

J. ARMSTRONG.

FEED-PUMPS FOR STEAM-BOILERS.

No. 176,417.

Patented April 25, 1876.

Fig. 1.

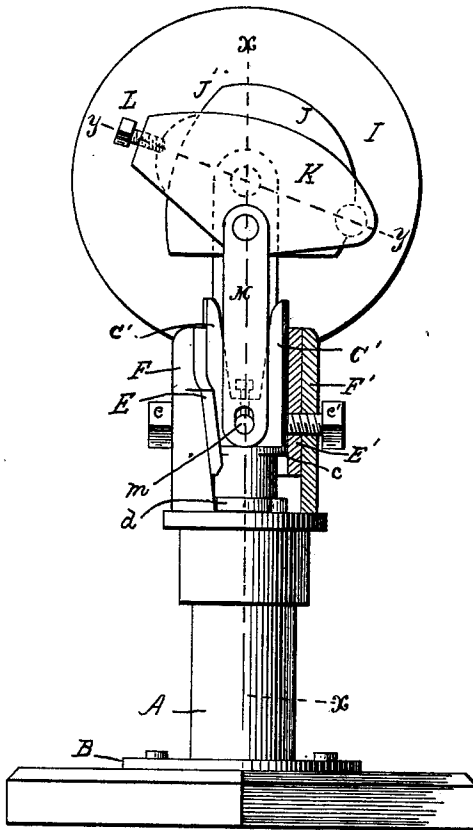


Fig. 2.

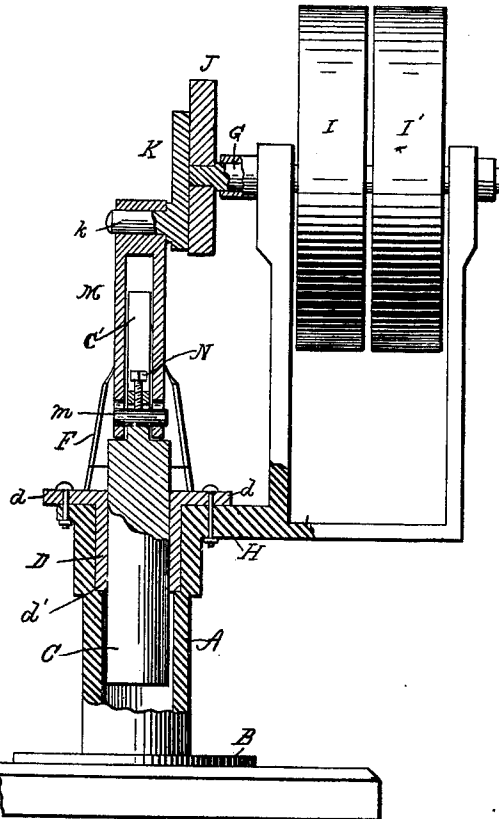


Fig. 3.

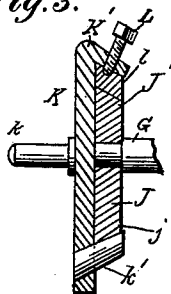
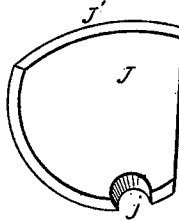


Fig. 4.



WITNESSES

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JAMES ARMSTRONG, OF TOLEDO, OHIO.

IMPROVEMENT IN FEED-PUMPS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **176,417**, dated April 25, 1876; application filed August 24, 1875.

To all whom it may concern:

Be it known that I, JAMES ARMSTRONG, of Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Feed-Pumps, of which the following is a specification:

My invention relates to a feed-pump for supplying steam-boilers and feed-water heaters and filters of that class in which the quantity of water fed is varied by varying the length of the stroke of the plunger; and my objects are to provide means by which the throw of the crank by which the plunger or piston is reciprocated may readily be adjusted to lengthen or shorten the stroke of the plunger, and firmly held in the desired position, and to compensate wear on the pivot by which the rod or link connecting the crank-wrist and plunger is attached to the plunger-rod.

The subject-matter claimed is hereinafter specifically designated.

In the accompanying drawings, which show so much of a pump and its attachments as are necessary to illustrate my invention, and which represent the best way now known to me of carrying out my improvements—

Figure 1 is a front elevation, partly in section; Fig. 2, a side elevation, partly in section, on the line *xx* of Fig. 1; Fig. 3, a section through the eccentric block or crank, and the removable plate or clamp and its wrist-pin, on the line *yy* of Fig. 1; and Fig. 4, a view of the inner side or back of the crank-block or eccentric.

A pump stock or barrel, A, of well-known construction, may removably be secured in the desired position by means of screws or bolts passing through its flanged bottom B. Suitable pipes, provided with inlet and outlet valves and leading into and from the barrel, connect, respectively, with the reservoir or other supply from which the water is drawn, and with the heater or boiler into which the water is to be fed or pumped. A plunger or piston, C, is reciprocated in the barrel, as will hereinafter be explained, and by preference works snugly in a stuffing box or gland, D, secured by lugs or flanges *d d*, and bolts in the mouth of the pump-barrel, which may have a shoulder, *d'*, for the lower end of the box to rest upon. The upper end of the plunger is, in this in-

stance, shouldered at *c* to somewhat enlarge it, and forked or bifurcated, as at *C'*. The enlarged forked end or rod of the plunger works snugly between gibs or curved bearing-blocks E E', adjustably and removably secured in position between the forked end *C'* of the plunger and standards E F', projecting upward from the pump-barrel on each side of the flanges *d d* of the stuffing-box D by means of set-screws *e e'*. By these means not only is the plunger guided in its reciprocations and strain on the plunger in the barrel of the pump, and tendency to bind therein prevented, but wear on the plunger end or rod, or on the gibs, may be compensated by tightening the screws so as to force the gibs inward, and inserting between the gibs and the standards some thin material, such, for instance, as paper or pasteboard, to make the gibs bear evenly throughout their length against the enlarged end of the plunger while supporting them firmly by the standards and screws. A shaft, G, by which the crank for reciprocating the plunger is worked, may be mounted in any suitable manner and driven by steam or other power. I prefer to mount this driving-shaft in bearings in the upwardly-projecting arms of a frame, H, formed with or firmly secured to the pump-barrel; and to drive it by means of a pulley, I, fast on the shaft, around which pulley passes a belt driven from the engine, the boiler of which is to be fed, or from any other prime mover. A loose pulley, I', is mounted on the shaft, upon which to shift the belt when the pump is to be stopped.

To the end of the shaft G is securely fixed a crank-block or eccentric, J, provided with a curved portion, J', forming the segment of a circle, and with an open-sided bearing or recess, *j*, concentric with the curved edge J', which edge it will be seen is curved eccentrically to the crank-shaft G. A plate or clamp-frame, K, is provided with a crank-wrist, *k*, preferably formed in one piece with the plate, and is likewise provided with a flange or lip, K', and pin or lug *k'*.

The crank-wrist or pin *k*, it will be seen, is located to one side of a line drawn from the pin *k'* to the flange K'. I prefer to incline both the flange and pin inward or toward the center of the plate, and to correspondingly

bevel the edge or periphery of the segmental portion *J'* of the crank-block, as clearly shown in Fig. 3. The sides of the bearing *j* are likewise inclined, as shown by Fig. 4, to allow the plate to be turned on its pivot-pin *k'* therein when the parts are adjusted. A set or pinch screw, *L*, and a shoe or movable bearing-block, *l*, serve to clamp the plate in any desired position upon the eccentric or crank-block, while admitting of the ready separation of the block and plate.

By this construction not only may the crank wrist or pin readily be adjusted relatively to the driving-shaft and its crank, so as to give a long, medium, or short stroke or throw (according to the distance the wrist is adjusted from or toward the crank-shaft or axis of revolution of the crank) to the crank-wrist on the clamp-plate, but a secure connection between the eccentric-block or crank proper, and the wrist-pin-supporting plate is secured as these parts dovetail together, and but slight pressure by the screw *L* is necessary to hold the parts firmly in the desired position. It will be seen that the crank-wrist imparts no motion if adjusted, as it may be directly in line with the driving-shaft.

It is obvious that the crank-block, instead of being made solid, as shown, may be of skeleton form, and that it is not necessary to form it in any particular shape so long as the bearing-recess and segmental portion are constructed and arranged relatively to each other and to the main shaft, as set forth.

The outline of the clamp-plate may also be modified, as desired, all that is necessary in its construction, whether solid or skeleton, being the pin at one end or side, the flange and clamping device opposite thereto, and the crank-wrist located on one side of a line drawn directly from the flange to the pin.

A link or connecting-rod, *M*, fits over the crank-wrist *k* at one end, and is piv-jointed at its opposite end at the juncture of the forks constituting the end or rod of the plunger. A set-screw, *N*, projects down through the end of the plunger between its forks and bears upon the pivot-pin *m*, which connects the plun-

ger and pitman or link rod, by which means wear on the pin or connecting-rod may be compensated simply by tightening the screw, the location of which between the forks of the plunger protects it from injury or accidental loosening.

From the foregoing description, by which the operation of my invention will readily be understood, it will be seen that I am enabled to obviate the disagreeable "chucking" or jarring caused by wear of the parts working in contact, the injurious effects of which are well known, and am also enabled to adjust the crank so as to supply the exact amount of water needed regularly.

I have found my invention particularly useful in supplying water to such of the feed-water heaters for which sundry Letters Patent of the United States have been granted to me as are used without elevated tanks or reservoirs, and in supplying the feed-water from the heaters to the boilers.

I claim as my invention—

1. The combination of the driving-shaft, the eccentric crank-block, the adjustable clamp-plate secured to the crank-block, the crank-wrist on the clamp-plate, the connecting-rod, and the plunger, these members being constructed and operating substantially as set forth.

2. The combination of the crank-block, its curved inclined portion *J'*, the clamp-plate, its inclined pin fitting in the flaring bearing in the crank-block, the inclined flange on the clamp-plate, the set-screw, and the crank-wrist on the clamp-plate, substantially as set forth.

3. The combination of the plunger, its forked end, the connecting-rod, the pivot-pin uniting the plunger and connecting-rod, and the set-screw passing through the end of the plunger between its forks and bearing on the pivot-pin, as and for the purpose set forth.

In testimony whereof I have hereunto subscribed my name.

JAMES ARMSTRONG.

Witnesses:

J. M. HUESTON,
ISAAC BAUGHMAN.