

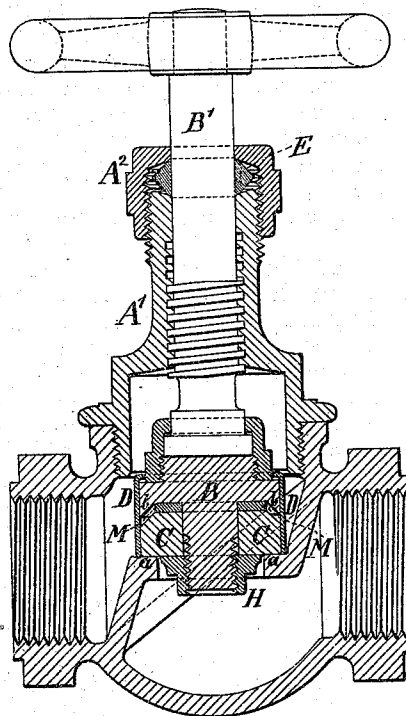
(167.)

E. RUSSELL.

Stop Valves.

No. 122,494.

Patented Jan. 2, 1872.



0 1 2 inches.

Witnesses,

Arnold Hermann
Campbell L. Livings

Inventor,

Edmund Russell
by his attorney *J. L. Peterson*

UNITED STATES PATENT OFFICE.

EDMUND RUSSELL, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STOP-VALVES.

Specification forming part of Letters Patent No. 122,494, dated January 2, 1872.

Specification describing certain Improvements in Stop-Valves, invented by EDMUND RUSSELL, of Brooklyn, in the county of Kings and State of New York.

In my patent dated August 1, 1871, No. 117,689, I have set forth a construction of stop-valve which is an important improvement over anything known before, but in which I failed to provide for one difficulty of considerable magnitude, due to unequal contraction and expansion. One object of the present invention is to overcome such difficulty; another is to better secure the joint which corresponds to a stuffing-box around the stem.

When the valve-stem is screwed down so as to form a perfect stop with the parts heated by steam, the subsequent cooling and contraction of the parts is liable to induce a tightening or loosening of the valve by reason of inequalities in the contraction. If the valve-stem contracts more than the casting it is liable to relax the pressure of the face of the valve upon the seat, and allow the valve to leak until it has been again heated up to about the same temperature. Or, under other conditions, the shrinkage of the outer casing more than the valve-stem is liable to crowd the face of the valve, with extraordinary tightness, upon the seat, so as to damage the parts or render it impossible to unscrew the valve without the aid of a wrench. The amount of this difference in contraction is never very great. I have devised means for providing for it by a backing spring mounted behind the loose valve-face, without materially increasing the expense or involving any serious difficulty.

The following is a description of what I consider the best means of carrying out the invention:

The accompanying drawing forms a part of this specification, and represents a central vertical section through my improved valve and its casing.

The main movable part B is formed with an annular ridge, *b*, in the position represented, adapted to bear tightly upon the seat *a*, and enable the valve to make a tolerably-close fit in the event of a complete failure of the other portions of the bearing material. It is of no consequence in its relation to the spring M, which I introduce behind the composition C, and

which forms the main element of my present invention, except so far as it limits the area of the spring or compels a modification in its form. The spring M is, preferably, a disk of vulcanized rubber, or of rubber mingled with fibrous materials. It may be corrugated or embossed with points or other devices over one or both its faces, to increase its elastic action by the compression and widening of such corrugations or points; or it may be partially filled up with cloth or other fibrous materials to increase its toughness; or both these characteristics may be present with advantage; but they are not essential. It is sufficient, if the washer or ring M be narrower than the space in which it is applied, and be sufficiently elastic to change its form and yield by flattening under any extraordinary pressure. Now, the parts being applied together as shown, when the valve is screwed down upon its seat the external ring D sustains no considerable pressure, but yields readily upward. Its entire function is performed in protecting the composition ring C and the spring M above it, and preventing any particles from being displaced laterally or spreading too far. The pressure on the seat is exerted by the composition C, and as this wears away the ring D yields and slides upward, assuming new positions successively higher and higher, as described in my former patent. But there is an action not in the previous construction and peculiar to this construction, in the slight yielding and returning again of the entire mass of composition C, under varying pressure, by the compression and expansion of the springy material M. An ordinary amount of pressure on the seat induces a slight compression of the ring M and a slight yielding upward of the composition ring C. A greater compression, due to want of harmony in the expansion and contraction of the parts, or other cause, induces a greater compression of the rubber M; but no amount of compression is liable to induce an injurious pressure of the valve upon the seat; and, on the other hand, no ordinary amount of relaxing of the pressure, due to a difference in contraction or expansion of the stem or casing or other parts, will be likely to make the valve leak, because the spring M will, by its elastic expansion under any relief of pressure, com-

compensate for the change of conditions, and still maintain a reasonably-tight pressure of the valve-face upon the seat. The joint where the stem B' passes out into the air is tightened by screwing down the cap A². The inner face of this cap is finished with a conical cavity, and the inner edge of the top of the neck-casing A¹ is similarly finished. Between these parts is applied a ring of the section, shown in the figure at E, cast or otherwise formed of an alloy of lead and tin. The conical cavities are just matched to the upper and lower edges of this ring E; and on screwing down on the cap A² the ring E is compressed together or slightly contracted in diameter at the upper and lower edges, and in some cases over its whole extent, so as to just press tightly against the stem B' within. The joint thus formed is perfectly tight, and is very easily and cheaply made. With the slight motion to which the stem B' is subjected the double conical ring E will endure for an indefinite period, and may be taken apart and applied together with trifling labor as often as may be desired. The part D, although called a ring in both this and my former patent, may, of course, be square, or hexagonal, or of various other forms, so long

as the interior is correspondingly formed so that it matches thereto. There may be a washer of rigid metal between the confining-nut H and the composition C, if preferred.

I propose to use this valve not only for a stop-valve, ordinarily so called, but also for compression-cocks and gauge-cocks, and generally where steam, water, gas, air, or other fluid is to be stopped or controlled.

I claim as my improvements in screw-valves—

1. The circular flat spring or elastic washer M, serving, between the stem B' and the bearing piece C, to compensate for expansion and contraction, as herein specified.

2. The double conical metallic ring E, surrounding the valve-stem B', and confined between tapering surfaces in the compressing parts A¹ and A², as herein specified.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

EDMUND RUSSELL.

Witnesses:

CAMPBELL C. LIVINGSTON,
ARNOLD HOERMANN.

(167)