

(No Model.)

FREDERICK E. & FRANK E. SMALL.  
VALVE.

No. 348,590.

Patented Sept. 7, 1886.

Fig:1.

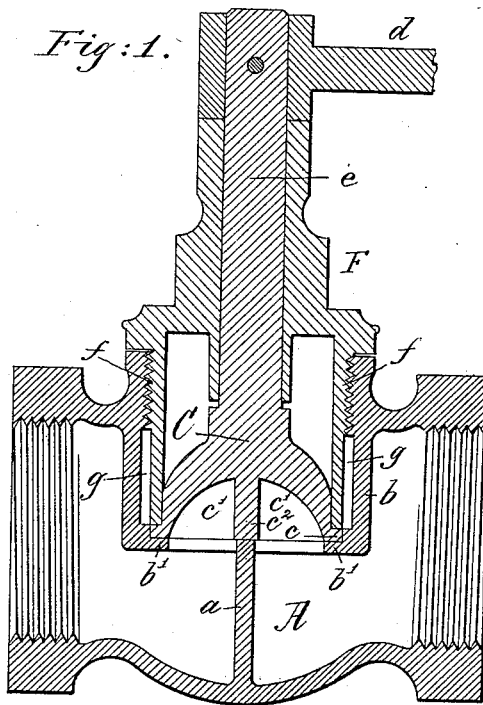
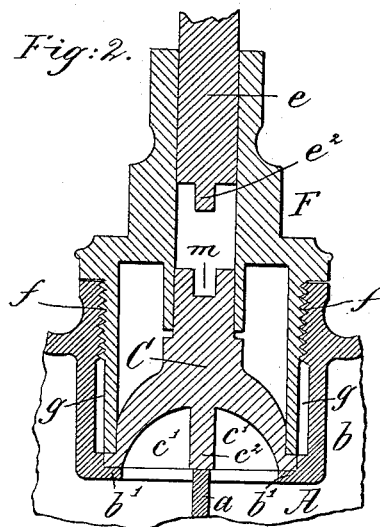


Fig:2.



Witnesses.

And L. Emery  
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By Kerosby & Gregory attys.

# UNITED STATES PATENT OFFICE.

FREDERICK E. SMALL, OF REVERE, MASSACHUSETTS, AND FRANK E. SMALL, OF BROOKLYN, NEW YORK.

## VALVE.

SPECIFICATION forming part of Letters Patent No. 348,590, dated September 7, 1886.

Application filed February 17, 1886. Serial No. 192,198. (No model.)

*To all whom it may concern:*

Be it known that we, FREDERICK E. SMALL, of Revere, county of Suffolk, and State of Massachusetts, and FRANK E. SMALL, of Brooklyn, county of Kings, and State of New York, have invented an Improvement in Valves, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Heretofore, so far as our knowledge extends, valves of the class herein referred to, and globe-valves, have been provided with stuffing-boxes or packing, to prevent the escape of steam about the valve-stem. In such forms of valves the packing or stuffing by use soon becomes more or less worn and fails to prevent the escape of steam about the stem. The escape of steam is a source of constant annoyance, requiring repairs in the packing at comparatively short intervals of time, or necessitating the replacement of such worn or partially-useless packing or stuffing by new packing. The annoyance and trouble arising from the use of packing or stuffing in valves of this class is more particularly noticeable in large work shops or manufacturing concerns where in numbers of such valves are required to be used.

The object of this our invention is to overcome these defects by dispensing altogether with packing or stuffing about the stem of the valve.

In accordance with our invention we have made the valve at the lower end of the stem of a cup shape, and have provided it with a lip-wheel, which co-operates with a ground seat, the upper side of the said lip being preferably ground to form a seat to receive the lower end of a sleeve which is screwed into the fitting or shell and surrounds the valve, the annular lip of the valve working between the ground seat in the fitting or shell and the end of the said sleeve. In a valve constructed as stated the escape of steam next the valve-stem is thoroughly provided against, and at the same time a steam-valve is produced which is effective and complete for the purpose for which it is intended. If desired, an annular space may be provided between the fitting or shell and the portion of the outer periphery

of the sleeve which surrounds the cup-valve, the said annular space being adapted to receive the steam that may possibly escape at the joint between the valve-seat and valve proper, and allow for condensation of such steam, or to break the force of its direct pressure before it can escape between the sleeve and valve-stem.

Figure 1 represents in central vertical section a valve embodying our invention, the said figure showing the cup-valve as provided with a valve-stem integral therewith, the latter having a handle secured to its upper end; and Fig. 2 is a similar view, partly broken away, showing the valve in modified form, it being provided with key-slots to receive a key on the lower end of the valve-stem.

The steam fitting or shell A, having a bridge, *a*, of usual construction, is provided with a socket, *b*, having at its lower end an annular flange, *b'*, encircling the usual central opening for the passage of steam or water from one to the other side of the bridge *a*. The upper side of the flange *b'* of the socket *b* is ground to form an annular seat to receive the ground under surface or bottom of the annular lip *c*, forming part of the cup-shaped valve C, thereby providing a steam-tight joint between said valve or its lip and the said annular ground seat. The cup-shaped valve C is provided with a concavity, *c'*, which is divided centrally by the wall *c''*, the bottom of said wall fitting the top of the bridge *a*, the two coacting when they are in the same plane to prevent the escape or passage of steam through the fitting or shell A from one to the other side of the bridge *a*. When the valve is turned, by the aid of the handle *d*, secured to the upper end of the valve-stem *e*, so that the wall *c''* of said valve is disposed at right angles, or substantially so, to the bridge *a*, the valve is then open to allow the passage of steam or water from one side of the bridge *a* through the concavity of the valve to the other side of said bridge, as will be understood by referring to the drawings. A sleeve, F, surrounding the valve-stem *e* and valve C, has a portion of its periphery screw-threaded, as at *f*, so as to be screwed or fitted into the socket *b* of the fitting A. The said sleeve serves as a support or bearing for the valve C and more or

1 ss of its stem *e*. The sleeve F is extended  
 down and around the valve C, so as to permit  
 its lower end to fit the ground seat on the  
 upper surface of its lip *c*, thus providing a  
 5 second steam-tight joint, and more thoroughly  
 preventing escape of steam or water from the  
 fitting or shell A through the valve-joints and  
 from about the stem. Thus arranged it will  
 be noted that when the valve is turned the  
 10 lip *c* thereof moves between the annular valve-  
 seat *b'* of the socket *b* and the bottom of the  
 sleeve F. An annular space, *g*, is provided  
 between the socket *b* and that portion of the  
 sleeve F which extends below the screw-  
 15 threaded portion *f*, the said annular space  
 receiving the steam that may possibly escape  
 at the joint between the annular valve-seat *b'*  
 and the lip *c* of the valve C, such escaping  
 steam disseminating or expending its force  
 20 throughout said annular space *g*, thereby re-  
 ducing its liability of escaping at the second  
 steam-joint between the ground upper surface  
 of the annular lip *c* of the valve and the lower  
 end or bottom of the sleeve F.  
 25 By the construction shown it will be noted  
 that the sleeve F and valve C may readily be  
 removed from the fitting or shell A by un-  
 screwing said sleeve at the joint *f*; or, on the  
 other hand, it may be screwed into the fitting  
 30 to bind closely upon the upper surface of the  
 lip *c* of the valve, and thus cause the lower  
 surface thereof to bind closely upon the an-  
 nular seat *b'*, thus compensating for wear or  
 providing a more or less tight joint, as may  
 35 be desired.  
 In Fig. 2 we have shown the valve-stem *e*  
 as being detached from the valve, the former  
 having a key, *e'*, at its lower end to lock into  
 a key-slot, *m*, in the upper end of the valve,  
 40 whereby the valve can only be turned when  
 the valve-stem with its attached handle (not  
 shown) is placed in a certain predetermined  
 position. By such latter construction it will  
 be noticed that we provide what is known  
 45 as a "lock-up" valve, wherein the handle  
 and its attached stem serves as a key which  
 may be used to open or close any one or more  
 of a series of valves, the key being in the cus-  
 tody of some regular attendant or other per-  
 50 son whose duty it is to attend to the opening  
 and closing of the valves, whereas with the  
 construction shown in Fig. 1 any person can  
 open or close the valve by merely turning the  
 handle *d*, an objection which in large work-

shops or other concerns it is advisable to pro- 55  
vide against.

It is obvious that our improved valve is ap-  
plicable for use in connection with water or  
other fluid.

We claim—

1. The combination, with the fitting or shell 60  
A, provided with a bridge, and a socket, *b*,  
having at its lower end an opening, and a  
flanged annular valve-seat, *b'*, of a valve pro-  
vided at its under surface with cavities or 65  
ports and with a dividing-wall, the said valve  
having an annular lip to fit the valve-seat  
of the said socket, as and for the purpose set  
forth.

2. The fitting or shell provided with a sock- 70  
et, *b*, having an opening and an annular flange  
or valve-seat, *b'*, combined with a sleeve fit-  
ting within the valve-case, and with a valve  
having an annular lip fitting between the said  
valve-seat *b'* and the bottom of the said sleeve, 75  
as and for the purpose specified.

3. A fitting provided with a screw-thread  
and a socket, *b*, having a steam-opening in its  
bottom and an annular flange or valve-seat,  
60 *b'*, as specified, combined with a screw-threaded  
sleeve fitting into the said socket and shaped  
to leave an annular space between it and the  
said socket, the said sleeve being provided  
with a valve having an annular lip projecting  
between the said seat *b'* and the bottom of the 85  
depending portion of said sleeve, to provide a  
double joint, substantially as set forth.

4. A fitting or shell provided with a bridge  
and with a socket, *b*, having a steam-opening  
in its bottom, and a flanged valve-seat, *b'*, en- 90  
circling said opening, as specified, combined  
with a sleeve fitting into the said socket, and  
with a valve provided with the steam-cavi-  
ties and the central wall, as specified, and fur-  
ther provided with the annular lip projecting 95  
between the said valve-seat and the bottom of  
the said sleeve, substantially as set forth.

In testimony whereof we have signed our  
names to this specification in the presence of  
two subscribing witnesses.

FREDERICK E. SMALL.

FRANK E. SMALL.

Witnesses for Frederick E. Small:

GEO. W. GREGORY,

C. M. CONE.

Witnesses for Frank E. Small:

GEO. H. WARD,

R. ELDER.