

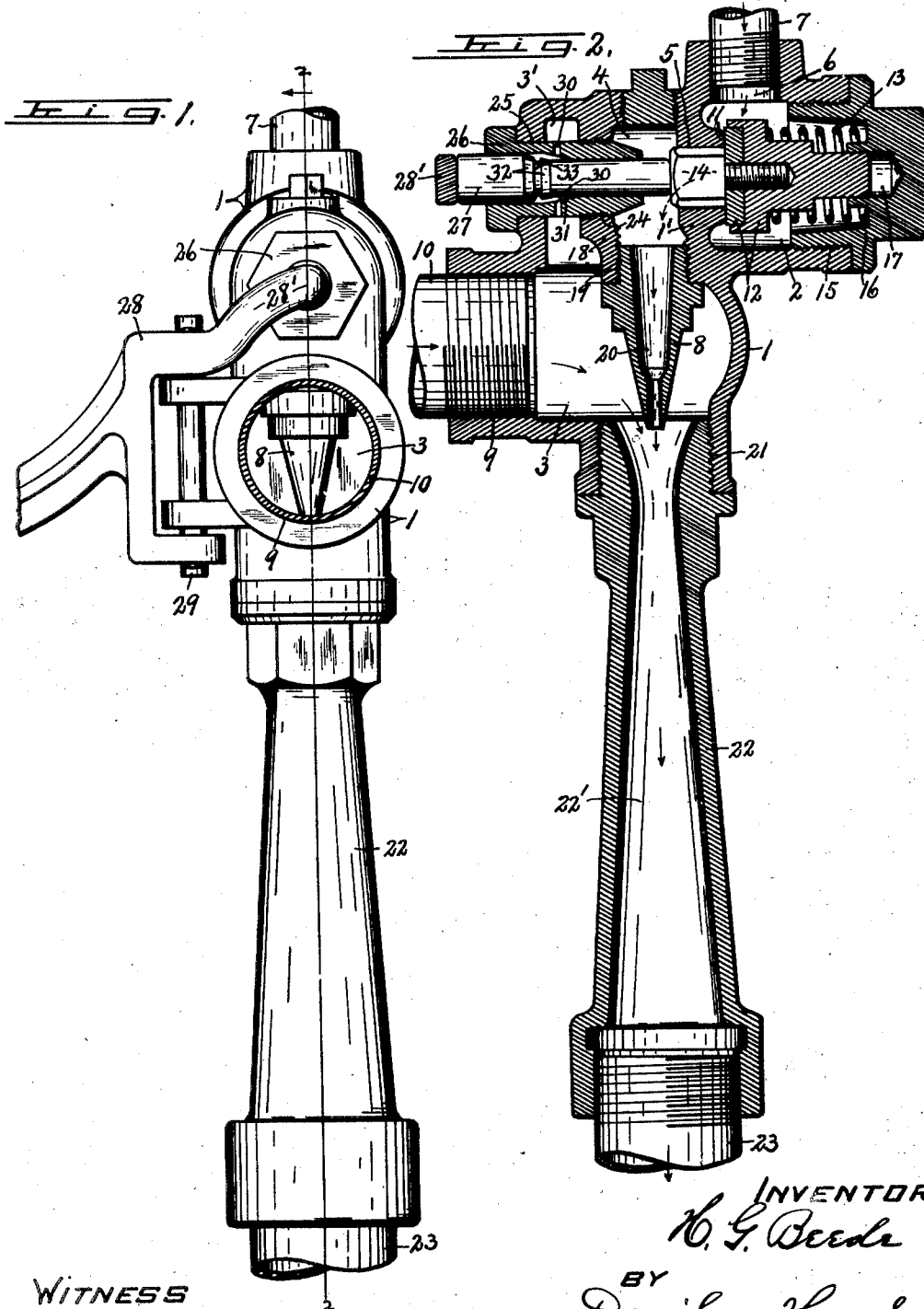
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VACUUM VALVE EJECTOR

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WITNESS

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VACUUM VALVE EJECTOR

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This invention relates to an ejector adapted to be used in connection with garment steaming and pressing machines and in other relations where a device of this character might be useful for withdrawing steam and moisture from the garment and from the padded pressing elements immediately following the pressing and shaping operations.

The main object of devices of this character is to render the operations of shaping, pressing and drying the garments more expeditious and less laborious and thereby to increase the output for a given period of time and incidentally to prolong the life of the pads commonly used on the pressing elements of garment pressing machines.

I am aware that various devices have heretofore been proposed for carrying out this main object in which the passage of the steam or other fluid under pressure through the ejector has been controlled by external means separate from the ejector per se while the object of the present invention is to incorporate the controlling means within the ejector as a part thereof so that both may be made as a unitary article of manufacture capable of being easily and quickly installed in the steam-distributing system of any garment pressing machine or other apparatus with which the device might be useful.

Another object is to provide simple and efficient means for reducing to a minimum the liability of leakage of the steam or other pressure fluid through or along the operating parts of the controlling means.

A further object is to bring all of the parts into compact relation so that the device may be installed in relatively small space within or upon the machine with which it is used.

Other objects and uses relating to specific parts of the ejector will be brought out in the following description.

In the drawings:

Figure 1 is a side elevation of an ejector

embodying the various features of my invention.

Figure 2 is a vertical sectional view of the same taken in the plane of line 2—2, Figure 1.

As illustrated, this device comprises a valve case or shell —1— having a pressure chamber —2—, a suction chamber —3— and an intermediate chamber —4— which is preferably located between the chambers —2— and —3— and is connected to the chamber —2— by means of a port —5—.

The chamber 2 forms a part of what may be called the induction passage of the ejector and is provided with an inlet 6 adapted to be connected by a pipe —7— to any available source of steam or other fluid supply under pressure.

The chamber —4— constitutes a part of what may be termed the eduction passage of the ejector and is provided with a discharge nozzle —8— projecting from one side of said chamber —4— across the suction chamber —3— for directing the pressure fluid through the outlet of the suction chamber —3— and thereby creating more or less suction in said chamber.

The chamber —3— is provided with an inlet —9— adapted to be connected by a pipe —10— to the steam-distributing chamber or chambers of a garment pressing machine or other apparatus for withdrawing steam and moisture therefrom and from the pads commonly used in such machines.

The chambers —2— and —4— are preferably arranged in coaxially spaced relation and separated by an intervening partition —1— in which the port —5— is formed, the side of the partition adjacent the chamber —2— being provided with a valve seat —11— surrounding the port —5—.

The induction or pressure chamber —2— also serves as a valve chamber for receiving a self-closing valve —12— which is normally spring pressed against the seat —11— by a coiled spring —13—.

The inner end of the valve is provided with a guide stem —14— slidable endwise in the port —5— and preferably slabbed in cross section to permit the passage of the pressure fluid through the port when the valve is open, said valve stem consisting, in this instance, of the head of a bolt or screw in threaded engagement with the body of the valve for holding the inner end packing of the valve in operative position.

The outer end of the chamber —2— is provided with an opening —15— of sufficiently large diameter to permit the valve —12— to be withdrawn and replaced endwise there-through, said opening being normally closed by a bushing —16— in threaded engagement with the internally threaded walls of the adjacent end of the shell —1— and provided with a central socket —17— for receiving the adjacent reduced end of the valve —12— and thereby additionally guiding the valve in its endwise reciprocal movements.

The spring —13— for holding the valve against its seat surrounds the outer end of the valve and has its inner end engaged with the head of said valve and its outer end engaged with the bushing —16—.

The intermediate chamber —4— is substantially coaxial with the chamber —2—, valve —12— and port —5— at the inner end thereof so that when the valve is opened the fluid under pressure entering the chamber —2— through the induction port —6— is instantly discharged into the chamber —4— and thence through the discharge nozzle —8— which is screwed or otherwise secured in a radial opening in one side of the chamber —4—.

The main portion of the suction chamber —3— is located at the same side of the chambers —2— and —4— as the nozzle —8— and to extend entirely around said nozzle and is provided with a branch chamber —3'— extending from the main portion of the chamber across the produced axis of the valve port —5— at the outer end of the chamber —4— and in spaced relation thereto.

The branch chamber —3'— is separated from the chamber —4— by an intervening partition —18— which forms the outer end wall of the chamber —4— and inner end wall of the chamber —3'—.

The nozzle —8— is preferably made separate from the valve case for convenience of manufacture and replacements and is provided with a reduced inner threaded end engaged in a threaded opening —19— in the dividing wall between the chambers —3— and —4—, said nozzle extending across the chamber —3— at substantially right angles to the axis to the chamber —2— and valve —12— and having an outwardly tapered central opening —20— through which the pressure fluid is discharged when the valve —12— is opened.

The outer wall of the chamber —3— is

provided with an threaded opening —21— in alignment with the nozzle —8— in which is secured the adjacent threaded end of the delivery conduit —22— having a central lengthwise opening —22'— through which the pressure fluid is discharged from the nozzle —8—.

The outer end of the delivery conduit —22— is adapted to be connected by a pipe —23— to any suitable waste pipe for conducting the steam and moisture laden air away from the machine and forms a common outlet for both chambers 3 and 4.

It is evident, however, that the steam and moisture discharged through the opening —21— may be utilized for heating purposes or reused for moistening purposes, if desired.

As previously stated, the suction chamber —3— may be connected by the pipe —10— or equivalent connections with the steam distributing chamber of a garment pressing machine for withdrawing steam and moisture therefrom to effect a quick drying of the garment and pads immediately following the steaming and pressing operations or the same suction force may be used for other purposes without departing from the spirit of this invention.

Valve opening means

The inner and outer end walls of the branch suction chamber —3'— are provided with registering openings —24— and —25— coaxial with the axis of the valve 12 and port 5 for receiving a tubular bushing or gland 26 which is passed through and tightly fitted within the openings —24— and —25— across the branch chamber —3'— so that its inner end may project into the intermediate chamber —4— thereby exposing the inner end of the gland to fluid pressure within the chamber —4— when the valve —12— is open.

The inner end of the gland 26 and walls of the opening 24 in the partition 18 are threaded and engaged with each other for holding the gland in operative position, the outer end of said gland being enlarged and engaged with the outer face of the adjacent portion of the valve case to limit its inward movement.

A valve operating member, consisting in this instance of a push rod 27, is reciprocally slidable in the central opening in the gland 26 and extends beyond the opposite ends thereof with its inner end engaged with the guide stem 14 of the valve and its outer end projecting beyond the corresponding end of the gland 26.

The valve operating rod 27 may be moved inwardly at will for opening the valve 12 against the action of the spring 13 but is normally held in its outermost position, as shown in Figure 2 by the force of said spring.

The inner movement of the rod 27 may be effected by any desired manually operated means consisting, in this instance, of a lever

—28— which is pivoted at —29— to the outer portion of the valve case —1— and has one end —28'— adapted to engage the outer end of the push rod 27 and its other end adapted to be connected to any suitable operating mechanism, not shown.

The push rod 27 is fitted as closely as possible within the gland 27 to reduce leakage of the pressure fluid through the gland when the valve 12 is open, but must, of course, move freely in the gland, and suitable means is, therefore, provided for preventing the escape of the pressure fluid through the gland.

For this latter purpose the portions of the gland —26— registering with the branch suction chamber —3'— is provided with one or more radial openings —30— therethrough for connecting the interior of the gland with said suction chamber whereby any steam or other pressure fluid which may tend to pass into the gland from the chamber 4 when the valve is opened would be instantly drawn through the openings —30— and into the suction chamber —3— to be discharged through outlet conduit —22— with the steam or other fluid passing through the nozzle —8—.

As a further means for preventing the escape of the pressure fluid through the gland the outer ends of the central opening in the gland and push rod 20 are made of somewhat greater diameter than their inner ends while the intermediate portions of the same parts are tapered for engagement with each other when the push rod is operated to open the valve. It will also be noted that when the push rod 27 is forced outwardly by the closing of the valve 12, the passages 30 will instantly be opened to break the vacuum in the chamber 3.

That is, the tapered portion —31— of the inner wall of the gland —26— extends beyond opposite ends of the openings —30— while the intermediate portion of the periphery of the push rod 27 is tapered at 32 to correspond with the taper 31.

The tapered portions 32 of the push rod 27 is provided intermediate its ends with an annular groove 33 adapted to register with the openings 30 when the push rod is forced inwardly in the act of opening the valve 12.

The tapered portion 32 of the push rod 27 is normally positioned at the outer end of the openings —30— or out of registration with the tapered portion 31 of the gland 26.

When the push rod is forced inwardly for opening the valve 12 the tapered portion 32 will engage the tapered portion 31 of the gland to close the opening through the gland against the leakage of steam or other pressure fluid therethrough and at the same time the annular groove 33 will be brought into registration with the openings 30 to allow any pressure steam which may enter the gland to be withdrawn by suction from the interior of the gland and discharged through

the outlet conduit 22 by the force of the stem passing through the nozzle 8.

The tapered portion 32 on the push rod 27 constitutes what may be termed a supplemental valve cooperating with the tapered seat 31 to prevent leakage of the pressure fluid through the gland when the push rod is operated to open the valve but in case any pressure steam should enter the gland while the push rod is being operated to open the valve 12 it would be instantly withdrawn from the gland into the suction chamber 3 and discharged into the outlet 22 by the force of the steam and other pressure fluid passing through the nozzle 8.

Operation

Assuming that the chamber 2 contains steam or other fluid under pressure and that it is desired to produce suction in the chamber 3 for withdrawing steam and moisture from the garment and pads of the pressing machine through the pipe 10 it is simply necessary to operate the lever 28 to force the rod 27 inwardly and thereby to open the valve against the action of the spring 13 during which operation the supplemental valve 32 would be brought into engagement with its seat 31 to close the opening through the gland 26 and at the same time to register the annular groove 33 with the openings 30.

This opening of the valve 12 will allow the pressure fluid to pass from the chamber 2 into the chamber 4 and thence outwardly through the nozzle 8 into the delivery conduit 22 thereby producing a partial vacuum in the chamber 3 for withdrawing the steam and moisture from the garment and pad of the machine or for other purposes while at the same time any pressure fluid which may enter the gland 26 will be withdrawn therefrom through the openings 30 and into the suction chamber 3 to be discharged with the pressure fluid escaping through the conduit 22.

In order to facilitate the exhaust of the steam from the chamber 3 the inner and outer ends of the passage 22' through the conduit 22 are made more or less flaring while the intermediate portion preferably adjacent the discharge end of the nozzle 8 is somewhat restricted as shown in Figure 2.

The construction shown and described is particularly efficient in carrying out the objects stated, but it is obvious that various changes may be made in the detail construction thereof without departing from the spirit of the invention.

What I claim is:

1. A fluid-operated ejector having a valve in its pressure side controlling the passage of fluid therethrough, a gland communicating with the suction side of the ejector, and a valve-opening member movable in the gland and provided with a supplemental valve co-

operating therewith for closing the gland when the first-named valve is opened.

2. A fluid-operated ejector comprising a shell having separate chambers provided with a common outlet, means for directing fluid under pressure through one of said chambers to the outlet for creating suction in the other chamber, said shell having a gland communicating with the suction chamber, a self-closing valve within the shell for controlling the passage of the pressure fluid through the shell, and a valve-operating member movable at will in said gland for opening said valve and provided with means cooperating with the gland for closing said gland when operated to open the valve.

3. A fluid-operated ejector comprising a shell having separate chambers provided with a common outlet, means for directing fluid under pressure through one of said chambers to the outlet for creating suction in the other chamber, a self-closing valve within one of the chambers for controlling the passage of the pressure fluid through the shell to the outlet, a gland member secured in registering openings in the shell and provided with an internal tapered seat communicating with the suction chamber, and a push-rod movable in the gland member for opening the valve and provided with a tapered peripheral portion for engaging said seat when the push-rod is operated to open the valve.

4. A fluid-operated ejector comprising a shell having separate chambers provided with a common outlet, means for directing fluid under pressure through one of said chambers to the outlet for creating suction in the other chamber, a self-closing valve within one of the chambers for controlling the passage of the pressure fluid through the shell to the outlet, a gland member secured in registering openings in the shell and provided with an internal tapered seat and an opening leading therefrom to the suction chamber, and a push-rod movable in said gland member for opening the valve and provided with a tapered supplemental valve for engaging said seat when the push-rod is operated to open the first-named valve, said tapered valve having an annular groove movable into and out of registration with the opening in the gland member as the push-rod is moved to and from its valve-opening position.

5. A fluid-ejector having a valve controlling communication between the induction and eduction passages, a valve-operating member, and a gland therefor having a portion thereof exposed to the pressure fluid and another portion thereof communicating with the suction side of the ejector to cause any fluid which may pass into the gland to be withdrawn therefrom by the suction in said chamber.

6. A fluid-ejector having a self-closing valve controlling the passage of the pressure fluid from the induction passage to the eduction passage of the ejector, a push-rod for opening the valve, and a guide-gland for the push-rod having its interior communicating with the suction side of the ejector, said push-rod having means cooperating with a portion of the gland for closing the opening through the gland when operated to open the valve.

In witness whereof I have hereunto set my hand this 27th day of December, 1928.

HERBERT G. BEEDE.