Oct. 22, 1929. J. H. OWENS 1,732,277

PIPE CLEANER

Filed Jan. 9, 1928

Fig. 1.

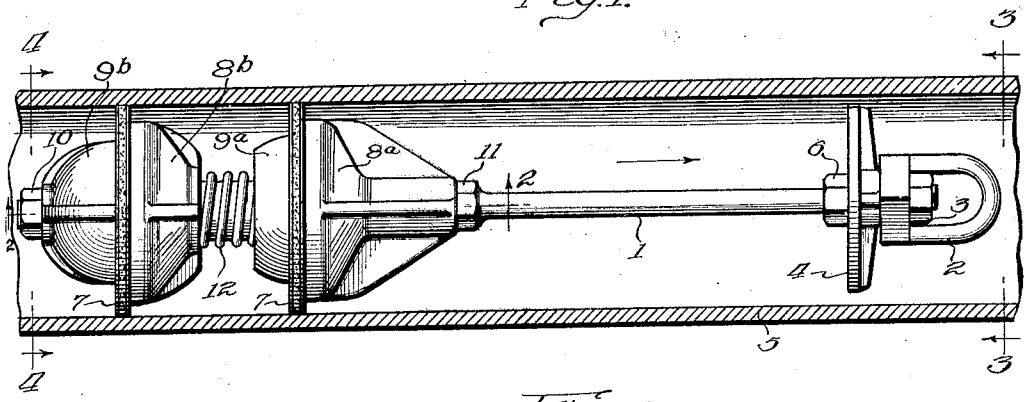


Fig. 2.

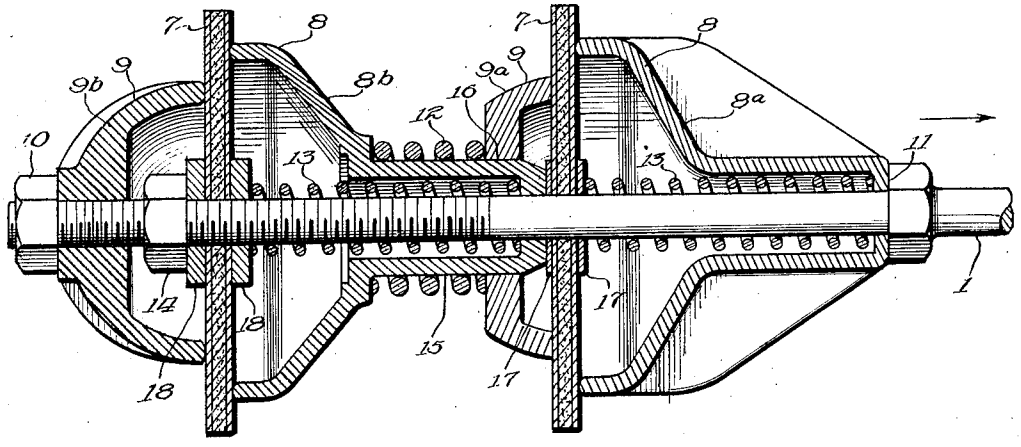


Fig. 3.

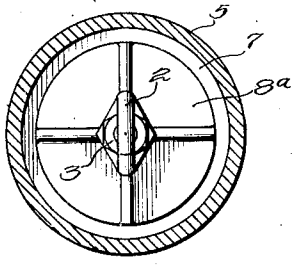
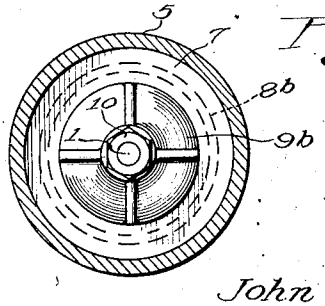


Fig. 4.



Witnesses

Arthur M. Franke.

Fred M. Davis.

Inventor:

John H. Owens.

By. Rummler & Rummler

Attys.

Patented Oct. 22, 1929 1,732,277

UNITED STATES PATENT OFFICE

JOHN HENRY OWENS, OF ELGIN, ILLINOIS

PIPE CLEANER

Application filed January 9, 1928. Serial No. 245,433.

This invention relates to methods and means for cleaning the interiors of pipes and tubular passageways and more especially to adjustable-gauge cleaners adapted for use in gas and oil pipe lines and the like.

The main objects of the invention are to provide an improved form of pipe cleaner; to provide for more apt and ready manual adjustment as to gauge; to provide for limited self responsive accommodation to local and incidental irregularities in the pipe wall contour; to provide for mutual equalizing self adjustment of the work engaging parts, in a series multiple contact cleaner; to provide for adjustable "dishing" of the working plates in a planar disk type of cleaner; to provide for manual setting of such adjustment according to general gauge requirements, and also to provide for self accommodation to refinements in gauge and to wall irregularities; to provide also for double or reverse dishing of the working disks in order to increase the range of gauge adjustment and to enhance resiliency; to provide for ready interchange of parts, especially those subject to wear; and to provide a cleaner of the character stated which cannot become inextricably jammed or wedged in its passage through the pipe.

An illustrative embodiment of this invention is shown in the accompanying drawings in which:—

Figure 1 is a side view of the cleaner lying in a pipe which is shown in section.

Fig. 2 is an enlarged view of the cleaner mainly in axial section on the line 2—2 of of Fig. 1.

Fig. 3 is mainly a front end view of the cleaner as seen from the right of Fig. 1, the pipe being in section on the line 3—3 of Fig. 1.

Fig. 4 is a rear end view of the cleaner as seen from the the left of Fig. 1, the pipe being in section on the line 4—4 of Fig. 1.

In the construction shown in the drawings the cleaner as a whole comprises mainly a pull-rod or stringer 1 on which the other members are assembled, a swivel link 2 secured on the front end by a nut 3, a rigid small-gauge front end buffer plate 4 held in place by nut 6 and link 2 and serving also to center the rod in the pipe 5, and a plurality of pipe engaging disks 7 operatively combined with a number of adjusting and controlling means to be more fully described. This cleaner is adapted to be drawn through the pipe by means of a cord or chain (not shown) attached to the link 2, the direction being indicated by the arrow on Figs. 1 and 2.

Referring now especially to Fig. 2, the disks 7 are of elastic yielding character, but are sufficiently resilient to effectually brush and scrape against the inner face of the pipe and so remove all ordinary obstructions such as slime sediment, light scale and the like. Heavy rubberized fabric answers well for this purpose. This kind of a disk accommodates itself to the occurrence of dents or similar irregularities such as are sometimes met in the pipe wall. Appropriate grades of this material may be selected according to specific needs from ordinary commercial goods known to the rubber trade.

In order to assure snug fitting of the disks in the pipe and to allow for some wear they are made somewhat oversize, that is to say, of larger gauge or diameter than the pipe. Furthermore, lest there be too tight a fit with accompanying friction and possible binding, means are provided for variably adjusting the gauge of the disks, sufficient not only for nice fitting to a single gauge of pipe but also for accommodation to slightly different gauges, and for different thicknesses of non-removable rust or scale on the inside of a pipe.

The disk gauge adjusting means referred to comprises, for each disk, mainly a pair of cooperatively mounted cups 8 and 9 of diverse diameters arranged to dish the disk by clamping engagement against its opposite faces on radially successive medial zones. As two disks 7 are here shown and as the front and rear disk dishing means or clamps 8—9 are somewhat different in certain details the front disk cups may be referred to specifically as 8^a and 9^a and the rear disk cups as 8^b and 9^b respectively. In order that the disks may most readily conform to the pipe wall and to fixed irregularities of any sort, it is preferable that the dishing shall provide for rear-

ward concavity and consequent trailing disk edges. This is effected by placing the larger cup in front and the smaller one behind the disk. The closer the cups are pressed the more the disk will be dished and its gauge correspondingly lessened.

The cup clamping referred to is accomplished by means of a nut 10 engaging the rear end of rod 1 and pressing forwardly against the rearmost cup 9^b; the leading cup 8^a being held against forward slipping by the shoulder 11 on said rod; and the intermediately disposed spring 12 serving to equalize the occlusion of the two clamps and to cushion the cup pressures on said disks.

In order to stabilize the disks and to urge due and prompt return to or toward their flat form when the clamping pressure is relaxed, centrally affective compression springs 13 are arranged within the larger cups to press rearwardly against the middle portions of said disks. The forward ends of said springs extend into the cored hubs of said cups and seat against their closed front ends.

With a view to accommodating still further adjustability and control a nut 14 is provided on rod 1 just back of the rearward disk, to press forward thereon. The function of this nut may be in effect either auxiliary or supplemental or both, relative to nut 10 for dishing the rear disk; but if retracted sufficiently it will entirely relinquish its share of control and if advanced sufficiently, it will entirely relieve nut 10 of disk pressure.

The hub-like forward end 15 of cup 8^b extends through and fits slidably in the wide central aperture 16 of cup 9^a and abuts forwardly against the front disk, so that when the clamping nut 10 is tightened the cup 9^b, rear disk 7 and cup 8^b being urged forward thereby, the hub 15 pushes the middle part of said front disk forward and thus supplements the dishing effect of cup 9^a. Tightening nut 14 tends likewise through the mediation of spring 13, rear disk 7 and cup 8^b to dish the front disk.

Wear plates or washers 17 are interposed to protect the front disk from the front spring 13 and hub 15, and washers 18 protect the rear disk from the rear spring 13 and nut 14.

The method of adjustment for normal use is to tighten the nut 14 merely enough to set snugly against the rear disk and so tension all of the springs and hold the several members snugly in contractual relation. Then the nut 10 is tightened and the clamps 8—9 thereby occluded sufficiently to accomplish the desired dishing of disks 7, according to the gauge of pipe to be cleaned. If, or whenever, more or less permanent dishing is desired the nut 14 may be set more tightly according to needs. Nut 14 enables certain desirable adjustments, but its use is not essential to the main operative features of the device.

Whenever in use the cleaner meets too great resistance, as from dents, hardened sediment, scale or the like, the edge part of the disk yields locally, and the increased tension on the rod 1 transmits additional clamping force to the rearward cups 9 and so augments the disk dishing sufficiently to enable the cleaner to pass and avoid irresistable wedging and stoppage.

As the cleaner advances the buffer 4 picks up the coarser lumps or scale flakes and the disks 7 brush the walls free of all removable finer material.

Although but one specific embodiment of this invention is herein shown and described, it is to be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:

1. A pipe cleaner comprising a central stringer rod having a plurality of resilient working disks spaced apart coaxially thereon, in combination with means to vary the effective gauge of said disks, said means including a series of cups of diverse sizes strung slidably on said rod coaxially therewith and arranged in pairs facing concavely against said disks, together with screw means on said rod to urge said cup and disk members together, the cups of each of said pairs being of different diameters whereby their edges are out of mutual registry, whereby said disks may be dished.

2. A pipe cleaner comprising a central stringer rod having a resilient working disk mounted coaxially thereon, in combination with means to vary the effective gauge of said disk, said means including a pair of cups strung slidably on said rod coaxially therewith and arranged to face concavely against said disk, together with screw means on said rod to urge said cup and disk members together, the cups being of different diameters whereby their edges are out of mutual registry, whereby said disk may be dished.

3. A pipe cleaner comprising a central stringer rod having a plurality of resilient working disks spaced apart coaxially thereon, in combination with means to vary the effective diameter of said disks according to different pipe gauges, said means including a series of cups of diverse sizes strung slidably on said rod coaxially therewith and arranged in pairs facing concavely against said disks medially of the cleaner gauge radius, together with screw means on said rod to urge said cup and disk members together, the cups of each of said pairs being of different diameters whereby their edges are out of mutual registry, and resilient helical means disposed in compression coaxially on said rod to react

against said disks and cups and tending to restore the planar form of said disks.

4. A pipe cleaner comprising a rod adapted for the connection of draft means thereto at one end, in combination with coaxial members strung thereon including a resilient working disk and a pair of mutually different sized cups disposed concavely against the sides of said disk respectively medially of its radius, the rims of said cups being out of mutual registry, together with resilient means urging said cups convergently, and additional resilient means longitudinally adjacent to and within the larger cup and pressing against the middle part of said disk, and screw means to adjust the tension of the first said resilient means.

5. A pipe cleaner comprising a rod in combination with a rubberized fabric working disk strung thereon, together with mutually movable means on said shaft which means have radially distributed annular bearing contact against said disk in sequentially alternate arrangement, and means to adjust the pressure of said means.

6. A pipe cleaner comprising a pull-rod in combination with a plurality of resilient working disks strung thereon, together with axially adjustable clamping means operatively associated with each of said disks to dish the same by longitudinal occlusion thereagainst, and resilient means to normally equalize the clamping force on said disks.

7. A pipe cleaner comprising a pull-rod having a front stop thereon and having strung thereon in the sequence enumerated, (1) a backward facing large cup, (2) a resilient working disk adapted to accommodate dishing adjustment, (3) a forward facing small cup, and (4) stop means having threaded engagement with said rod to hold said cups and disk in place according to desired dishing adjustment.

8. A pipe cleaner comprising a pull-rod having strung thereon a plurality of working units each including a resilient disk and a pair of cups having diverse rim diameters embracing the same; stop means back of the rearward unit; helical spring means urging said units apart; and means integral with one of said units positively limiting the juxtaposition of said units to relieve said spring means against overload.

9. A pipe cleaner comprising a rod having a resilient working disk strung coaxially thereon, in combination with radially distributed annular means on said rod adapted and arranged to dish said disk reversely in concentric zones, and means engaging said rod to forcibly adjust the relative position of said dishing means.

10. A pipe cleaner comprising a pull-rod in combination with a plurality of resilient working disks strung in series thereon, dishing clamps therefor respectively, spring means to equalize the occlusive force of said clamps and adjusting means including a nut on said rod to bear against the rearward disk, and another nut on said rod to bear against the rearward clamp to adjust gauge dishing.

Signed at Aurora, Illinois, this 5th day of January, 1928.

JOHN HENRY OWENS.