Nov. 22, 1932. G. J. SCOFIELD 1,888,575

CLEANSING APPARATUS

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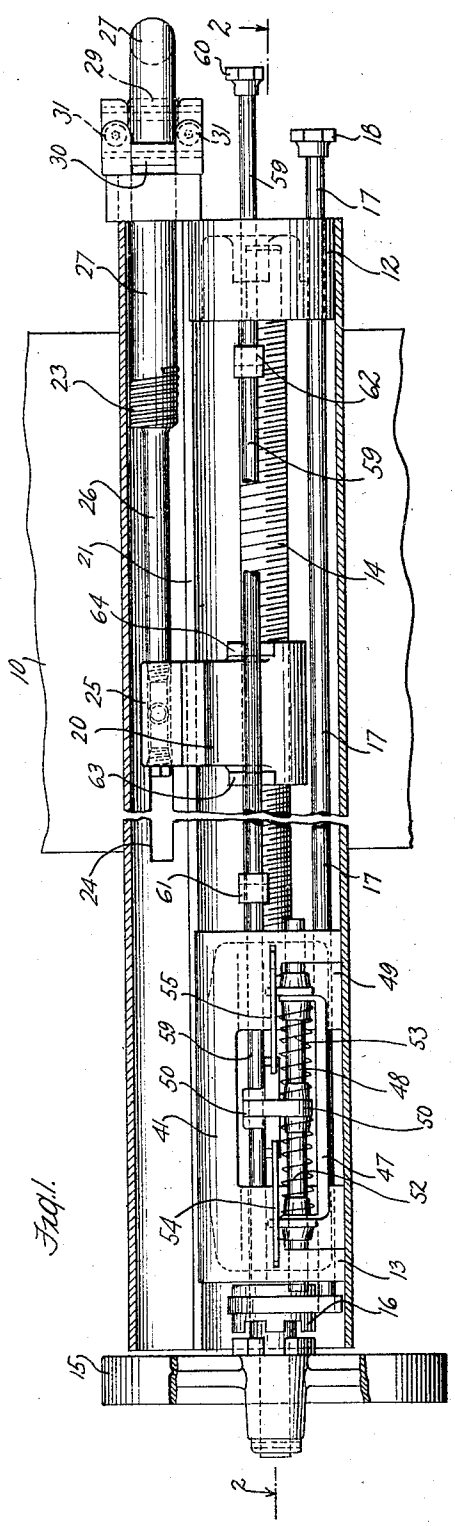


Fig. 1.

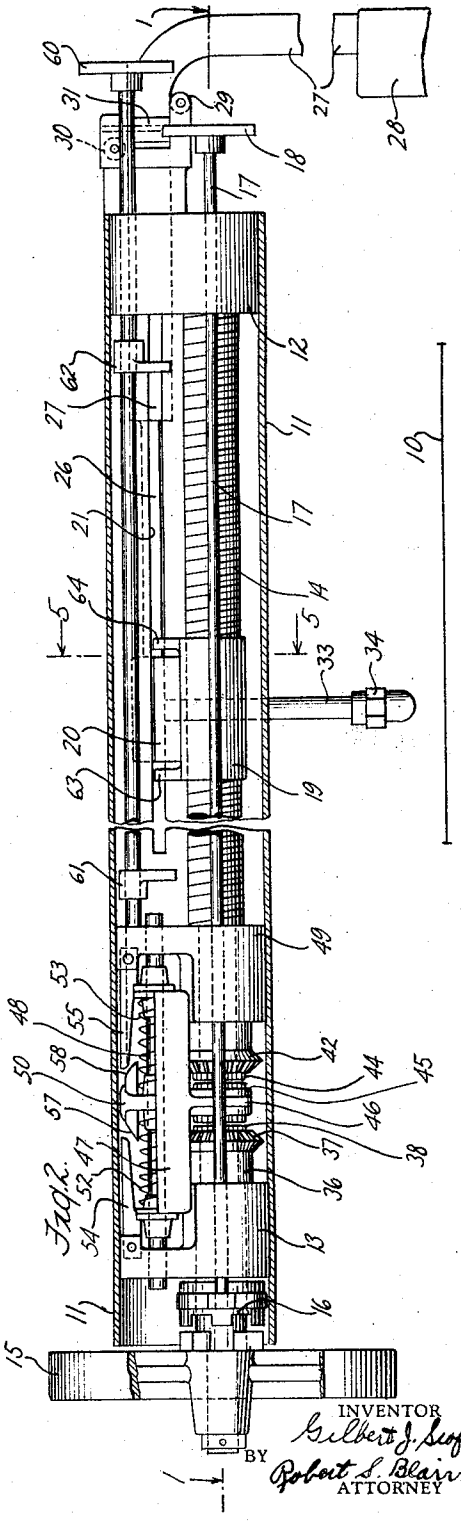


Fig. 2.

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Fig. 3

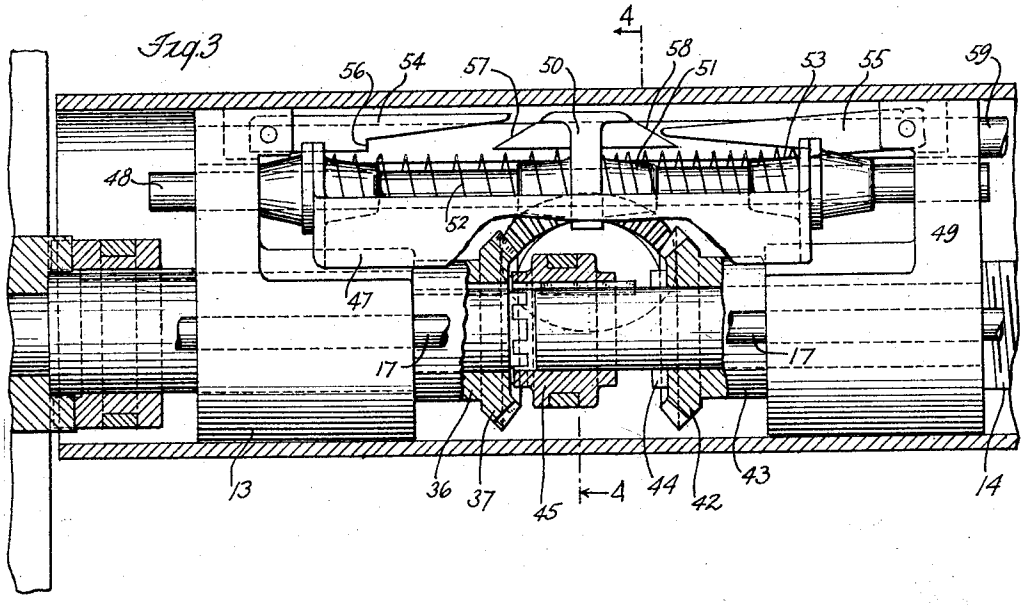


Fig. 4

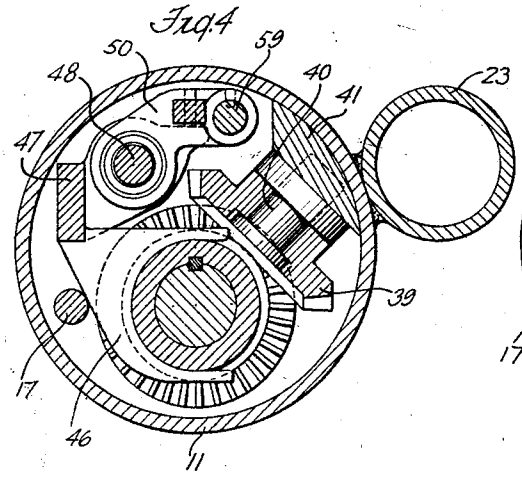
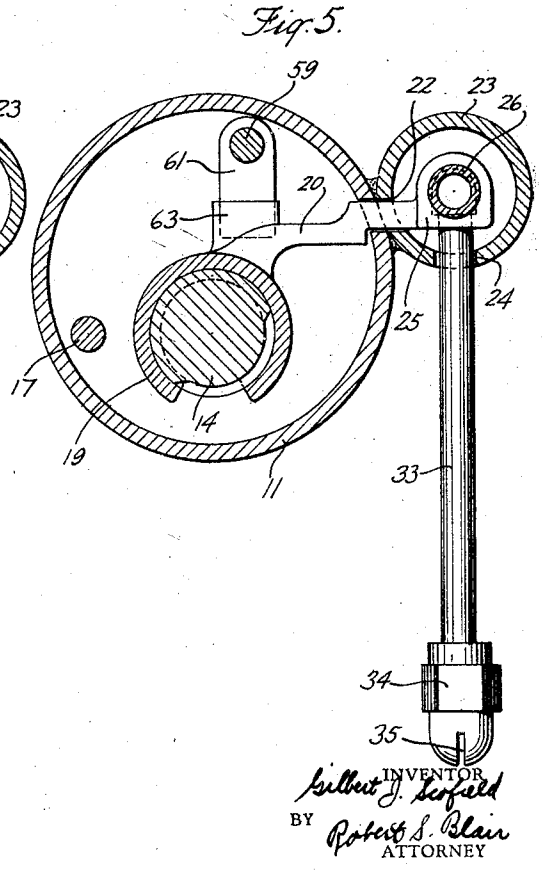


Fig. 5.



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UNITED STATES PATENT OFFICE

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CLEANSING APPARATUS

Application filed July 6, 1928. Serial No. 290,763.

This invention relates to cleansing apparatus and more particularly to such apparatus in connection with certain portions of paper-making machinery which tend to become clogged in use.

One of the objects thereof is to provide practical apparatus of the above nature of simple and durable construction. Another object is to provide apparatus of the above nature the action of which is efficient and dependable. Another object is to provide in apparatus of the above nature an effective and flexible means of control to meet varying conditions of use. Another object is to provide apparatus of the above nature in which the wear of the parts is reduced to a minimum. Another object is to provide a simple and highly efficient reversing mechanism. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings in which is shown one of various possible embodiments of this invention,

Figure 1 is a plan, partially in section, taken along the line 1—1 of Fig. 2;

Fig. 2 is an elevation, partially in section, taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional elevation on an enlarged scale of the reversing mechanism shown in Fig. 2;

Fig. 4 is a section taken along the line 4—4 of Fig. 3; and

Fig. 5 is a section on an enlarged scale taken along the line 5—5 of Fig. 2.

Similar reference characters refer to similar parts throughout the several views of the drawings.

In order that certain dominant features of this invention may be the more readily grasped, it may be noted that in paper-making machinery there are pulp-supporting elements of the machine which tend to become clogged with pulp and introduce imperfections in the resilient paper. This clogging may occur at various portions of the surface and to varying degrees; furthermore, there is a continuous tendency to clogging even though it does not become localized. It is also to be noted that in machinery of this sort the space available for cleansing mechanism is cramped and the conditions of use are severe. To provide apparatus which will efficiently meet these severe requirements and perform its functions in a practical and dependable manner is among the dominant aims of this invention although it may be noted that certain features herein set forth are of advantage in other relations.

Referring now in detail to the accompanying drawings, there is diagrammatically indicated in Fig. 2 at 10 the element to be cleaned, which may be a screen, felt or other form, and which may be assumed to travel in a direction toward or away from the paper, still having reference to Fig. 2. Mounted above the element 10 is a casing 11 which may be supported in any convenient manner and which is provided with tight end fittings 12 and 13 respectively. Journaled within these fittings is a threaded shaft 14 one end of which is driven through suitable reverse mechanism, hereinafter described in detail, from a pulley 15, a jaw clutch 16 being provided to throw on and off power, this clutch being controlled by a sliding rod 17 having a hand grip 18.

Mounted upon shaft 14 and having an internal thread coacting therewith is a sleeve 19 having an integral arm 20 extending laterally through a slot 21 in the casing 11, as best indicated in Fig. 5 of the drawings. This slot 21 extends throughout a substantial portion of the length of casing 11 and leads through a registering slot 22 in a supplementary casing 23 secured as by brazing to one side of the upper portion 11. This casing 23 is provided at its bottom with a slot 24 substantially co-extensive in length with the slots 21 and 22.

The arm 20 terminates in a fitting 25 leading into which and secured to which is one end of a pipe 26 which is connected at its opposite end with a hose 27. This flexible hose

leads from a source of supply of cleansing fluid diagrammatically indicated at 28 which preferably takes the form of water driven into the hose under pressure of a steam injector. The hose 27 is provided with suitable slack and leads upwardly over the roller 29 as indicated in Fig. 2 of the drawings and under the roller 30 placed somewhat in advance of the roller 29. Engaging the hose on the sides are a pair of rollers 31 as indicated in Fig. 1, and it will thus be seen that as the hose travels into and out of casing 23 it rides upon these slightly concaved rollers thus lessening the load on the moving parts and greatly reducing the wear upon the hose.

Leading downwardly from the fitting 25 is a short discharge tube 33 having at its end a nozzle 34 provided with a flat slot 35 which extends in the direction of the length of the casing 23.

It will thus be seen that in all positions of the sleeve 19 along the threaded shaft 14 the fitting 25 will readily assume a corresponding position and carry with it the fluid jet from the nozzle 34. It may here be noted that the term "jet" is used throughout in a broad sense to indicate any form of discharge of a cleansing fluid and that the term "nozzle" is used with an equally broad significance to denote any part from which a jet may be discharged.

It will be seen from the foregoing that upon power being applied to the shaft 14 its rotation will move the nozzle 34 across the surface of the part 10, the direction of movement being governed by the direction of rotation of the shaft. There is accordingly provided reversing mechanism whereby the nozzle may be caused to move back and forth across the part to be cleaned without the necessity for reversal of the driving mechanism.

On the driven side of the clutch 16 is a short hollow shaft section 36 which terminates in a beveled pinion 37 having formed thereon a jaw clutch member 38. Mating with pinion 37 is a beveled pinion 39 which may be mounted upon a stud shaft 40 extending from the inner surface of a connecting portion 41 which is preferably cast integral with the fittings 13 and 49. This unitary arrangement of the parts 13, 41 and 49 not only maintains the mechanism rigidly in a predetermined relation, but facilitates the assembly and disassembly of the apparatus as a whole. The pinion 39 drives a beveled pinion 42 upon a hollow shaft section 43, it being understood that the unthreaded end of shaft 14 extends through the hollow shafts 36 and 43. Pinion 42 is provided with a jaw clutch member 44 and between the clutch members 38 and 44 is a double-faced clutch member 45 splined to the shaft 14 and adapted to be slid along that shaft into engagement with either of them. Thus with a constant direction of rotation of the pulley 15, the shaft 14 is driven in one or the other direction in accordance with the position of the clutch member 45.

This latter member is controlled in position by a shipping arm 46 extending from a slidable support 47 which is fast upon a slidable shaft 48 resting within suitable bearings in the fittings 13 and 49. The movement of the support 47 is controlled by an actuating member 50 slidable on shaft 48 by means of the hub 51. A pair of spiral springs 52 and 53 rest about the shaft 48 between the respective ends of the hub 51 and the corresponding ends of the support 47. Thus as the actuating member 50 is moved to the left or to the right, having reference to Fig. 3 of the drawings, it tends to bring about a corresponding movement of the support 47 by compression either of the spring 52 or the spring 53. Normally, however, the fitting 47 with the central clutch member 45 is locked in one or the other of its engaging positions, as by means of the pivoted locking dogs 54 and 55 each provided with a shoulder 56. With the parts as shown in Fig. 3 of the drawings, the locking dog 55 is coacting with the adjacent flange of the support 47 and holding the clutch member 45 in operative relation to the clutch member 38.

The sliding actuating member 50 is provided with a pair of cam surfaces 57 and 58 respectively coacting with the ends of the locking dogs in such manner that if for example the part 50 be moved to the right in Fig. 3 of the drawings the cam surface 58 will raise and release the locking dog 55. During this action the spring 53 will have become compressed and when the support 47 is unlocked by the raising of the dog 55 the former will be snapped to the right to bring the clutch member 45 out of engagement with the clutch member 38 and into engagement with the clutch member 44. It will be seen, furthermore, that the compression of the spring 53 holds clutch member 45 against clutch member 44 until these parts snap into interlocking engagement. Furthermore, when this is accomplished, the locking dog 54 will drop so as to bring its shoulder 56 back of the adjacent flange of the support 47 and lock the clutch in its new position with a reversed drive of the shaft 14. Movement of the actuating member 50 in the opposite or leftward direction, having reference to Fig. 3, will, in a manner which will be obvious from the foregoing, cause disengagement of the clutch 45 from the clutch 44 and engagement with the clutch 38.

The movement of the actuating member 50 is controlled by a slidable rod 59 terminating in a hand grip 60. This rod is provided with a pair of stops 61 and 62 adjustably held thereon by set screws or other suitable means. These stops extend down respectively into the path of shoulders 63 and 64

formed on the sleeve 19. Thus, assuming that the direction of drive of shaft 14 is such as to move the sleeve 19 to the left, having reference to Fig. 2 of the drawings, the shoulder 63 will engage and move the stop 61, and by the means hereinbefore described actuate the reversing mechanism to reverse the direction of drive of the shaft 14. Thereupon the sleeve 19 will travel toward the right, having reference to Fig. 2, until the shoulder 64 engages and moves the stop 62 thereby again actuating the reverse mechanism and again reversing the direction of drive of the shaft 14. In this manner the sleeve 19 automatically and positively travels back and forth along the above path carrying with it the nozzle 34 and moving edgewise the fluid jet discharged thereby over the surface of the screen or felt 10. It is to be noted that in this movement there is substantially no wear on the parts and no uncertainty of operation. The threads on the shaft 14 may be of any desired size, and the internal threads meshing therewith have a continuous snug fit. Furthermore, the mounting of the hose relieves his part of any substantial load and there is no interference with full lubrication of the shaft and its associated parts as there is no leakage of water from the casing 23 to the casing 11.

In the use of apparatus of this nature it often happens that there is an aggravated clogging of the web at some particular part, and it is possible that with an ordinary regular back-and-forth movement of the jet this clogged portion may be carried past the line of cleansing before it is engaged with sufficient severity by the cleansing fluid. This is provided for by the hand control through the grip 60 of the controlling rod 59. By a slight longitudinal movement of this rod by hand the reverse of the shaft 14 is effected at any time irrespective of the position of the sleeve 19 with respect to the stops 61 and 62. Thus the nozzle and cleansing jet may be caused to reverse their direction of movement at any desired instant and may be made to move back and forth quickly through a path of any desired length or position to meet the particular conditions which are confronted.

It will thus be seen that there is provided apparatus which the several objects of this invention are accomplished and which is well adapted to meet the conditions of hard practical use.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In cleansing apparatus, in combination, a source of supply of a fluid under pressure, a nozzle, means adapted to move said nozzle along a predetermined path, a conduit leading from said source of supply to said nozzle and comprising a flexible portion and a support comprising a pair of vertically offset rollers between which said flexible portion passes, the lower roller being offset with respect to the upper roller in a direction toward the source of supply.

2. In cleansing apparatus, in combination, a source of supply of a fluid under pressure, a nozzle, means adapted to move said nozzle along a predetermined path, a conduit leading from said source of supply to said nozzle and comprising a flexible portion and a support comprising a pair of vertically offset rollers between which said flexible portion passes, the lower roller being offset with respect to the upper roller in a direction toward the source of supply, and a pair of rollers respectively engaging opposite sides of said flexible portion adjacent said first rollers.

3. In cleansing apparatus, in combination, a source of supply, of a cleansing fluid under pressure, a nozzle, a conduit leading from said source of supply to said nozzle, means comprising a rotatable member adapted to move said discharging means in accordance with its direction of rotation, a source of power, a reversing mechanism interposed between said source of power and said rotatable member and comprising a member the movement of which operates said reversing mechanism, an actuating member, a spring interposed between said last two members through which said reversing mechanism is operated, a casing about said first means and said reversing mechanism, and a casing about said conduit so disposed with respect to said first casing as to prevent water leakage therein.

4. In cleansing apparatus, in combination, a source of supply of a fluid under pressure, a nozzle, means adapted to move said nozzle along a predetermined path, a conduit including a flexible portion leading from said source of supply to said nozzle, and a support comprising a plurality of rollers engaging more than one side of said flexible portion between which said flexible portion passes.

5. In cleansing apparatus, in combination, a threaded rotatable shaft, means adapted to discharge a fluid jet and threaded upon said shaft, housing means forming a bearing for one end of said shaft, a pair of oppositely disposed rotating members mounted within said housing means upon axes substantially parallel to said shaft, means for rotating said last-mentioned members in opposite directions, clutch parts secured to each of said last-mentioned members, a clutch member slidably mounted upon said shaft and connected thereto, said clutch member being

adapted to engage either of said clutch parts to cause rotation of said shaft in either direction, a part connected to said clutch member, resilient members in engagement with the opposite sides of said part and adapted to hold said clutch member in a neutral position between said clutch parts, means connected to said part and coacting with said first-mentioned means to force said clutch member into engagement with either of said clutch parts in accordance with the position of said discharge means on said shaft and against the action of one of said resilient members, means for holding said part in said position until actuated by said last-mentioned means, and holding means disposed opposite said last-mentioned means for securing said part in another position with said clutch member in engagement with the other clutch part when said part is released by said forcing means.

6. In cleansing apparatus, in combination, housing means, a threaded shaft rotatably mounted in said housing means, means adapted to discharge a fluid jet and threaded upon said shaft, a clutch member rotatably mounted in said housing means on an axis parallel to the axis of said shaft, a second clutch member rotatably mounted within said housing an axis parallel to said shaft, said clutch members being spaced from each other and having their clutch faces opposing each other, means for imparting rotation to said clutch members in opposite directions, a clutch part slidably mounted upon said shaft between said clutch members and connected to said shaft, a cam member connected to said clutch part and slidably mounted upon a rod, a pair of stopping elements secured at spaced points on said rod facing the opposite sides of said cam member, resilient members disposed between said cam member and said stopping elements, said resilient members adapted to hold said clutch part in a neutral position between said clutch members, means for actuating said cam member to move said clutch part into engagement with either of said clutch members according to the position of said discharge means on said threaded shaft, and a pair of cam faced dog members pivotally mounted on said housing means and coacting with said stopping elements, each of which is adapted to hold said part in one position and said clutch part in a position against one of said clutch members against the action of one of said springs, said cam member coacting with said last-mentioned means and adapted to release the dog which is in locking position upon actuation by said discharge means.

7. In cleansing apparatus, in combination, housing means, a threaded shaft rotatably mounted within said housing means, means adapted to discharge a fluid jet and threaded upon said shaft, a pair of oppositely positioned clutch members rotatably mounted in said housing means upon the same axis as said shaft, a clutch part slidably mounted upon said shaft between said clutch members and connected to said shaft, means for imparting rotation to said clutch members in opposite directions, a cam member connected to said clutch part, a pair of resilient members engaging said cam member and adapted to hold said cam member and said clutch part in a neutral position between said clutch members, means associated with said discharge means for actuating said cam member and said clutch part in directions parallel to the axis of said threaded shaft according to the position of said discharge means on said shaft, means in engagement with the opposite ends of said resilient means, and locking means associated with said housing means for holding said last-mentioned means in one of two positions so that either one of said resilient members forces said clutch part into engagement with one of said clutch members, said cam member coacting with said locking means to release said last-mentioned means and allow said other resilient member to force said clutch part into engagement with the other clutch member when said cam member is actuated by said discharge means.

8. In cleansing apparatus, in combination, housing means, a threaded shaft rotatably mounted within said housing means, two oppositely disposed clutch members rotatably mounted within said housing means spaced from each other and mounted upon the same axis as said shaft, a clutch part slidably mounted upon said shaft between said clutch members and connected to said shaft, resilient means adapted to hold said clutch part in engagement with either of said clutch members, means for imparting opposite rotation to said clutch members, means associated with said discharge means near one end of its path of travel on said shaft for forcing said clutch part and said resilient means into engagement with one of said clutch members, means for locking said resilient means and said clutch part in said last-mentioned position, means associated with said discharge means near the other end of its path of travel along said shaft and adapted to release said locking means so that said resilient means may force said clutch part against the other of said clutch members, and means for locking said resilient means and said clutch part in said last-mentioned position.

9. In cleansing apparatus, in combination, a nozzle, means adapted to move said nozzle in two directions along a predetermined path, reversing means for controlling the direction of movement of said nozzle along said path, resilient means adapted to actuate said reversing means, and means situated

substantially at the ends of said path and adapted to initiate the action of said resilient means when said nozzle reaches either end of its path of movement.

10. In cleansing apparatus, in combination, a threaded shaft capable of rotation in reversed directions, a nozzle threaded upon said shaft, means for rotating said shaft, reversing means for changing the direction of rotation of said shaft, resilient means for actuating said reversing means, and means situated substantially at the opposite ends of said shaft and adapted to initiate the action of said resilient means when said nozzle reaches either end of said shaft.

In testimony whereof, I have signed my name to this specification this 27th day of June, 1928.

GILBERT J. SCOFIELD.