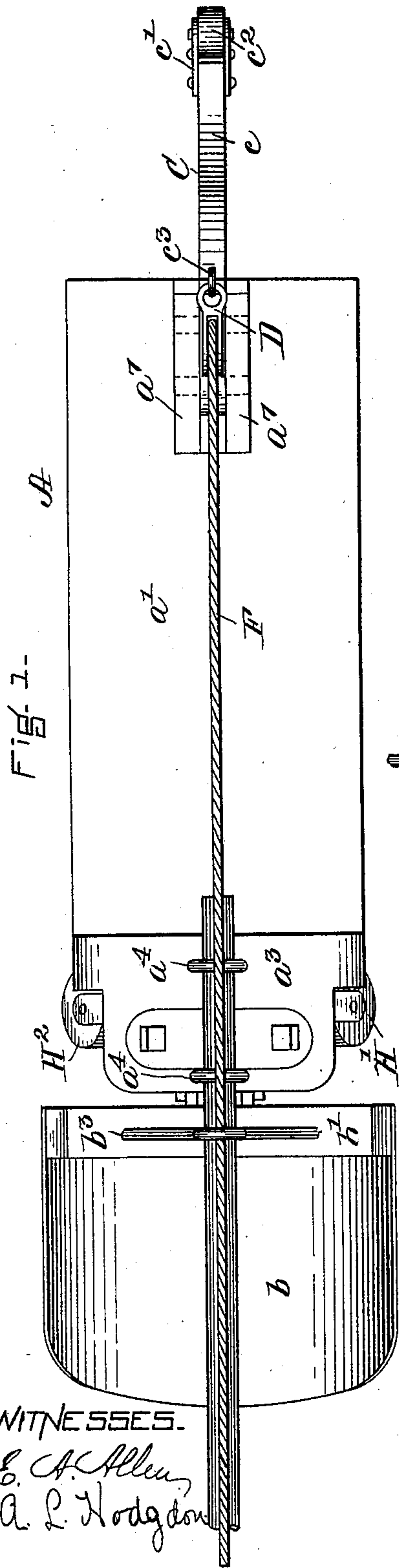
P. J. HEALEY.

SEWER CLEANING AND EXPLORING MACHINE.

(Application filed May 5, 1899.)

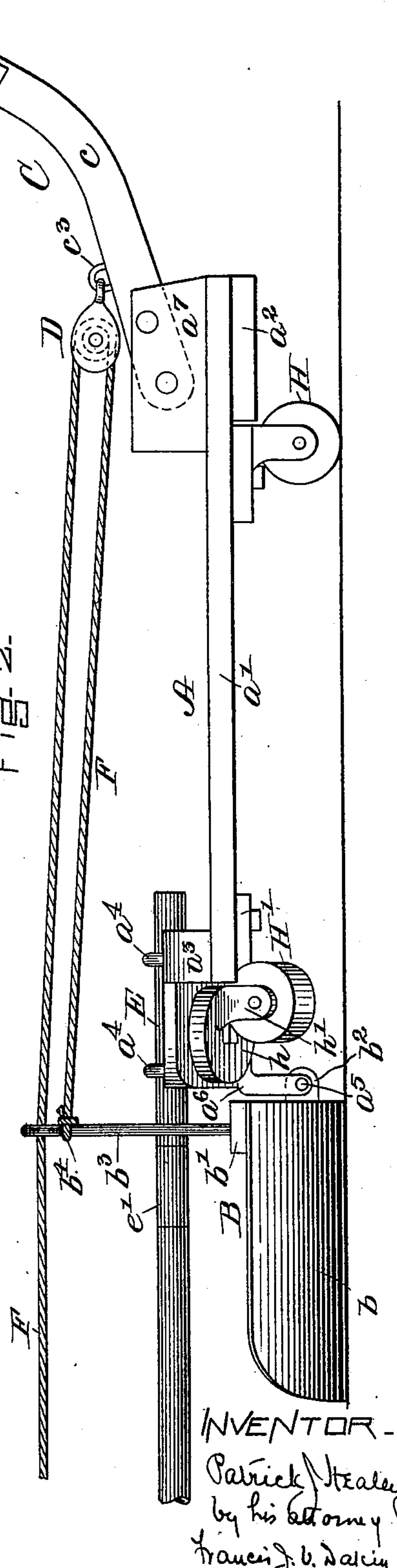
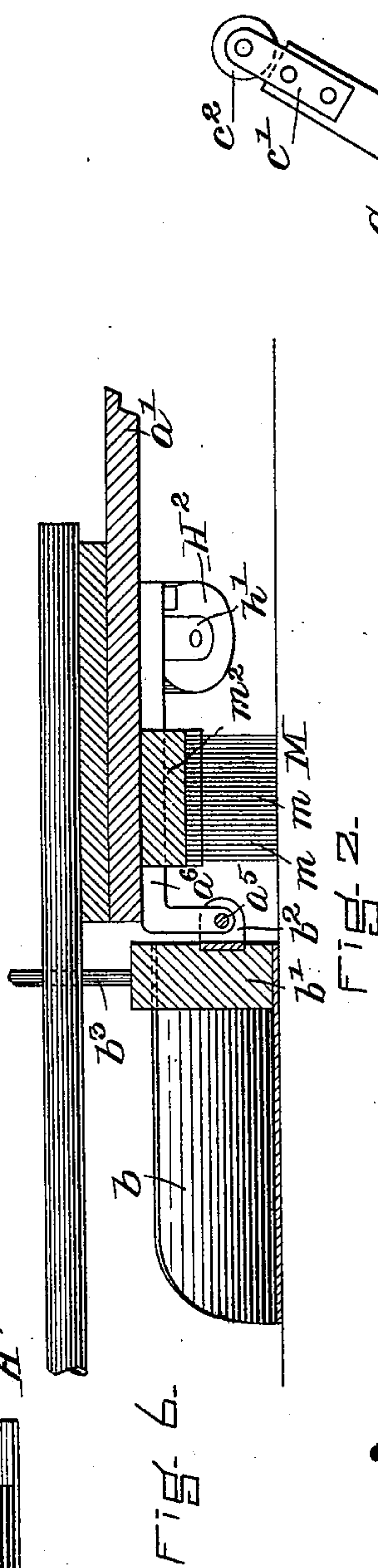
(No Model.)

2 Sheets—Sheet 1.



WITNESSES.

E. A. Allen
A. L. Hodgdon



INVENTOR.

Patrick Healey
by his attorney
Francis J. Dalton

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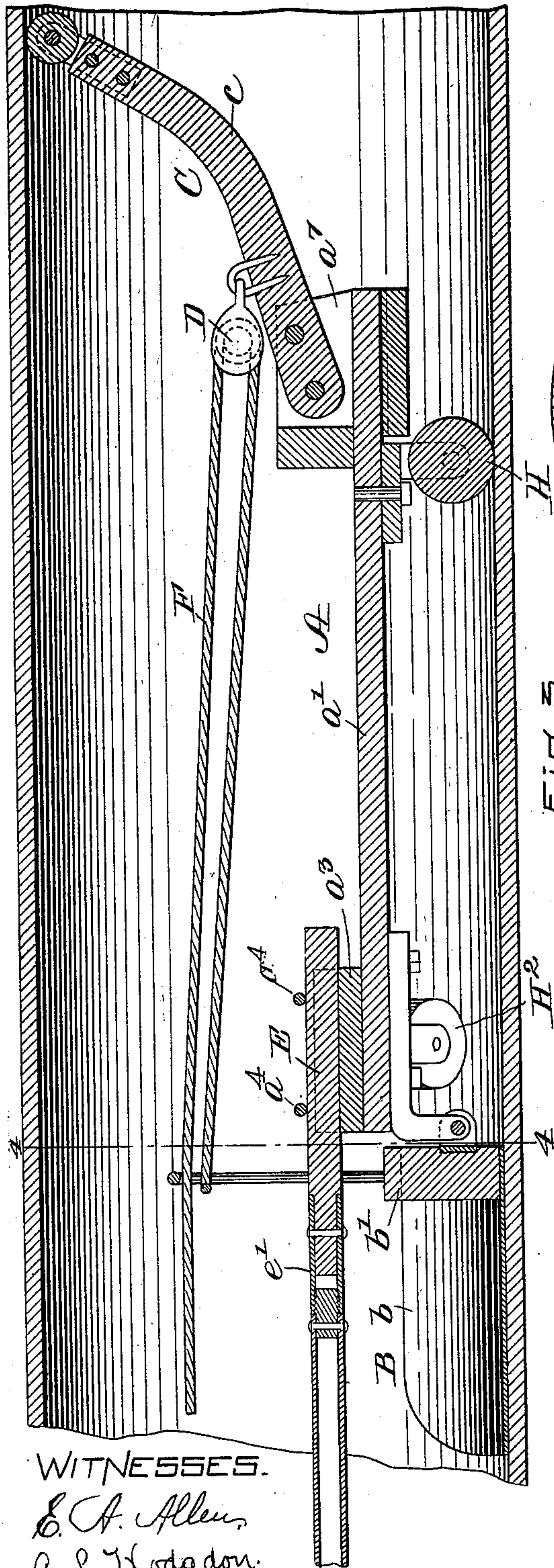
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WITNESSES.

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Fig. 3-

Fig. 5-

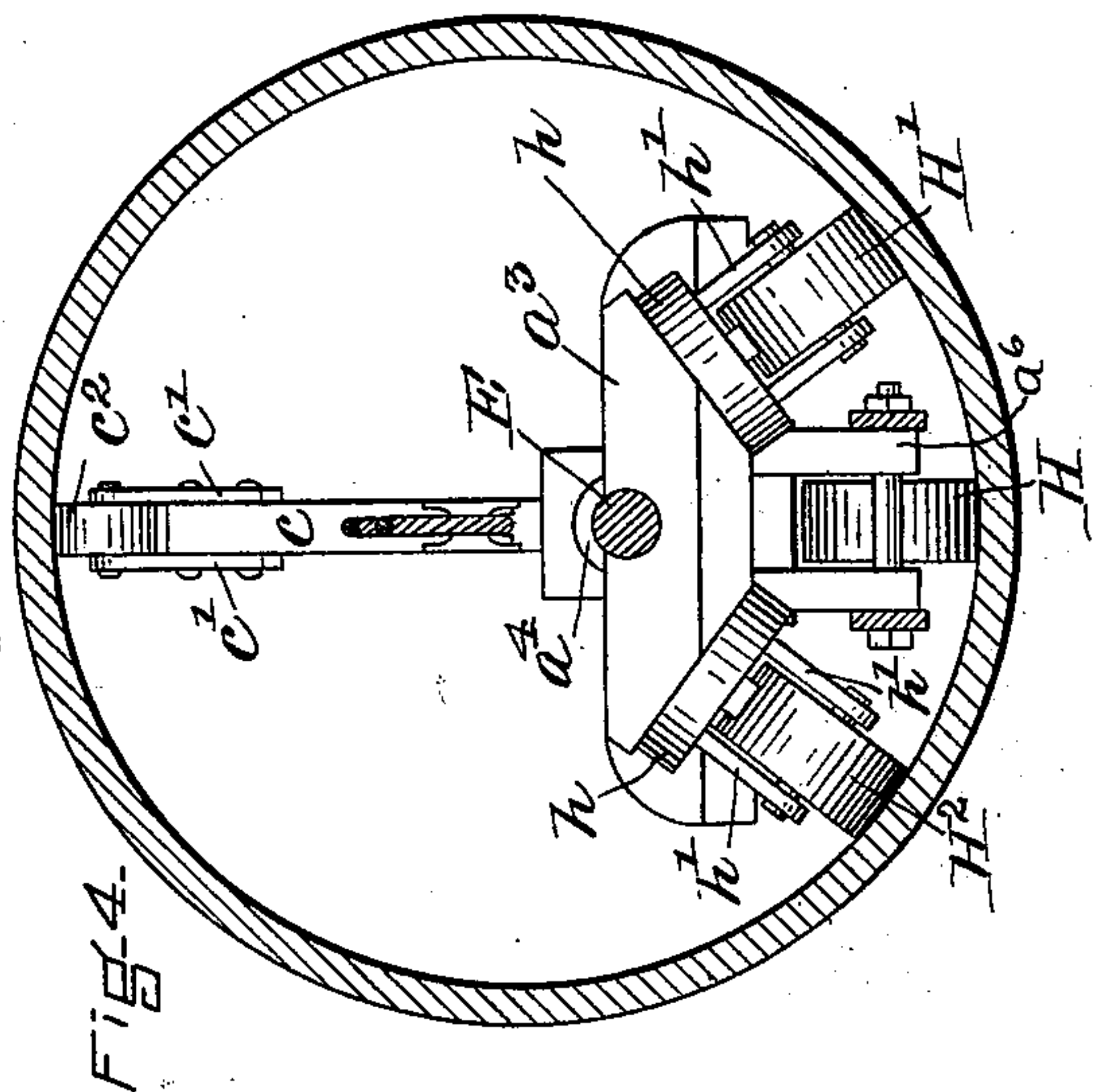
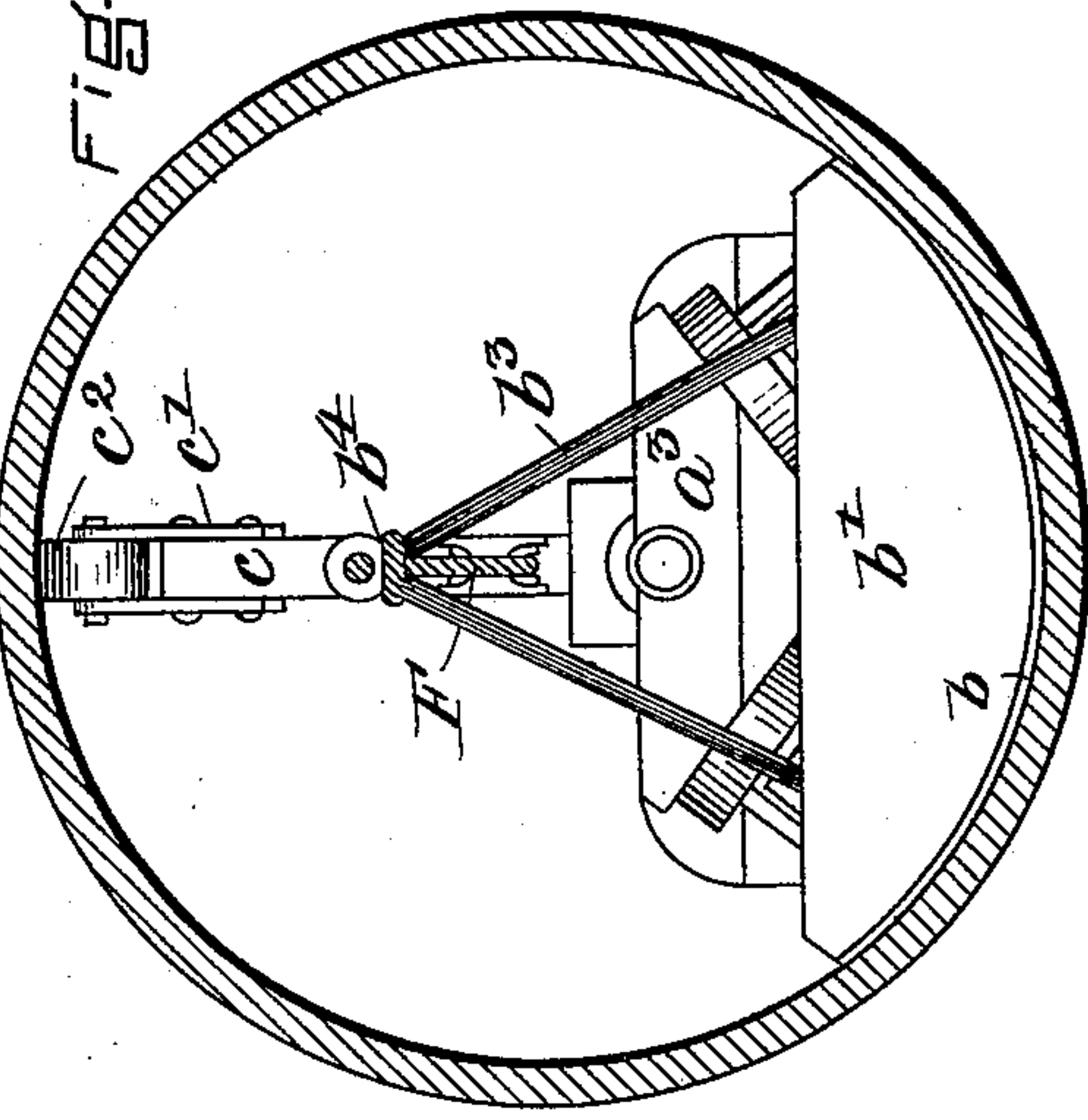


Fig. 4-



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UNITED STATES PATENT OFFICE.

PATRICK J. HEALEY, OF HYDE PARK, MASSACHUSETTS.

SEWER CLEANING AND EXPLORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 636,526, dated November 7, 1899.

Application filed May 5, 1899. Serial No. 715,672. (No model.)

To all whom it may concern:

Be it known that I, PATRICK J. HEALEY, a citizen of the United States, residing at Hyde Park, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Sewer Cleaning and Exploring Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in machines for cleaning sewers or drain-pipes, in which a shovel operates in conjunction with a rolling platform; and the object of my invention is the removing of sand, dirt, or other obstacles in sewers or drains which are too small in diameter to permit the workmen to enter.

The following is a clear description of the machine, reference being made to the accompanying drawings, in which—

Figure 1 is a plan view of my machine. Fig. 2 is a side elevation. Fig. 3 is a vertical longitudinal section of the entire machine; Fig. 4, a vertical cross-section on the line 4 4 in Fig. 3; Fig. 5, a front end view. Fig. 6 is a detail of a modification.

Similar letters refer to similar parts throughout the several views.

A designates the framework of the machine, of which a' is a rectangular platform or truck-body mounted on three small wheels H, H', and H², the wheel H being vertical and situated under the middle of the platform a' near the rear end and the wheels H' and H² being placed one on each side of the front end of the platform a' , which is reinforced at that end by a heavy block a^3 , fastened to the top surface of a' . The platform a' and each side of block a^3 for a short distance from the front are beveled, and on these beveled surfaces are attached round disks h , with hangers h' projecting to hold the shafts on which revolve the two wheels H' and H². The effect of this construction is to give the two wheels an outward slant, so that the machine may be easily propelled on a curved surface, like the bottom of a drain or sewer pipe.

Attached to the front end of the frame A by a pin a^5 , journaled at the end of two arms a^6 , is the shovel B, the blade b of which is

represented as of semicylindrical shape. This represents a blade which is to be used in round drains or sewers. If the drain or pipe is square, arched, or rectangular, the shape of the blade b must be varied to conform to the bottom of the drain. In the shovel B b' is a block fitted into the back of the shovel, and b^2 is an arm projecting from the back b' of the shovel, by means of which the shovel is attached to the frame A. When in use, the blade of the shovel rests on the bottom surface of the drain; but it may be tilted up on the pin a^5 as a pivot. The top of b' is flat, and inserted in this block is a metal rod b^3 , bent into a form like an inverted letter V and bent at the top to form a loop or hole. This bent rod serves as a lever for the purpose of lifting the shovel around the pin a^5 as a pivot and then enabling the shovel to pass over obstructions in the bottom of the drain. Around the neck b^4 of the rod b^3 , just below the loop at the top, is fastened a rope F, which is carried back to the pulley D, which is attached to a sloping arm C by a staple C³ or any other suitable means. Passing through the pulley D the rope F turns back and goes through the loop in the rod b^3 , so that when the rope is pulled it will exert a backward pull on the rod b^3 and lift up the front of the shovel B, and when the rope is released the weight of the shovel will cause it to fall back on the bottom of the drain.

At the rear end of the platform a' is placed a curved arm C, which slopes backward and upward. The rear end of the platform a' is reinforced by a block a^2 of about the same thickness as the platform a' . The arm C is secured to the platform a' by being bolted between two upright standards a^7 , and at the upper end of C is a small wheel c^2 , journaled between two arms c' . The purpose of the arm C is to prevent the rear end of the machine tilting upward when in use and being pulled through a pipe. The wheel C² is in contact with the upper inner surface of the drain, and the arm C being immovable the rear end of the machine is kept in its proper place.

When my machine is being used in a drain or sewer pipe, it will preserve its equilibrium in the pipe, notwithstanding a strong pull

forward. The weight of the shovel and the platform keeps the front end of the machine and the edge of the shovel on the bottom of the drain, the two oblique wheels H' and H^2 prevent the machine from oscillating sidewise in its progress through the pipe, and the wheel C^2 , in contact with the upper surface of the drain, keeps the rear end of the machine from tilting or ascending.

It will be observed that in the preferred embodiment of my invention shown in the drawings the shovel-tilting rope F and the propelling device, preferably made up of the jointed rigid pieces E , e' , &c., are operated from the shovel end of the machine—that is, when the shoveling operation takes place the machine is pulled or drawn toward the matter to be removed instead of being pushed against it, and for this reason it is practically important that the propelling device be rigid in order that it may be used to push the machine away from the initial starting-place preliminary to the shoveling operation; but independently of the rigidity of the propelling device when it is to be used as a pusher there is an important practical advantage gained by making the machine in such wise that its shovel will shovel when the machine is pulled toward the operator, the advantage lying in the fact that the operator can more clearly see the character of the matter or obstruction with which the shovel engages than he could if he were pushing the truck and it were between himself and the matter or obstruction engaged by the shovel. The lights or lamps may be placed on the shovel end of the platform, and no part of the machine except the shovel will be between the operator and the matter or obstruction.

The upwardly-extending arm or keeper C is mounted, preferably, at the rear end of the truck and its free end is best in the vertical plane of the central lengthwise axis of the truck, so that when its free end is against the top of the sewer-wall the arm coöperates with the slanted wheels to keep the truck properly in place, the sewers being commonly circular in cross-section and the wheels on each side of the truck having their lower peripheries slanted outwardly from the vertical, while the arm C , preferably tipped with the roller c^2 , works along the top wall of the sewer. In my preferred construction the rear end portion of the shovel (in the present construction the block b') has its upper surface below the upper surface of the truck, so that the rear of the shovel may not obstruct light from a lantern or other light placed on the platform a' . This is an important feature of the machine, as it is practically important to make as much light as possible available from lights carried on the platform and without casting shadows in the sewer to obstruct the views of the workmen.

It will be obvious that some of the important features of my invention may be availed of

even if the truck-propelling and shovel-tilting device pass rearwardly from the truck, so that the latter is operated from the rear; but I have described all the features of my invention in the best mode now known to me.

In order to propel my machine through the sewer or drain, I use short rods, each about five feet long, which may be connected, one screwing into the other, as shown in Fig. 3. On the front or shovel end of the machine, set in a groove in the block a^3 and secured by metal hangers a^4 , is a round rod E , with a metal end or joint piece e' , which is hollow, with a thread on the inner surface. The short rods have at one end a screw and at the other end a metal joint-piece similar to e' , so that one of these rods may be screwed into e' and then another rod screwed into the first in the same manner, and so on. It is necessary to use short jointed rods because the machine when being used is operated from a manhole and the space is limited. If preferred, a rope may be used in place of the jointed rods. This is necessary where the drain is curved in direction between two adjacent manholes, as it would be impossible to use a straight rod.

Heretofore in locating leaks in sewers and what are called “missing Y ’s” therein—that is, Y -sections of pipe of which no records were made when the sewer was laid—it has been the general custom, so far as I am informed, to select bright sunny days for discovering the faults, one man on the surface of the ground holding a mirror over a manhole and another man in the sewer at the bottom of the manhole holding a mirror into which rays of light reflected from the first mirror were directed, the rays being thence directed along the sewer by the man within the sewer using his mirror for that purpose. The man within the sewer on discovering a fault—such as a leak, unlocated Y , or the like—would then guess the distance of the fault from the manhole. Then the distance so guessed would be measured along the surface of the ground in the line of the sewer, and the laborers would then dig down and so try to uncover the leak, missing Y , or other fault. Very frequently the guess of the man holding the mirror within the sewer would be a number of feet out of the way, frequently from twenty-five to fifty feet out of the way, and the laborers who did the digging frequently would be required to dig a considerable number of pits before finding the fault. It is obvious that this clumsy and expensive way of discovering leaks and missing Y ’s and other faults is highly objectionable. To overcome this objection, I provide my machine with any suitable lights to light the interior of the sewer when the machine is in use for discovering faults, and the main purpose of using the short rods, each about five feet long, and, preferably, just five feet long, is to utilize these rods as measuring devices for determining approximately the exact distance of the discovered faults from

the manhole. The five-foot length is desirable because it is the most convenient maximum length for inserting through ordinary manholes into ordinary sewers, and sections of this length are conveniently transported. At the same time they are short enough to enable the workmen to judge of the exact distance of the fault from the edge of the manhole by the number of five-foot lengths employed plus any fractional part of the last section used. Of course any other predetermined lengths may be used for propelling the machine and gaging the distance of the fault. The lights—candles, lanterns, or electric lights—supplied from storage batteries or the like will be placed on the machine at a known distance from the junction with the machine of the first section. It will be seen that by using a propelling device, whether rigid or flexible, of predetermined length and made of sections of known length the fault when discovered may be located accurately for all practical purposes on the surface of the ground, thus saving the laborers a great deal of work in digging out the earth for leaks or other faults.

A modification of my invention is shown in Fig. 6, in which a brush *M*, made of steel wires *m m*, set in a metal base *m*², may be attached by any suitable means to the under forward surface of the platform *a'*, either just in front of or behind the wheels *H*¹ and *H*². This brush is cut to correspond to the shape of the blade of the shovel, which of course depends upon the shape of the pipe or drain in which the machine is to be used. The purpose of this brush is to catch any dirt or sand that may escape the shovel, and thus thoroughly clean the pipe.

In using my machine it is first lowered into a manhole, which in most sewers are about three hundred feet apart, and operated from the manhole. It is pushed into the pipe rear end first, and the rods are added until the rear end of the machine appears at the next manhole. The apparatus is then pulled back and the shovel catches all the sand or other dirt on the bottom of the sewer. If the edge of the shovel strikes any fixed obstacle, then the rope *F* is pulled and the edge of the shovel is lifted and, passing over the obstacle, is then allowed to drop back. It has been found absolutely necessary in practice to have some contrivance for lifting the front edge of the shovel, since there is always more or less cement projecting from the joints in the pipe, which in the absence of the lifting apparatus would effectually bar the progress of the shovel. If the shovel becomes filled up before it has completed the section, it may be run back to the starting-point and emptied.

What I claim is—

1. In a sewer cleaning and exploring machine, the combination of a truck-body; and suitable wheels therefor operatively mounted thereon with a shovel having a hinge con-

nection with the truck and its front end below the truck-body; a propelling device for moving the truck along the sewer-bottom; means for tilting upwardly the front end of the shovel; and an upwardly-extending arm carried by the truck and adapted to engage an upper wall of the sewer.

2. In a sewer cleaning and exploring machine, the combination of a truck-body; and suitable wheels therefor operatively mounted thereon with a shovel at one end of the truck and having a hinge connection therewith; a rigid propelling device for moving the truck along the sewer-bottom; a flexible shovel-tilting device having a connection with the rear portion of the shovel; a pulley for said flexible device and an upwardly-extending arm at the other end of said truck.

3. In a sewer cleaning and exploring machine, the combination of a truck-body and suitable wheels therefor operatively mounted thereon with a tilting shovel carried by the truck at one of its ends; an upwardly-extending arm carried by the rear end of the truck; means for tilting the shovel, said means extending forwardly as to the front end of the shovel; and a rigid propelling device extending forwardly as to the front end of the shovel.

4. In a sewer cleaning and exploring machine, the combination of a truck-body and suitable wheels therefor operatively mounted thereon with a tilting shovel operatively connected to the truck; means for tilting the shovel; an upwardly-extending arm carried by the truck and in the vertical plane of the central lengthwise axis of the truck; and means for propelling said truck.

5. In a sewer cleaning and exploring machine, the combination of a truck-body; wheels therefor operatively mounted thereon with their lower peripheries inclined outwardly from the vertical; an arm extending upwardly with its free end in the vertical plane of the central lengthwise axis of the truck; a shovel hinged on the carriage; means for tilting the front end of the shovel; and a rigid propelling device made up of sections of known length.

6. In a sewer cleaning and exploring machine, the combination of a truck-body; suitable wheels therefor operatively connected therewith; a platform carried by the truck; a tilting shovel carried by the truck; means for tilting the shovel; means for propelling the truck; and an upwardly-extending arm carried by the truck rearwardly of the shovel.

7. In a sewer cleaning and exploring machine, the combination of a truck-body, comprising a platform and suitable wheels therefor operatively mounted on the truck-body; a shovel mounted at one end of the truck; an arm which extends upwardly from the truck back of the shovel; means for operating the shovel; a truck-propelling device

comprising sections of known length; said
upwardly-extending arm being adapted to
engage an upper wall of the sewer to steady
the machine in its passage through the sewer;
5 and the platform being above the wheels and
shovel and adapted to support lanterns, sub-
stantially as and for the purpose set forth.

In testimony whereof I affix my signature
in the presence of two witnesses.

PATRICK J. HEALEY.

Witnesses:

A. W. W. MURRAY,
TIMOTHY H. MURRAY.