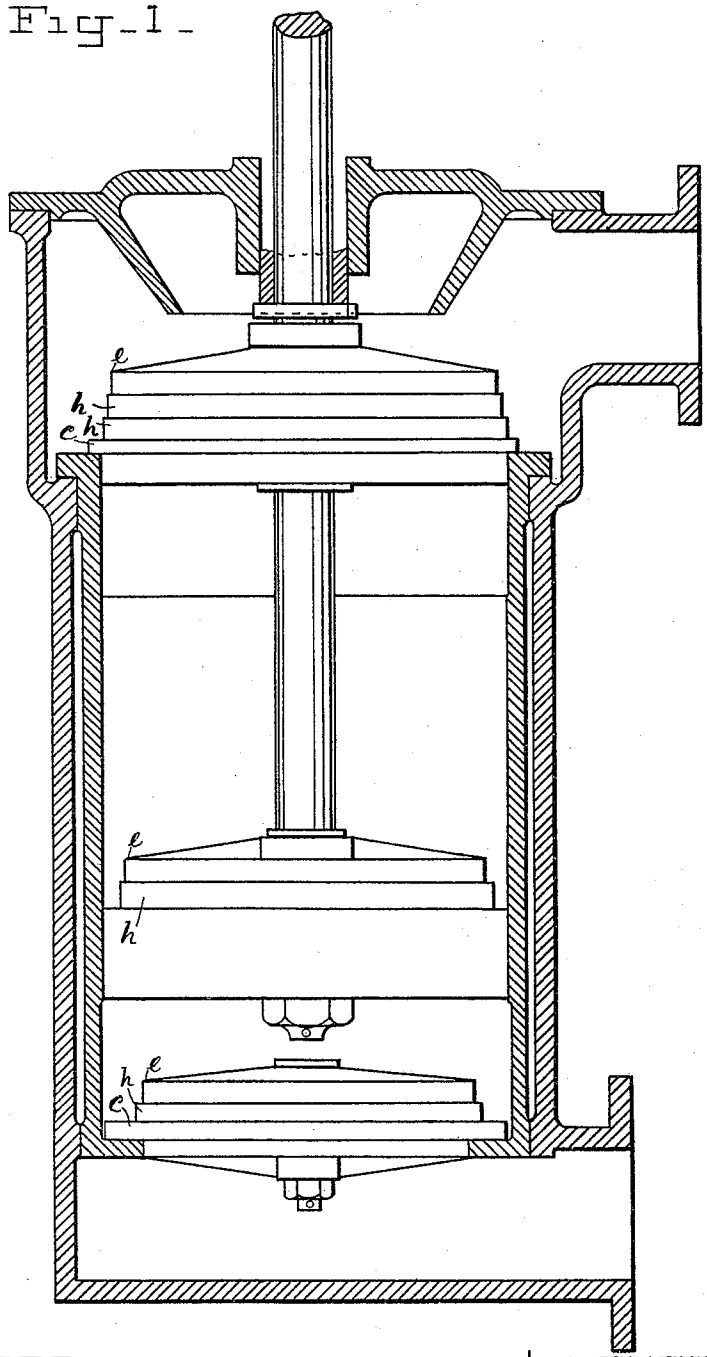
(No Model.) 2 Sheets—Sheet 1.

C. J. MELLIN.

GRIDIRON VALVE.

No. 454,875. Patented June 30, 1891.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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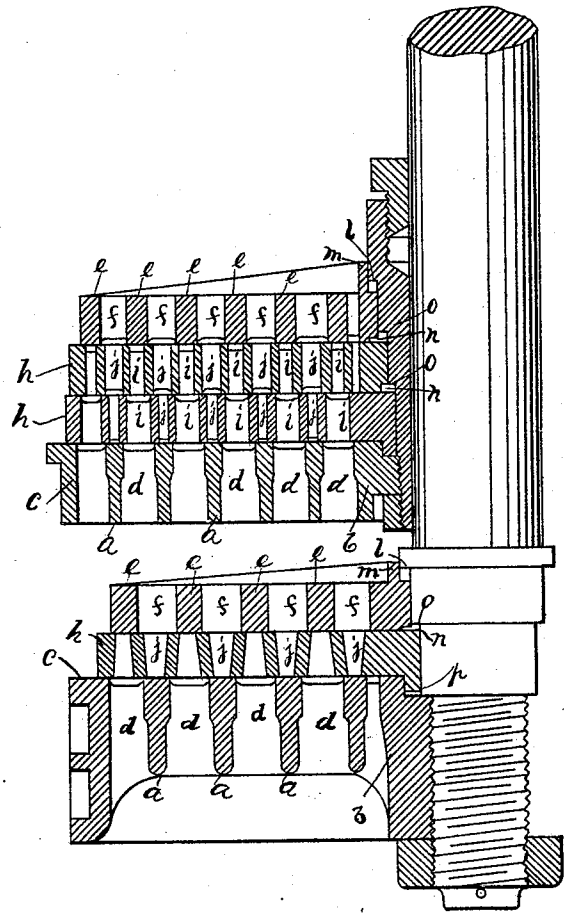
No. 454,875. Patented June 30, 1891.

Fig. 2.



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UNITED STATES PATENT OFFICE.

CARL J. MELLIN, OF RICHMOND, VIRGINIA.

GRIDIRON-VALVE.

SPECIFICATION forming part of Letters Patent No. 454,875, dated June 30, 1891.

Application filed March 6, 1890. Serial No. 342,889. (No model.)

To all whom it may concern:

Be it known that I, CARL J. MELLIN, a citizen of Sweden, and a resident of Richmond, in the county of Henrico and State of Virginia, have invented new and useful Improvements in Gridiron-Valves, of which the following is a specification.

My improvements in gridiron-valves relate to the construction of stop, check, and other such valves as rise or otherwise move to and from the seat in a gridiron form, affording double or more the area of opening for a given size than the sliding gridiron-valves are capable of with proportionately less area subject to pressure than in the ordinary stop, check, or other lift valves, and so that the rise or movement of the valve may be proportionately less for a given amount of opening; and it consists in duplex or triple constructions of the valve, whereby still greater area of opening is secured and less movement is required, all as hereinafter fully described, reference being made to the accompanying drawings, in which—

Figure 1 is a sectional elevation of the barrel or cylinder of a lift-pump having my improved gridiron-valves, which are in duplex and triplicate construction, respectively; and Fig. 2 is a transverse section of half each of the upper check-valve and the piston-valve of Fig. 2, and side view of part of the piston-valve rod on an enlarged scale to illustrate the invention more clearly.

Gridiron lift-valves have been made in which the valve-seat consists of one or more concentric annular or other shaped rings *a*, and the center *b*, in addition to the outer ring *c*, forming the usual seat, with intervening annular spaces *d*, and the valve is constructed with corresponding annular rings *e* and spaces *f*, except that the rings of the valve cover the spaces of the seat and the rings of the seat cover the spaces of the valve, so that as the valve lifts off the seat two ways of escape are opened by each ring of the valve to the fluid from each passage through the seat, whereby with a valve having three annular passages through the seat and three rings to the valve there are six openings for the escape of the fluid to one of the common form, with probably three or four times the area, which is not increased in proportion to the number of openings, because of the decreasing circumference of the inner openings; but the increase of area is very large, and consequently the valve may be much smaller; and it will be observed that for valves of equal size the area of the valve subject to lifting-pressure is diminished by the area of all the rings and the center piece of the seat, so that it is probably not a quarter of that of the ordinary disk-valve. This is especially important in safety and relief valves, as it lessens the strength and weight of the balancing devices, particularly the springs of spring-controlled safety-valves.

As a further means of increasing the area of opening and diminishing the lift, I propose to construct the valve in two or more lifting-plates, whereof the intermediate plate or plates *h* have, besides the passages *j*, over the bars of the seats, other passages *i*, over the passages of the seat, which are closed by the bars *e* of the top plate or valve proper, thus providing double the number of openings through the intermediate plate or plates, by which it will be seen that the area of opening is enabled to be greater than the area of the bars, as will be seen in Fig. 2, by which the size of the valve and the height of the lift may be correspondingly diminished.

To cushion the working-plates of the valve and prevent them from beating together or on the seat or against the shoulder *l*, limiting the rise of the top plate, I provide the flange *m* on the top plate to trap the water in the annular space under said shoulder; also the annular spaces *n* between the plates and in conjunction with the annular spaces under shoulders *o*, and also the flange *p* on the lower plate in conjunction with the corresponding recess in the center hub of the valve-seat, in all of which traps the water cushions the plates by delay in escaping through the limited spaces of the joints at the instant before the contact of the plates, as will be clearly understood, and thus prevents or greatly limits the shocks of contact and diminishes the damaging effects thereof on the metal.

I claim as my invention—

The combination, with the gridiron-valve seat, of a gridiron-valve consisting of a top plate and one or more independent intermediate plates, said top plate having like num-

bers of bars and passages as the seat, or thereabout, and the intermediate plate or plates having double the number of the same, or thereabout, the area of the passages being greater than the area of the bars, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence or two witnesses, this 31st day of December, 1889.

CARL J. MELLIN.

Witnesses:
W. J. MORGAN,
W. B. EARLL.