March 8, 1932. M. C. SHAW 1,848,436

NOZZLE

Filed May 2, 1930

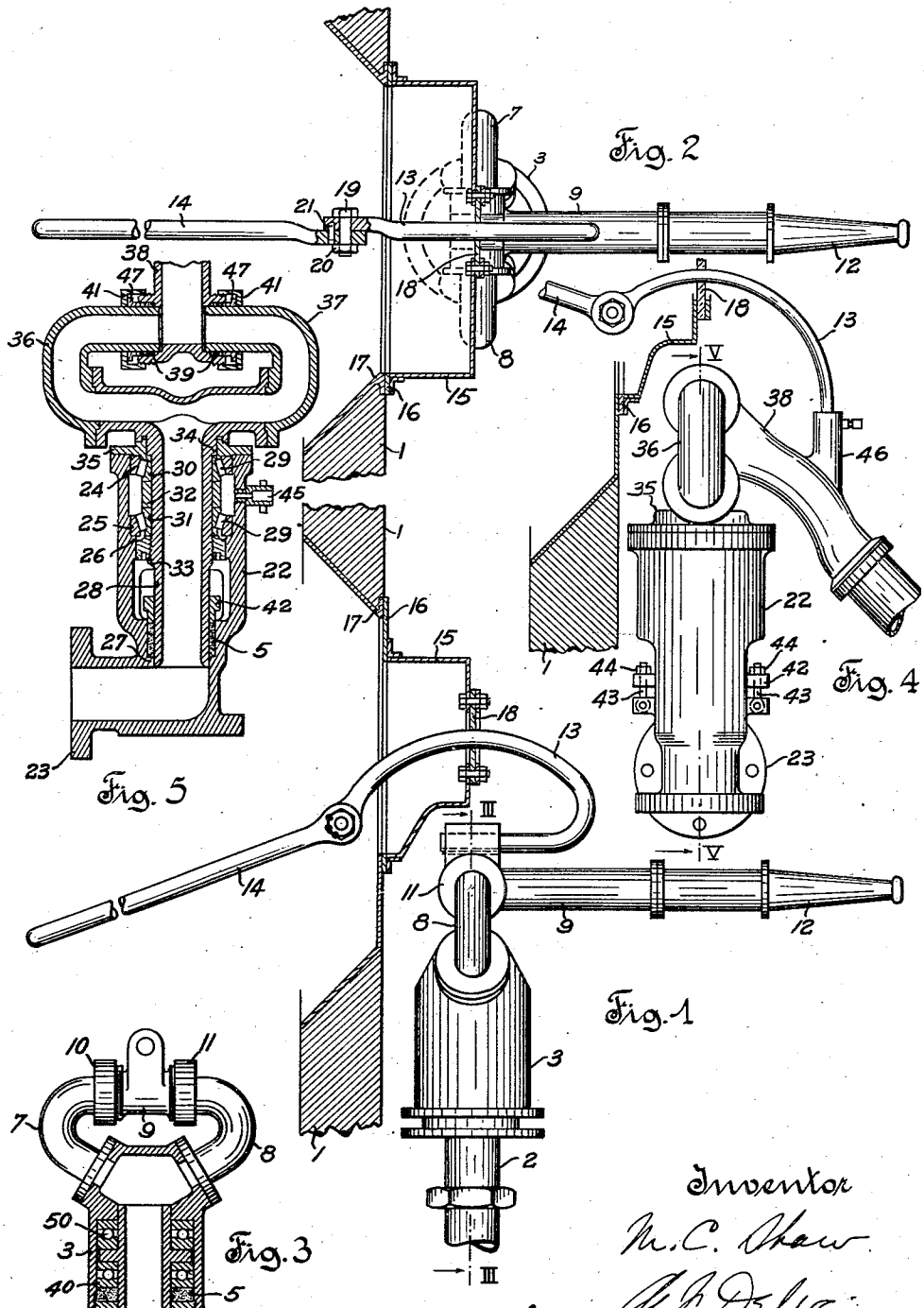


Fig. 1

Fig. 3

Fig. 5

Fig. 4

Fig. 2

Inventor

M. C. Shaw

by G. P. Dewey

Attorney

Patented Mar. 8, 1932 1,848,436

UNITED STATES PATENT OFFICE

MELVIN C. SHAW, OF WEST ALLIS, WISCONSIN, ASSIGNOR TO ALLIS-CHALMERS MANUFACTURING COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF DELAWARE

NOZZLE

Application filed May 2, 1930. Serial No. 449,166.

This invention relates to improvements in nozzle structures, and more particularly to nozzles adapted for use in cleaning devices for castings or the like, in which a stream of cleansing medium, such as water, is directed against the article to be cleaned.

An object of the invention is to provide an improved nozzle construction which is simple and compact in structure, and efficient in operation.

Another object of the invention is to provide an improved shielding device for facilitating manipulation of a nozzle from the exterior of a cleaning chamber.

Another object of the invention is to provide an improved handle adapted for use with the improved shielding device.

Another object of the invention is to provide a nozzle having a discharge member movable in any direction, by means of a curved lever and mount the nozzle at one side of a chamber wall portion provided with an opening and a shielding device substantially closing said wall opening and extending over a considerable portion of the nozzle said shielding device having and requiring but a small sized flexible member snugly engaging and receiving the curved portion of said lever to effectively prevent the escape of the high pressure cleansing fluid through said wall opening as well as foreign material directed toward said opening as a result of impact of the cleansing fluid against the article being cleansed, to the other side of said wall portion from which the lever is normally operated.

Further objects and advantages of the invention will be set forth in the detailed description which follows.

In the accompanying drawings:

Fig. 1 is a side elevation of a nozzle, the improved shielding device being shown in section.

Fig. 2 is a plan view of the nozzle shown in Fig. 1, the improved shielding device and part of the improved handle being shown in section.

Fig. 3 is a fragmentary view showing a partal section on line III—III of Fig. 1.

Fig. 4 is a side elevation of a modified form of nozzle, part of the improved shielding device being shown in section.

Fig. 5 is a section on line V—V of Fig. 4.

In foundry practice it has recently become a custom to remove cores and moulding materials which adhere to castings after they have been taken out of the mould, by shooting a powerful stream of water against the cores. Such cleaning process is preferably performed within a large chamber, and suitable windows must be provided through which an operator standing outside, may observe the process of cleaning. In order to enable the operator to direct a stream of water against certain parts of the casting, a movable nozzle is arranged inside of the cleaning chamber, and the present invention contemplates provision of suitable means for manipulating such nozzle from the outside. In accordance with the improvement, an operating lever is preferably used to move the nozzle, and a shielding device through which such lever passes, protects the operator from injury by débris and water.

It has heretofore been proposed in carrying out such a cleaning process to provide the wall of the cleaning chamber with an opening sufficiently large to permit of the necessary ranges of movement of the operating lever of a universally movable nozzle, the discharge member of which preferably not extending through the wall, and sealing the opening with a member of leather or canvas and of pyramid form having its base marginal portions attached to the wall material immediately surrounding the opening and having its inner end attached to the operating lever close to the nozzle. The necessary freedom of movement for the discharge member of the nozzle in all directions was provided by the flexibility of the material. This member was subjected to considerable deterioration due to the constant dampness, water generally being used as the cleansing fluid because of its relative cheapness. Furthermore the canvas or leather member of pyramid form did not provide the operator with complete safety in case of the bursting of the nozzle or piping or in case of leakage from the gaskets. The size of the member and its

relative stiffness because made of leather or canvas constituted a drag on the nozzle requiring the expenditure of an unnecessary amount of energy in moving the nozzle. The size and the arrangement of the leather or canvas member also seriously interfered with the removal of the nozzle for purposes of repacking or repairing the same.

In order to more completely protect an operator of such a nozzle from injury while enhancing the ease of operation thereof by reducing the size of the flexible member, this invention contemplates the production of a turret type of nozzle, utilizable in the said cleaning process, having a peculiarly curved operating lever movable within the confines of a rigid metallic shield of box shape, which substantially closes the wall opening, while the discharge member is moved in all directions by said lever, said shield surrounding the lever receiving wall opening and requiring by reason of the slight orbital movements of the operating lever in the extended face of said shield a much smaller flexible member for completely sealing the wall opening than what was required in the construction and arrangement of nozzle heretofore used and as described above.

In the drawings, 1 indicates the wall of the cleaning chamber, and a nozzle which is movable in any direction, is preferably located closely adjacent to the inside of said wall. The nozzle shown in Figs. 1, 2 and 3 is of well known design and has a stationary support 2 about which a nozzle body 3 is rotatable upon ball bearings 40 and 50. A packing 5 is held within the nozzle body 3 by a packing gland 6, and seals the joint between support 2 and nozzle body 3. Elbows 7 and 8 are connected to the nozzle body 3 by suitable means, said elbows 7 and 8 constituting with said body a tubular support and admit the water to a nozzle head or discharge member 9 which is adapted to swing in a vertical plane around horizontal legs of the elbows 7 and 8. Suitable packings held in place by caps 10 and 11, seal the joints between the nozzle head 9 and the elbows 7 and 8. At its outer end, the nozzle head 9 has an orifice portion 12 through which the water is delivered in the form of a high velocity jet.

To operate the nozzle from the outside of the cleaning chamber, a curved lever 13 is attached in a suitable manner to the nozzle head 9 and is provided outside of the cleaning chamber with a handle 14. The curved portion of the lever 13 passes through a shield 15 and is bent along an arc concentric with the horizontal pivotal axis of the nozzle head and with the horizontal legs of the elbows 7 and 8. The shield 15 is made of a suitably rigid material, preferably sheet metal, and is firmly retained upon a plate 16 supported by a frame 17 which is fastened by suitable means, in an opening of the wall 1 of the cleaning chamber. The shield 15 is so located that its front wall with the hole for the curved lever 13 is approximately coincident with the vertical axis of rotation of the nozzle body 3, and the hole itself is so located that it lies substantially on said axis. It will be apparent that this arrangement permits unobstructed movement of the curved lever 13, no matter if the nozzle head 9 is moved in a vertical or a horizontal plane. Moving the handle 14 up and down will cause the nozzle head 9 to swing in a vertical plane with the curved lever 13 traveling through the hole in shield 15. Swinging the handle around in a horizontal plane will cause the nozzle body 3 to travel around its vertical axis and, as the hole in shield 15 lies substantially on this axis, a wide range of lateral movement will be obtained if the hole in shield 15 is only slightly larger than the diameter of lever 13. A flexible plate 18 fits snugly over the lever 13 and is fastened by suitable means to the shield 15. The plate 18 is preferably made of soft rubber and will adjust itself to any position of the curved lever, thus sealing at all times the space between this lever and the shield. The handle 14 is adjustably connected with the lever 13 so that the end thereof which is graped by the operator, can be adjusted to any convenient height. A bolt 19 and a nut 20 hold the two parts together, and different relative positions are secured by a stud 21 in one part cooperable with any one of a number of sets of holes in the other. Differently shaped handles may be employed to secure additional travel of the nozzle, if necessary.

A modified form of nozzle construction is shown in Figs. 4 and 5. A stationary nozzle body 22 has on its lower portion a flange 23 adapted to be connected with a pipe line or other suitable means, not shown in the drawings, for supplying the medium to be discharged through the nozzle. The upper part of the nozzle body 22 is fitted with outer races 24 and 25 of conical roller bearings, the lower race 25 being supported by a shoulder 26 on the nozzle body. Another shoulder 27 in the lower part of the nozzle body is provided as a packing retainer. 28 indicates a T-shaped fitting which is rotatably held within the nozzle body 22 by conical rollers 29, and by inner races 30 and 31 cooperating with the outer races 24 and 25. The races 30 and 31 are separated by a spacer 32 and are secured against axial displacement by a ring 33 and a shoulder 34 on the shank of the fitting 28. The latter, is prevented from axial displacement by the inclined disposition of the rollers 29, the shoulder 26, and by the cover 35 which retains the outer race 24. Attached to the lateral extentions of the T-shaped fitting 28 are elbows 36 and 37 constituting with said fitting a tubular support, the elbows 36 and 37 pivotal-

ly connecting the fitting 28 with a nozzle head or discharge member 38 which has an orifice portion similar to that shown in Figs. 1 and 2 at its outer end. The nozzle head 38 is pivoted upon straight horizontal legs of the elbows 36 and 37 by means of a T-shaped head, the lateral extensions of which are fitted with packings 39, bushings 47 and caps 41. A packing 5 in the lower part of the nozzle body 22 seals the joint between this body and the shank of fitting 28. A gland 42 retains the packings 5 in place, and can be adjusted by means of eye-bolts 43 and nuts 44. Upon releasing the eye-bolts 43 from engagement with the gland 42 the latter may be retracted along the diametrically opposed openings provided in stationary nozzle body 22 so as to expose the packing 5 which then may be romoved and replaced with new packing material without detaching the nozzle from the supply pipe. The space between the roller bearings may be filled with grease by means of a grease cup 45 screwed into the wall of the nozzle body 22.

A curved lever 13 which is bent along an arc concentric with the horizontal nozzle axis and with legs of the elbows 36 and 37, is secured in a socket portion 46 of the nozzle head 38, and passes through a shield 15 in a similar manner to that described in connection with the nozzle shown in Figs. 1 and 2, so that the nozzle head can be moved in any desired direction.

By providing roller bearings to take up axial thrust as well as lateral thrust, the packing 5 will be relieved from such lateral thrust, and resistance to manipulation of the nozzle will be greatly reduced. The packing 5 is arranged at such a place that it prevents the fluent medium to be discharged by the nozzle, from entering the space between the roller bearings. Any leakage fluid passing the packing 5 escapes through the opposed openings in the nozzle body 22 rather than to enter the bearings located in a path of higher resistance. The opposed openings in the nozzle body therefore serve the dual function of permitting the escape of fluid passing packing 5 and of providing an avenue of approach for retracting the gland 42 preliminary to replacing the packing 5. This is a highly desirable feature if the nozzle is to be used in casting washing plants because, in this case the water is used over and over again and, therefore, carries considerable grit which would quickly destroy the working surfaces of the roller bearings.

It should be understood that it is not intended to limit the invention to the exact details of construction herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. In combination, a wall portion having an opening, a nozzle comprising a discharge member and a cooperating tubular support associated with said wall portion, said discharge member being movable in any direction, and a curved lever having an adjustable handle attached to said discharge member and extending through said wall opening, said lever having a curved portion concentric with a center of movement of said discharge member.

2. In combination, a wall portion having an opening, a shielding device substantially covering said opening and provided with a relatively small opening, a nozzle comprising a discharge member and a cooperating tubular support associated with said wall portion, said discharge member being movable in any direction, and a curved lever attached to said discharge member, said lever having a curved portion concentric with a center of movement of said discharge member and extending through said wall opening and passing through substantially a fixed point in the plane of said shielding device opening as the discharge member is moved to its different positions.

3. In combination, a wall portion having an opening, a shielding device substantially covering said opening and provided with a relatively small opening, a flexible member covering said latter opening, a nozzle comprising a discharge member and a cooperating tubular support associated with said wall portion, said discharge member being movable in any direction, and a curved lever attached to said discharge member, said lever having a curved portion concentric with a center of movement of said discharge member and extending through said wall opening and passing through substantially a fixed point in the plane of said shielding device opening and being closely engaged and surrounded by said flexible member as the discharge member is moved to its different positions.

4. In combination, a wall portion, a nozzle located at one side of said wall portion, said nozzle comprising a stationary body adapted to be connected to a source of high pressure fluid, a fitting rotatably associated with said body and a discharge member pivotally associated with said fitting, said wall portion being provided with an opening, a shield mounted over said opening and having an opening, and a lever secured to said discharge member and having a substantially arc-shaped curved portion concentric with the center of movement of said discharge member, for adjusting the position thereof and passing through said shield opening, and the plane of said shield opening being substantially in the axis of rotation of said fitting.

5. In combination, a wall portion, a nozzle located entirely at one side of said wall por-

tion, said nozzle comprising a stationary body adapted to be connected to a source of high pressure fluid, a bifurcated member rotatably associated with said body and a discharge member pivotally associated with said bifurcated member, said wall portion being provided with an opening, a shield mounted over said opening and having a relatively small opening, a flexible member surrounding said shield opening, and a lever secured to said discharge member and having a substantially arc-shaped curved portion concentric with the center of movement of said discharge member, for adjusting the position thereof and passing through said shield opening and being closely engaged by said flexible member, and the plane of said shield opening being substantially in the axis of rotation of said bifurcated member.

6. In combination, a wall portion having an opening, a shielding device substantially covering said opening and provided with a relatively small opening, a nozzle comprising a discharge member and a cooperating rotatable tubular support, said discharge member being rotatable on said tubular support on an axis at an angle to the axis of rotation of said tubular support, said shield opening being substantially in a plane passing through the axis of said support, and a curved lever rigidly attached to said discharge member, said lever having a curved portion concentric with a center of movement of said discharge member and extending through said wall opening and passing through said shielding device opening.

In testimony whereof, the signature of the inventor is affixed hereto.

MELVIN C. SHAW.