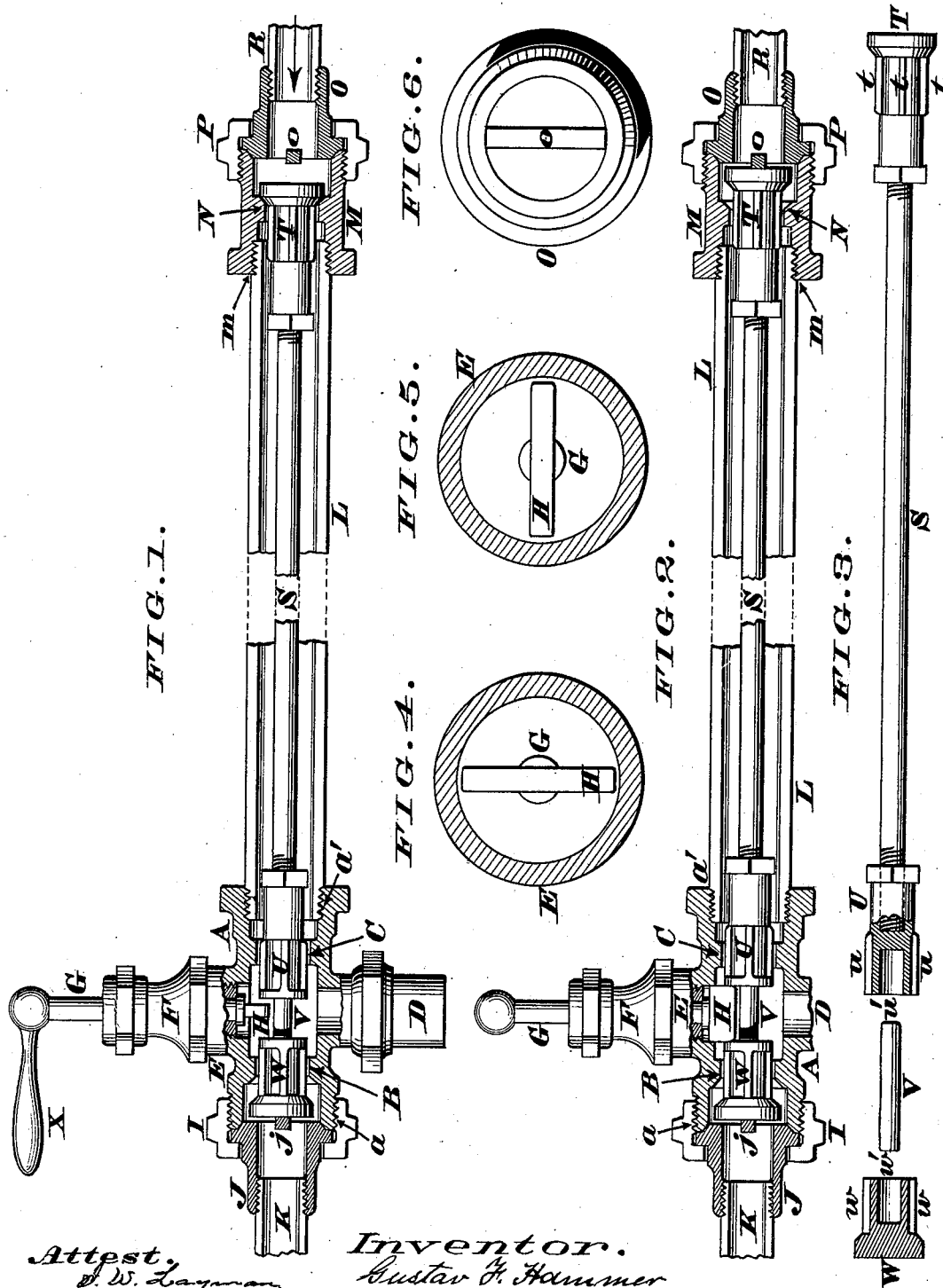


G. F. HAMMER.
Cylinder-Cock.

No. 202,167.

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Attest.
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN CYLINDER-COCKS.

Specification forming part of Letters Patent No. **202,167**, dated April 9, 1878; application filed February 2, 1878.

To all whom it may concern:

Be it known that I, GUSTAV F. HAMMER, of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Cylinder-Cocks, of which the following is a specification:

This invention relates to that class of cylinder-cocks seen in Letters Patent No. 190,680, issued to me May 15, 1877; and the first part of the present improvements comprises a novel construction of such cocks, whereby they are rendered more serviceable for long-stroke engines.

The second part of the present invention comprises a more reliable construction of the adjusting devices, wherewith the stroke of the two reciprocating valves is exactly adapted to the capacity of the engine to which the cock is applied.

The third part of the present invention consists in locating a pair of bridges or bars athwart the tail-pieces or other connections of the cock, so as to limit the motions of the aforesaid valves as they recede from their respective seats.

In the accompanying drawings, Figure 1 is an axial section of my elongated cylinder-cock, the controlling key or bit being shown set so as to allow the reciprocating valves to act automatically. Fig. 2 is a similar section, but showing the key turned so as to dislodge both of said valves from their respective seats, and thereby arrest the automatic action of the apparatus. Fig. 3 is a partially-sectionized elevation of the valves and their accessories detached from the housing of the cock. Figs. 4 and 5 are enlarged transverse sections through the neck of the barrel, which sections show more clearly the two positions of the controlling key or bit; and Fig. 6 is an elevation of one of the stops or bridges.

The principal member of the present device is a metallic barrel, A, of any suitable size and shape, and provided near one end with a counter-bored seat, B, and near the other end with a circular orifice, C. Furthermore, said barrel is provided near its mid-length with a discharge-pipe, D, above which is located a neck, E, whose stuffing-box F is traversed by a stem, G, having at its extreme lower end the controlling bit or key H. One end of barrel A has a male thread, *a*, for engagement of coupling I, wherewith the tail-piece J is united to said

barrel. The inner end of this tail-piece has cast with it, or otherwise applied thereto, a transverse bridge or bar, *j*, that limits the stroke of the valve housed within barrel A. Engaging with the outer end of said tail-piece is a short pipe or elbow, K, that communicates as directly as possible with one end of the steam-cylinder. The other end of barrel A is provided with a female screw, *a'*, wherewith a housing or tube, L, is engaged with said barrel, which tube is of such length as to allow barrel A and shell M to be located near the opposite ends of the steam-cylinder. This shell M is attached to said housing L with a female thread, *m*, and is provided with a seat, N, similar to the one B, but opening in an opposite direction to the latter.

O is a tail-piece, attached to shell M by the coupling P. *o* is a stop, disposed transversely of the inner end of said tail-piece, while the outer end thereof has secured to it a pipe or elbow, R, similar to the one K. Occupying an axial position within housing L is a long stem or tube, S, to one end of which is screwed a valve, T, that is adapted to seat in the counter-bore N of shell M. This valve is furnished with wings *t*, as more clearly shown in Fig. 3, the intervals between which wings serve as channels for the escape of water as soon as said valve leaves its seat N. The other end of said rigid stem has screwed to it a cylindrical guide, U, capable of traversing the circular orifice C of barrel A, and this guide is furnished with wings *u*. Furthermore, the outer end of this guide is chambered at *u'* to admit one end of an adjusting-rod, V, which rod is preferably of steel. This rod is of such length as to impart the desired stroke to the two reciprocating valves of the cock, the outer end of said rod playing freely within the bore or chamber *w'* of valve W, which valve has wings *w*, similar to the ones *t* and *u*. X is the handle or wrench wherewith the controlling-stem G H is operated.

My improved form of cylinder-cock is adjusted in the following manner: The housing L is cut of such length as to locate barrel A and shell M as near as practicable to the opposite ends of the steam-cylinder, in order that the connections K and R may be as short and direct as possible. The adjusting-rod V is then inserted in the sockets *u'* and *w'*, before

the cock is fitted together, said rod having been previously cut the desired length.

If it is required to move the valves T W but a limited distance, said rod is filed so as to shorten it; but, on the contrary, when it is desired to impart a full stroke to said valves, this rod is not shortened, as no lost motion of the same is then necessary. By thus preserving said rod V of the proper length to prevent it having lost motion within the chambers *w'* and *w'*, the valves T and W are compelled to travel in exact unison with each other.

When the engine is first started, key H is disposed longitudinally of barrel A, as seen in Figs. 2 and 5, thereby compelling the two valves T and W to recede from their seats, and said valves are maintained in this open position until the engine becomes heated up, when handle X is turned so as to dispose said key transversely of the barrel, as shown in Figs. 1 and 4. The apparatus now operates in precisely the same manner as the cock described in my patent previously alluded to—that is to say, when the live steam closes valve T the other valve, W, is opened by the thrusting action of stem S and rod V, and the water of condensation then escapes from the exhaust end of the steam-cylinder through seat B and common discharge-pipe D; but at the next stroke of the engine this automatic action of the valves is exactly reversed, and so on alternately.

It is apparent the bridges *j* and *o* act as stops to limit the lift of valves W and T, and thus prevent said valves being shifted too far from their respective seats B and N. When the valve T is open, the channels between the wings *u* of guide U allow the water of condensation to escape from that end of the steam-cylinder with which the pipe R communicates.

The cock described in my old patent works perfectly with short-stroke engines; but when it is applied to long-stroke engines too great an accumulation of water occurs in the pipes that connect the barrel of the device with the steam-cylinder, and, as this water is comparatively inelastic, the valves are closed very suddenly, which sudden closure impairs the efficiency of the apparatus by wearing out the valves and seats and breaking the valve-stems.

Now, by simply separating the two reciprocating valves as far as possible by the interposition of a housing, L, or its equivalent, between barrel A and shell M, and uniting the valves T and W with a long stem, S, all of these difficulties are obviated, and the apparatus then works perfectly, no matter how long a stroke the engine may have. But in case the engine should have an unusually long stroke—say from eight feet upward—it is preferred to construct barrel A with two orifices similar to the one C, and then screw into said barrel two oppositely-projecting housings. Each housing should have attached to its outer end a shell like the one M, and each shell should have a valve-seat similar to the one N. By

this arrangement an undue length of stem S would be obviated.

I have described the stops *j* and *o* as cast with their respective tail-pieces J O; but it is evident said stops may be removable bars let into suitable mortises or sockets in said tail-pieces, or in the barrel A or shell M.

The principal advantage due to such location of said stops is that they are readily accessible whenever it is desired to file or otherwise dress them so as to permit a greater stroke of the two reciprocating valves; or perforated diaphragms or washers may be substituted for said stops, which perforated members may be clamped to the apparatus when the tail-pieces are coupled onto their appropriate bearings.

Instead of employing the screw-connections *a'* and *m*, the housing L may be attached to the barrel and shell with flanges and bolts, or otherwise, as the leading feature of my invention consists in constructing an automatic cylinder-cock in such a manner as to locate the two valve-seats B and N as near as possible to the opposite ends of the steam-cylinder, and therefore I reserve the right of modifying the details of the device to suit circumstances.

I am aware it is not new to secure stops athwart the barrel of a cylinder-cock for the purpose of limiting the stroke of the two reciprocating valves of the same, as such an arrangement of stops is seen in Letters Patent No. 195,108, issued September 11, 1877, and therefore my claim to these devices is expressly limited to their application to the inner ends of the tail-pieces, but not necessarily to their attachment to said tail-pieces.

I claim as my invention—

1. The combination of an elongated cylinder-cock, consisting, essentially, of a barrel, A B, and shell M N, connected together by an intermediate section or housing, L, which latter is traversed by the stem S of the loosely-coupled reciprocating valves T and W, all constructed and arranged as herein described, and for the purpose set forth.

2. In combination with an automatic cylinder-cock, the loose adjusting-bar V, whose opposite ends traverse the chambers *w'* and *w'* of guide U and valve W, respectively, for the purpose set forth.

3. In combination with an automatic cylinder-cock, the valve-stops *j o* attached to the inner ends of tail-pieces J O, constructed and arranged substantially as shown, and for the purpose specified.

4. The combination of barrel A B C D, housing L, shell M N, stem S, valves T W, guide U, chambers *w' w'*, loose adjusting-rod V, and controlling device G H, as herein described.

In testimony of which invention I hereunto set my hand.

GUSTAV F. HAMMER.

Witnesses:

JAMES H. LAYMAN,
GEO. H. KOLKER.