W. J. STEVENSON.

SEWER CLEANER.

APPLICATION FILED DEC. 23, 1913.

1,102,304.

Patented July 7, 1914.

2 SHEETS—SHEET 1.

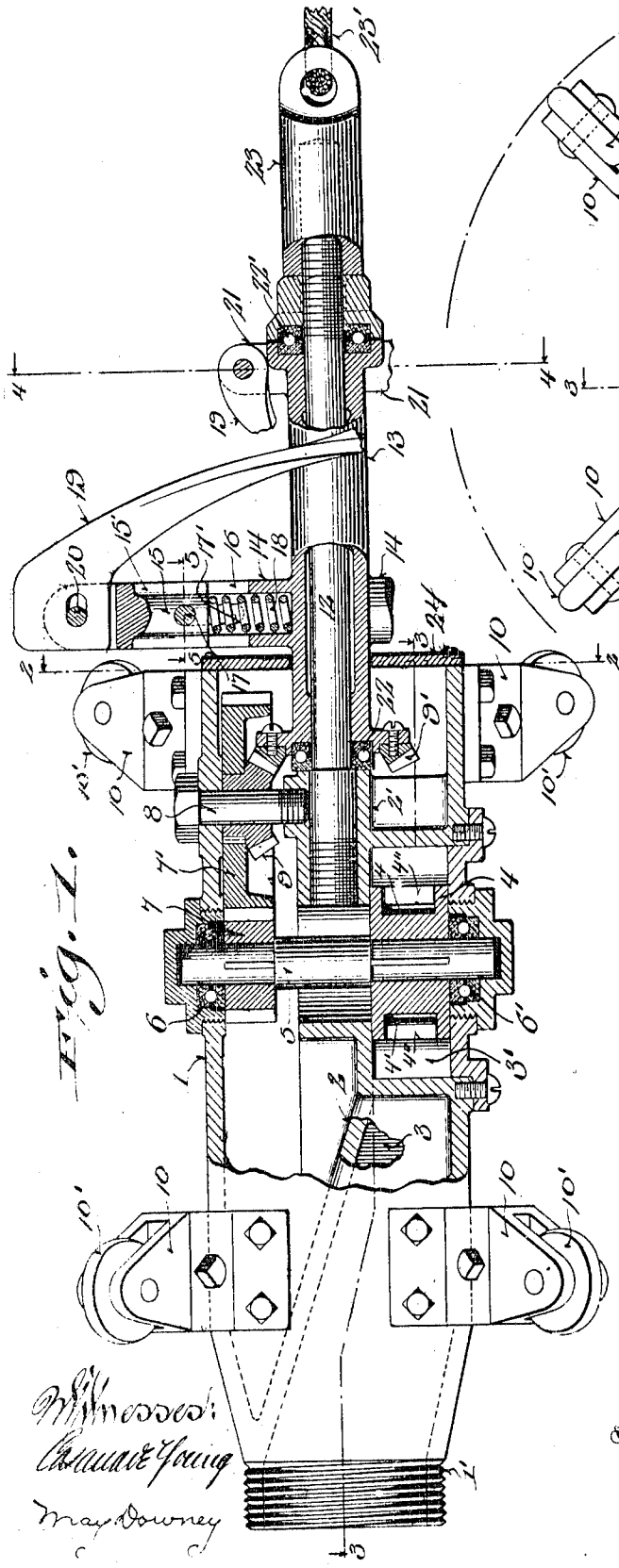


Fig. 1.

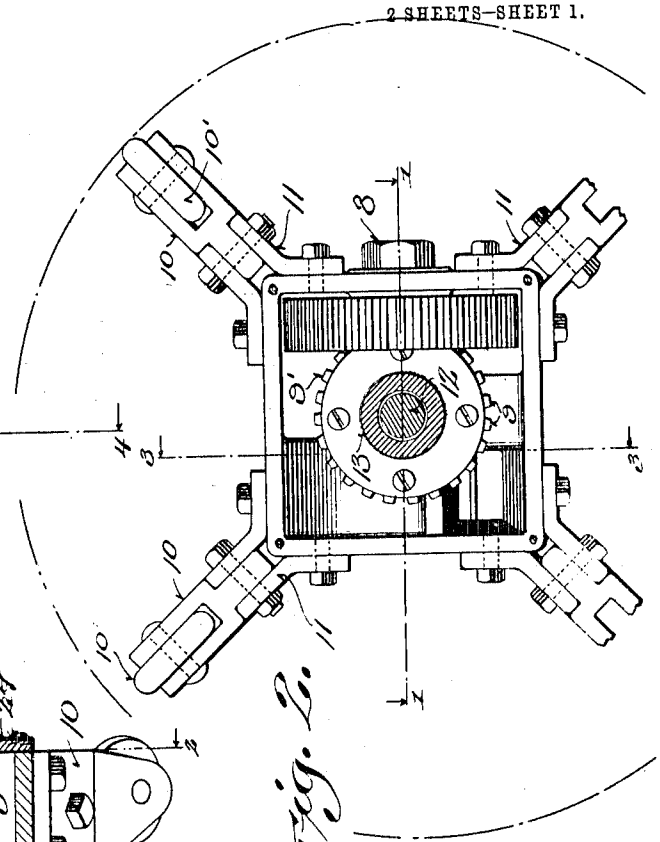


Fig. 2.

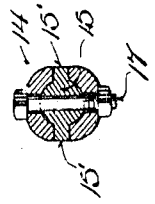


Fig. 3.

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2 SHEETS—SHEET 2.

Fig. 3.

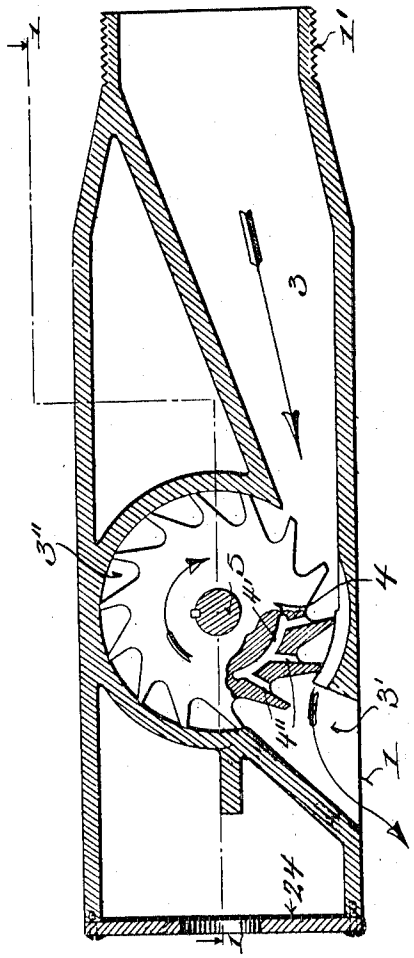
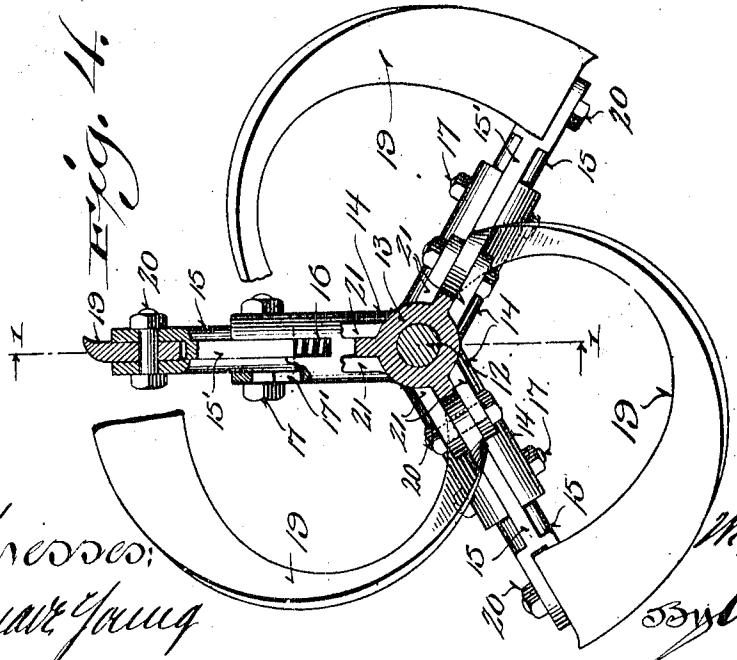


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM J. STEVENSON, OF MILWAUKEE, WISCONSIN.

SEWER-CLEANER.

1,102,304. Specification of Letters Patent. Patented July 7, 1914.

Application filed December 23, 1913. Serial No. 808,372.

To all whom it may concern:

Be it known that I, WILLIAM J. STEVENSON, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Sewer-Cleaners; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention refers to portable cleaners, its object being to provide a simple, economical and effective device of the above character, the same being especially adapted for use in cleaning and flushing sewers.

The arrangement and construction of my improved device is such that a shell-like body having a flexible hose attached to one end and a cable to the opposite end is drawn through the pipe or sewer to be cleaned and coincident to travel thereof a jet of steam water, or air supplied through the hose is delivered and exhausted from a motor contained in the shell. The motor, through a suitable gear connection imparts rotation to a scraper set in advance of the shell, the said scraper comprising a series of helically arranged vanes or blades that are capable of slight contraction and expansion, whereby solid foreign matter is loosened from the walls of the sewer, it being understood that the exhaust water, after passing through the motor, is discharged in advance of the shell for flushing purposes.

With the above objects in view the invention consists in certain peculiarities of construction and combination of parts as set forth hereinafter with reference to the accompanying illustrations and subsequently claimed.

In the drawings Figure 1 represents an elevation of a cleaning device embodying the features of my invention, the same being shown partly broken away and in section as indicated by lines 1—1 of Figs. 2, 3 and 4; Fig. 2, a detailed cross section of the device, the section being indicated by line 2—2 of Fig. 1; Fig. 3, a detailed longitudinal sectional view of the shell portion of the cleaner showing a rotor in connection therewith, the section being indicated by line 3—3 of Fig. 2; Fig. 4, a detailed end view partly in section as indicated by line 4—4 of Fig. 1, the said view showing the scraper mechanism, and Fig. 5, a detailed cross-section of one of the spider supporting arms constituting a detail of the scraper mechanism.

Referring by characters to the drawings, 1 represents a hollow shell-like body open at its ends and provided with a longitudinally disposed partition wall 2, whereby a compartment 3 is formed in the shell extending from its receiving end to the bottom delivery or discharge mouth 3′.

As best shown in Fig. 3, the compartment 3 is provided with an intermediate circular pocket 3″ for the reception of a rotor 4 that is notched at its periphery to form vanes whereby water under pressure flowing through the compartment imparts motion to said rotor, the same constituting a motor. The rotor is provided with a circular channel 4′ having leads 4″ that communicate with the interstices of the vanes, whereby water or steam is permitted a free exhaust to the delivery mouth 3′. The rotor is mounted upon a shaft 5 which extends through an aperture in the partition wall and is journaled in suitable ball-bearings 6, 6′, that are fitted to the outer rectangular walls of said shell. The motor-shaft 5 also carries a pinion 7, which pinion meshes with a gear-wheel 7′ that is loosely mounted upon a fixed stud 8, the same being extended through one wall of the shell and provided with a threaded end which engages a hub 2′ that is formed at the discharge end of the partition wall 2. The gear-wheel 7 also carries a beveled pinion 9, which pinion is arranged to impart motion to a scraper to be hereinafter described.

The receiving end of the shell 1 communicates with the water compartment 3 and is provided with a threaded mouth 1′, which threads constitute one member of a hose coupling connection, not shown. The shell is also provided with two sets of radially disposed feet 10, which feet carry guide rollers 10′ that are adapted to engage the side walls of the pipe or sewer. The feet are bolted to bracket members 11, which bracket members in turn are secured to the rectangular corners of the shell body and in order to adjust the cleaning device to different size sewer pipes shorter or longer feet 10 carrying rollers are substituted for the feet shown.

Secured to and extending from the partition wall hub 2′ is a stem 12, upon which stem is loosely mounted the sleeve portion

13 of a spider having hollow arms 14 that extend from the sleeve portion, as best shown in Figs. 1, 4 and 5. Fitted in each arm is a plug 15 having wings 15′ which engage slots 16 that are formed in said arms whereby the plugs are guided. The plugs are retained within the arms by means of bolts 17 which pass therethrough and are adapted to have play in slots 17′ that are formed in the arms at right angles to the plug wing slots 16. Each plug is forced outwardly by a coiled spring 18, which outward movement is limited by the bolts 17 the said coiled springs being interposed between the bottom of the plug and the base of the arm to which it is applied.

The ends of each plug are forked for the reception of the cutting end of a blade 19, which blade is secured to the plug by means of a bolt 20 that passes through a slot in the blade end and apertures with which the plug is provided. Each blade 19 is helical in shape and extends forwardly from its cutting end, being contracted and secured at its forward end to ears 21 that project from the sleeve portion of the spider. The sleeve portion of the spider is provided at its ends with ball-bearings 22′, whereby said spider and the helical blades which constitute a scraper are capable of revolving at high speed with a minimum amount of frictional resistance. The inner end of the sleeve portion of the spider has secured thereto a beveled wheel 9′, which beveled wheel is adapted to mesh with the beveled pinion 9, whereby motion is imparted to the scraper mechanism. The forward end of the stem carries an eyed head 23, to which head is attached a cable 23′, or other flexible draft line, whereby the cleaner device is drawn through a section of sewer pipe.

In the operation of the device, a flexible hose is attached to the coupling member 1′ and power being applied to the draft cable the cleaner as a whole is caused to travel through the pipe, being guided by the sets of legs carrying rollers which serve to maintain the device in practically a central position relative to the inner walls of the pipe. Co-incident to the travel, water is introduced through the hose pipe and as it travels through the compartment 3 motion is imparted to the motor or rotor, whereby the scraper is positively rotated through its gear connection with the motor. The outer cutting ends of the helically shaped blades, in their rapid rotation, will thus loosen or sever any foreign matter which has adhered to the walls of the sewer pipe and this loosened matter will be gradually drawn in toward the forward end of the blades due to their configuration. Thus as the device moves forwardly all foreign matter is separated from the pipe and carried with the stem to the end of the pipe section. Co-incident to this positive separation of the foreign matter from the walls of the sewer pipe the exhaust water or steam from the motor is discharged downwardly and forwardly of the shell body, whereby the sewer is thoroughly flushed during the scraping operation, the current of water causing fine particles to be forced in the direction of travel of the device. Hence it is apparent that after the sewer section has been subjected to the cleansing operation aforesaid it is left in a sanitary condition and the next section of sewer is then subjected to the same operation.

Attention is called to the fact that, owing to the rear ends of the blades being capable of slight yield, any hard substance such as cement or the like to which the blades are subjected in their rotation, will not injure or break said blades as, under such conditions, they will yield and ride over such surfaces. Furthermore it is apparent that, owing to the weight of the body and its gear connection to the cleaner mechanism, there will be no tendency for said body to rotate in opposition to power applied to the revoluble scraper, this resistance being reinforced by engagement of at least two guide rollers of each set with the sewer walls.

In order to protect the gearing the discharge end of the shell-like body is closed by a head 24, which head is centrally apertured to admit passage therethrough of the sleeve 13. Thus all the gearing and forward or discharge end of the shell body is closed to prevent foreign matter from entering the shell and choking or otherwise marring the gear train.

I claim:

1. A cleaning and flushing device comprising an open-ended shell having a longitudinally disposed compartment extending therethrough, the same being provided with a pocket, a rotor revolubly mounted within the pocket, a fixed stem extending from the discharge-end of the shell, a spider having hollow arms revolubly mounted upon the stem, plugs yieldably fitted to the spider arms, helical blades having their rear ends secured to the plugs and their forward ends secured to the spider, a gear train connecting the spider and rotor, and a hose coupling connection carried by the shell at its receiving end.

2. A cleaning and flushing device comprising a shell, a rotor mounted therein, means for admitting water to the rotor, means for exhausting water from said rotor, a revoluble spider in gear connection with the rotor, hollow arms extending from the spider, plugs slidably mounted within the arms, coiled springs seated in the hollow arms and opposed to the plugs, and helical blades having their forward ends in pivotal union with the spider, the rear ends of the

blades being secured to the spring-opposed plugs.

3. A cleaning and flushing device comprising an open-ended shell having a longitudinally disposed compartment extending therethrough, the same being provided with a pocket, a rotor revolubly mounted within the pocket, a fixed stem extending from the discharge end of the shell, a spider having a sleeve portion revolubly mounted upon the stem, hollow arms extending from the sleeve portion, plugs yieldably fitted to the spider arms, means for limiting the yielding movement of the plugs in both directions, helical blades having their rear ends in pivotal union with the plugs and their forward ends in pivotal union with the sleeve portion of the spider, a gear-train connecting the said sleeve portion of the spider and rotor, and a hose coupling connection carried by the shell at its receiving end.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee in the county of Milwaukee and State of Wisconsin in the presence of two witnesses.

WILLIAM J. STEVENSON.

Witnesses:
GEO. W. YOUNG,
M. E. DOWNEY.