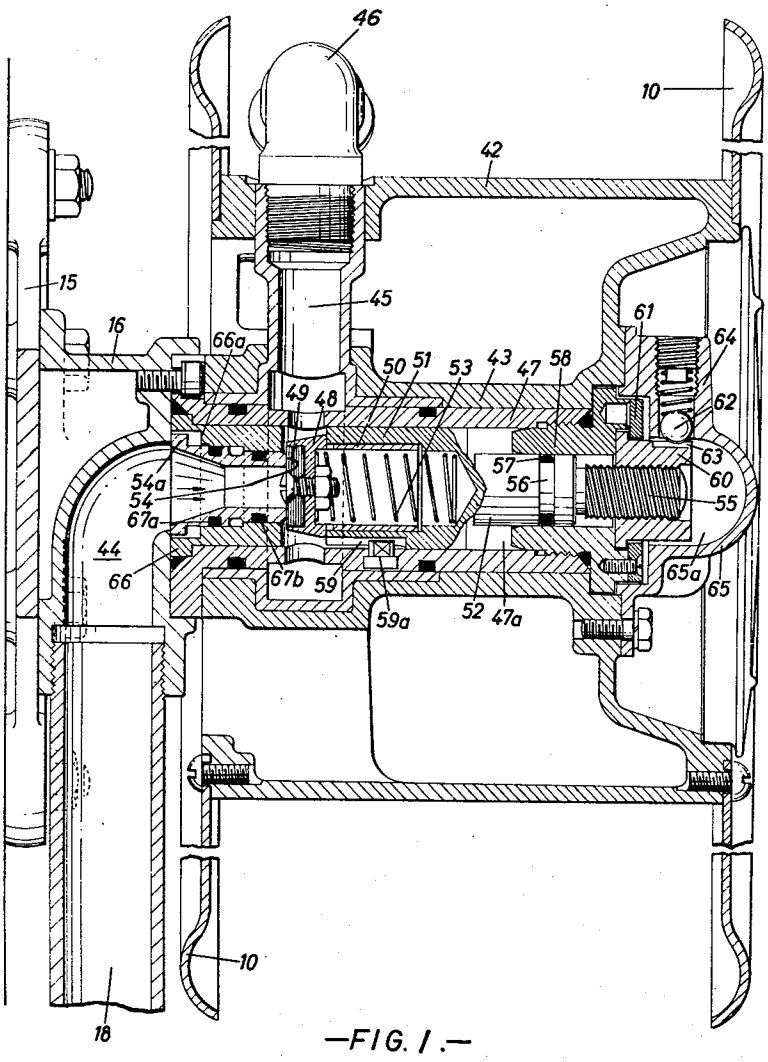
Aug. 21, 1962 E. HOOPER 3,050,078

HOSE REELS AND VALVES OPERATED THEREBY

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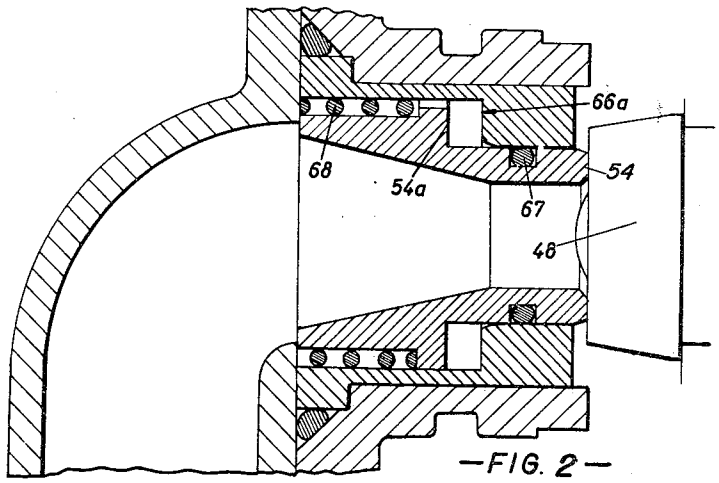
—FIG. 1.—

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—FIG. 2—

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HOSE REELS AND VALVES OPERATED THEREBY

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Claims priority, application Great Britain Nov. 8, 1958
5 Claims. (Cl. 137—355.19)

This invention is for improvements in or relating to hose reels of the kind (herein referred to as the kind specified) incorporating or associated with valve means, the arrangement being such that running out of the hose (e.g. on the occurrence of a fire) automatically actuates the valve e.g. to turn on or make available to the hose a supply of water or other fluid.

With hose reel operated valves as available heretofore there is the possibility that a relatively small pulling out of the hose, or slight rotation of the reel by a person tampering with it, may result in the opening of the valve and an objectionable discharge of the water or other fluid. One object of the present invention is to avoid this possibility. A further object of the invention is to provide a construction which ensures smooth running out of the reel and efficient opening and closing of the valve means without risk of said valve means, particularly the valve seating, being damaged due to strain imposed on it by rotation of the reel after the valve has been fully opened or fully closed.

According to one feature of the present invention the valve is provided with a seating which is permitted a limited amount of movement so that it follows or takes part in movement of the valve in the opening direction, to maintain the valve closed, until it comes up against an abutment or stop. In order to stop water hammer, which is liable to take place at or just before final closing movement of the valve, arrangements are preferably made whereby there is a pressure on the "floating" valve seating, in the direction of flow of the water or other fluid, which is greater than the pressure on said seating in the reverse direction. This may be achieved by providing the valve seating with two sealing members or rings (e.g. two O-rings) that against which the pressure acts in the direction of flow through the valve having a greater area than the other. Alternatively the valve seating may be loaded by means of a spring which augments the pressure on it in the direction of flow through the valve.

According to a further feature of the invention the drive between the reel and the valve incorporates a slipping clutch or like device which allows the reel to over-run the valve means once the valve has been opened and/or closed fully or to a predetermined extent.

According to a still further feature of the present invention the valve has a washer (e.g. similar to a tap washer) against which the valve seating bears and this washer is let into a recess in the valve face. With this arrangement there is little or no risk of the valve-washer or sealing member disintegrating and thereby clogging or fouling any of the fluid flow passages through the valve or reel. It will be appreciated that this is important having regard to the fact that a fire hose reel may be left for a considerable period of time without attention or use.

A particular embodiment of the invention will now be described by way of example with reference to the accompanying drawings whereon:

FIGURE 1 is a detail sectional elevation through the reel and valve, and

FIGURE 2 is a detail sectional view showing a modification of the valve incorporated in the reel shown in FIGURE 1, the valve being in the closed position.

Referring to FIGURE 1 of the drawings, the reel has a hub 42 and located within this central portion or hub and formed integrally therewith is a valve housing 43.

The water inlet 44 is incorporated in the bracket 15, 16 as previously described. The water outlet is indicated at 45 and this has a spigot part 46 which is inserted into the inner end of the hose wound on the reel.

The flow of water from the inlet 44 to the outlet 45, 46 is controlled by valve means including a valve casing 47 located in the housing 43, said valve casing being secured to the bracket 15, 16. An O-ring sealing member is located between the inner end of the valve casing 47 and the part 16 of the bracket. It will be appreciated that, in effect, the valve casing 47 forms a stub shaft or trunnion on which the reel rotates. The outlet part 45 is preferably of some non-corrosive metal (e.g. gun-metal) cast into the part 42, 43 of the reel which is preferably of a light material such as aluminum.

The valve means also comprises a valve proper 48 which has a sealing washer 49 (which may be similar to an ordinary tap washer) let into a recess in the valve face. The valve proper 48 has a hollow stem part 50 which is housed in the enlarged head 51 of the valve operating member or shaft 52. A spring 53 is also located in said enlarged head 52 and acts to press the valve proper 48, 49 onto the valve seat 54.

The end of the valve operated member or shaft 52 is provided with a multi-start (e.g. two start) thread 55 and said shaft is grooved at 56 and provided with packing 57 where it passes through a gland 58 screwed into the end of the valve casing, 47.

The head 51 of the valve operating shaft or member 52 is slotted at 59 and a stud 59*a* projects into said slot so as to hold said valve operating shaft against rotation but permit limited axial movement.

Screwed onto the threaded end 55 of the valve operating shaft 52 is a nut 60 which is free to rotate but is held against axial movement by a retaining ring 61 secured to the gland 58.

Rotation of the nut 60 by rotation of the reel is effected, for the purpose hereinafter described, through a slipping clutch mechanism comprising a plurality (say three) of spring loaded ball devices 62 arranged radially around the nut 60 the balls engaging in recesses or grooves 63 at spaced intervals around the periphery of the nut. The spring loaded ball devices 62 are housed in a circumferentially spaced radial housing 64 on an end cover 65 secured to the hub portion of the reel.

An important point to note is that the valve seating 54 is free to have limited axial movement or "float" in its housing 66 which is trapped in the housing 47. In other words the valve seating 54 is free to follow up movement of the valve, under the pressure in the inlet 44, until a flange 54*a* on the seating 54 comes up and against an abutment or stop 66*a* formed on the housing 66. O-ring sealing members 67*a* and 67*b* are provided for the seating 54.

As soon as unreeling of the hose is commenced the slipping clutch device comprising the balls 62 provides a temporary drive between the reel and the valve operating member or shaft 52 which, due to rotation of the nut 60, is caused to move axially to the right so that the valve member proper 48, 49 is free to open under the water pressure to allow water to flow from the inlet 44 to the outlet 45 and spigot 46. Initial rearward movement of the valve (i.e. movement to the right in the operating direction) does not, however, actually cause opening of the valve because the valve seating 54 follows up this movement, due to the pressure in the pipe 44, and maintain itself against the washer 49 until the flange 54*a* of the seating comes up against the stop 66*a*. The valve then commences to open. Before this can take place it is necessary to reel off a portion of the hose say four or five feet. This arrangement ensures, therefore, that persons tampering with the hose reel by giving the hose a slight

pull or the reel a slight turn will not in fact open the valve. A definite running out of the hose to a certain amount is necessary before this can happen.

In the fully open position of the valve continued rotation of the reel is permitted by "slipping" of the ball drive device, without risk of any undue strain being placed on the mechanism.

To overcome the possibility of water hammer or chatter, particularly when the valve is almost at the fully closed position, provision is made to ensure that the hydraulic pressure in the inlet **44** acting on the floating valve seating **54** is greater in the direction of flow of the water (i.e. in the direction indicated by arrows in FIGURE 1) than in the reverse direction. In other words the hydraulic pressure on the floating valve seating is not balanced but is greater in the one direction than the other. With this object in view the O-ring **67***a* is made larger than the O-ring **67***b* by, in this particular case, 0.103 sq. in.

An alternative arrangement to that just described is shown in FIGURE 2 in which, instead of having two O-rings there is a single O-ring **67** and a spring **68** is provided which acts to load the floating valve seating in the direction required to maintain it against the valve proper at all times except when the seating comes up against the stop **66***a* and the valve continues its movement in the opening direction.

It will be appreciated that the spring loaded valve proper **48**, **49** constitutes also a non-return valve so that should the water pressure in the inlet **44** fail for any reason this valve will close automatically to prevent any stale water running back from the hose to the inlet.

Another advantageous feature of the above design is the multistart thread **55** which prevents binding of the nut **60** and ensures easy and speedy operation of the valve mechanism both in the opening and closing direction.

The end cover **65** provides a space **65***a* which is advantageously filled with oil or light grease to ensure free operation of the valve even after years of "standing idle" which may well be the case where the valve is incorporated in a fire hose reel.

The balls **62** when running frictionally on the nut **60**, act, to some extent, to "brake" rotation of the reel in the unwinding direction should the reel tend to over-run the hose.

The valve operating member **52** may have its head **51** fluted longitudinally so as to enable water to pass to the space **47***a* and thereby balance, to some extent, the hydraulic pressure on the valve mechanism.

It will be appreciated that, for exemple, in the reel above described the slipping ball clutch devices may be replaced by some form of slipping friction drive incorporating suitable friction surfaces.

Whilst the invention has been described more particularly or applid to a fire hose it can be used in other circumstances where a supply of fluid to a hose is required to be made available automatically on, or after a predetermined unreeling of the hose.

What I claim is:

1. A hose reel including valve means and driving means between the reel and said valve means whereby the reel when rotated is operative to open said valve means, said driving means including a slipping clutch device, said valve means comprising a valve member proper, means supporting said valve member proper for movement from an open to a closed position and vice versa, a seating for said valve means proper, means supporting said valve seating for movement in the valve opening and closing direction, abutment means on said valve seating, a valve seating stop spaced from said abutment means in the valve opening direction, and means operative to cause movement of the valve seating in the valve opening direction until said abutment means engages the valve seating stop whereby during preliminary rotation of the reel there is a period during which the valve is closed.

2. A hose reel including valve means and driving means between the reel and said valve means whereby the reel when rotated is operative to open said valve means, said driving means including a slipping clutch device, said valve means comprising a valve member proper, means supporting said valve member proper for movement from an open to a closed position and vice versa, a seating for said valve means proper, means supporting said valve seating for movement in the valve opening and closing direction, abutment means on said valve seating, a valve seating stop spaced from said abutment means in the valve opening direction and means applying a fluid pressure on the movable valve seating in the direction of fluid flow through the valve, which pressure is greater than the fluid pressure acting on the movable seating in the reverse direction, so as to cause movement of the valve seating in the valve opening direction until said abutment means engages the valve seating stop whereby during preliminary rotation of the reel there is a period during which the valve is closed.

3. A hose reel including valve means and driving means between the reel and said valve means whereby the reeel when rotated is operative to open said valve means, said driving means including a slipping clutch device, said drive means comprising a screw threaded member connected to the valve, a nut threaded on said screw threaded member and spring loaded ball means carried by the reel and engaging in groove means in the nut, said valve means comprising a valve member proper, means supporting said valve member proper for movement from an open to a cloesd position and vice versa, a seating for said valve means proper, means supporting said valve seating for movement in the valve opening and closing direction, abutment means on said valve seating, a valve seating stop spaced from said abutment means in the valve opening direction and means operative to cause movement of the valve seating in the valve opening direction until said abutment means engages the valve seating stop whereby during preliminary rotation of the reel there is a period during which the valve is closed.

4. A hose reel including valve means and driving means between the reel and said valve means whereby the reel when rotated is operative to open said valve means, said driving means including a slipping clutch device, said valve means comprising a valve member proper, means supporting said valve member proper for movement from an open to a closed position and vice versa, a seating for said valve means proper, means supporting said valve seating for movement in the valve opening and closing direction, abutment means on said valve seating, a valve seating stop spaced from said abutment means in the valve opening direction, means operative to cause movement of the valve seating in the valve opening direction until said abutment means engages the valve seating stop whereby during preliminary rotation of the reel there is a period during which the valve is closed, and spring means acting on the valve means proper in the closing direction so as to close said valve if the fluid pressure supply to the hose fails.

5. A hose reel as claimed in claim 2 wherein the valve means and drive means are enclosed in a water tight casing embodied in the hub of the reel.

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CERTIFICATE OF CORRECTION

Patent No. 3,050,078 August 21, 1962

Edward Hooper

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 50, for "exemple" read -- example --; line 55, for "applid" read -- applied --; column 4, line 23, for "reeel" read -- reel --; line 31, for "cloesd" read -- closed --; line 59, before "closing" insert -- valve --.

Signed and sealed this 8th day of January 1963.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents