

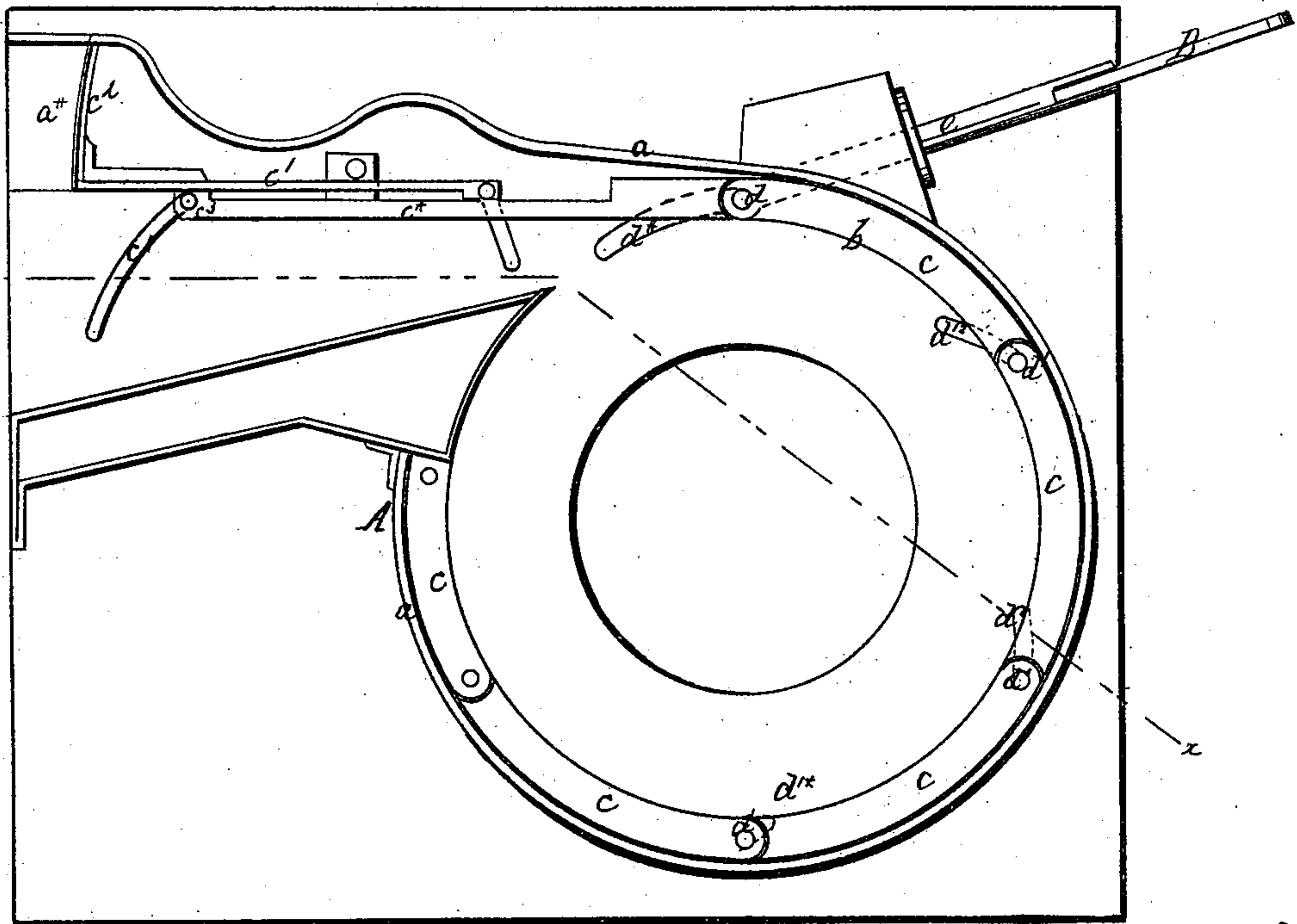
*J. E. Huston,*

*Water Wheel Gate.*

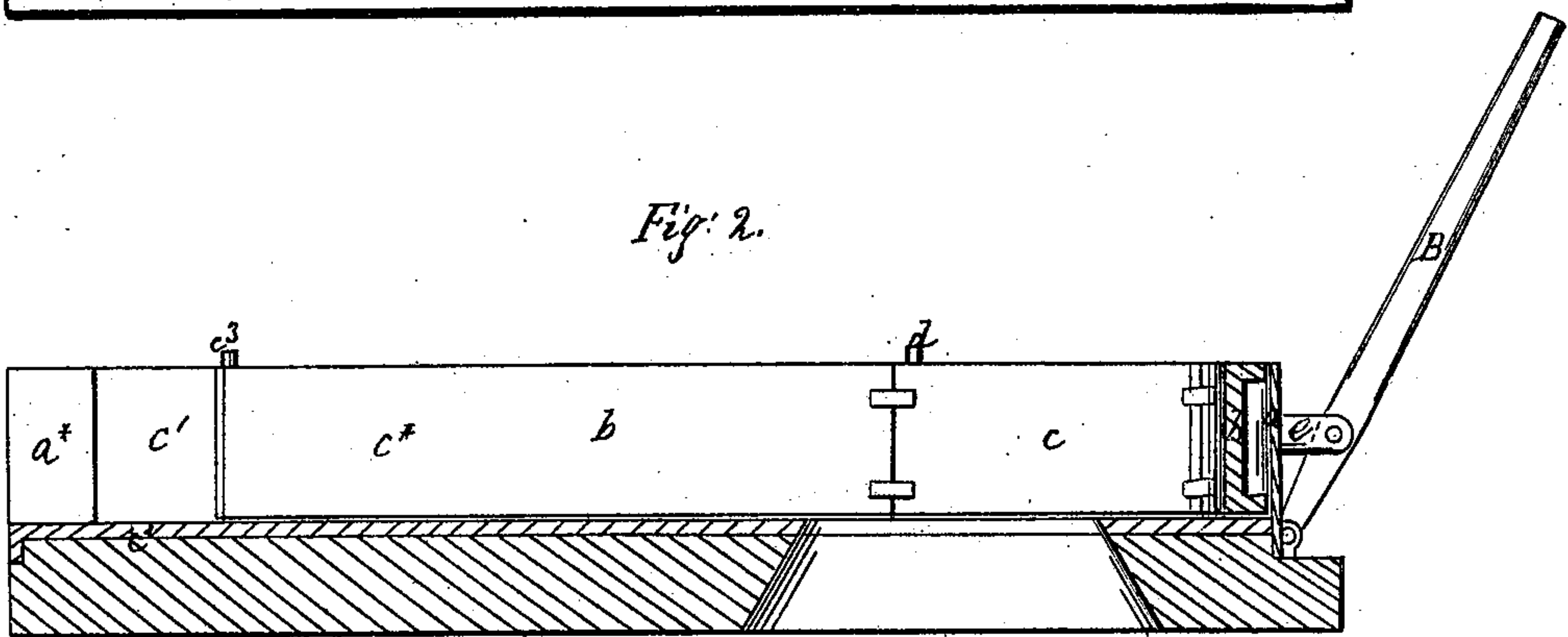
*N<sup>o</sup> 44,195.*

*Patented Sep. 13, 1864.*

*Fig. 1.*



*Fig. 2.*



*Witnesses*  
*Henry Hains*  
*Ed To Pliff*

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# UNITED STATES PATENT OFFICE.

J. E. HUSTON, OF HILLSDALE, MICHIGAN.

## IMPROVEMENT IN WATER-WHEEL SCROLLS.

Specification forming part of Letters Patent No. 44,195, dated September 13, 1864.

*To all whom it may concern :*

Be it known that I, J. E. HUSTON, of Hillsdale, in the county of Hillsdale and State of Michigan, have invented a new and Improved Adjustable Scroll for Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a plan or top view of my invention. Fig. 2 is a longitudinal vertical section of the same, taken in the plane indicated by the line  $x x$ , Fig. 1.

Similar letters of reference indicate corresponding parts in the two figures.

This invention consists in the application to an ordinary central-discharge water-wheel of a stationary shell and adjustable interior scroll in such a manner that the amount of water used on the wheel may be regulated so as to have a solid spout of water in all cases, whatever the amount of water used on the wheel, either by hand or by a governor, and without any waste of water.

To enable others skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A represents my scroll, which is composed of two distinct parts—namely, the external stationary shell,  $a$ , made of sheet-iron or other suitable material, in the usual shape, and the inner adjustable part or scroll,  $b$ . This scroll is composed of a series of sections,  $c c^*$ , which are connected together by hinge-joints. The first section,  $c^*$ , which serves to regulate the chute, is rectilinear, and it is provided on its back with a movable slide,  $c'$ , the outer curved end,  $c^2$ , of which bears tight against the inner surface of the lip  $a^*$  of the stationary shell  $a$ , being held up against the same by pins projecting from its inner end into slots in the bottom and top of the shell. The outer end of the section  $c^*$  is guided by pins  $c^3$ , projecting into slots  $c^4$  in the top and bottom of the stationary shell  $a$ , and its inner end connects by a pivot,  $d$ , with the succeeding section  $c$  of the adjustable scroll  $b$ . The ends of the pivot  $d$  project into oblique slots  $d^*$  in the top and bottom plate of the shell  $a$ , and it connects, by means of a rod,  $e$ , with the lever B, which may be operated by hand, or which may connect to a governor in any convenient manner.

The remaining sections of the adjustable scroll are connected by pivots  $d'$ , the ends of which project in corresponding oblique slots,  $d'^*$ , in the top and bottom plates of the shell  $a$ .

By throwing the lever B in the direction of the arrow marked near it in Fig. 2 the adjustable scroll and the chute are contracted, and by these means the amount of water used on the wheel can be regulated just in proportion to the amount of power required; or, in cases where it is desirable to use the water to the best advantage, the adjustable scroll can be so regulated that the water will fill the same with a solid spout, and the power obtained will be in the proper proportion to the amount of water used.

My adjustable scroll is also of advantage in such cases where different quantities of power are required from the same wheel at different times, and still a uniform velocity is desirable. In those cases I connect my adjustable scroll with a governor, so that the motion will be regulated by the use of more or less water, as occasion requires. By attaching the governor to the adjustable scroll the velocity of the wheel and the quantity of water admitted to the wheel can be regulated much better and easier than it can be done when the governor is connected to the gate as usual. Furthermore, in cases where a steady motion is required from a head and fall of water that is not uniform at all times, my invention is applicable with great advantage, and without it it is impossible to obtain a steady and uniform motion of a central-discharge scroll water-wheel. For instance, in imparting motion to two runs of mill-stones from one central-discharge scroll water-wheel under a given head and fall, it is found that four hundred inches of water will produce the requisite power; but a part of the time only one run of stones is required, and consequently only half the power is needed, and consequently two hundred inches of water ought to be sufficient to produce the requisite motion; but I find it impossible to obtain the desired velocity with half the water unless I make use of my invention. For if a wheel be provided with a scroll of sufficient capacity to just use four hundred inches of water, and the full power of the wheel is required to drive the two runs, when I come to throw off one run I find it takes at least three hundred inches to produce power



enough to drive one run, and for the reason that just as soon as I use less water I find it becomes broken and spends a great part of its force before it acts on the wheel; but if I can contract the scroll so that two hundred inches of water will just fill it, I find no trouble in producing one-half the power with one-half the water. This adjustable scroll is applicable to any central-discharge scroll water-wheel with any width of bucket or any diameter of wheel. It may be made of wood or of wood and iron, or of iron alone, and it may be made in sections with joints, as above described, or it may be made of wrought-iron similar to boiler-iron and all in one piece, dispensing with the joint, but using the elasticity of the iron instead of the joint. The guides and slots may be straight or arched, and the position and location of the several guides and slots depends upon the range given to the chute and scroll. When the scroll is made of boiler-iron, all in one piece and without a joint, it will be necessary to use the guides frequently, and to use them above and below.

In order to make the chute as it should be, guides and slots will have to be used above and below at each end; but it is not indispensable to use the guides above and below

on the scroll if the same is constructed as shown in the drawings.

By using the adjustable scroll in combination with the stationary shell, all waste of water can be avoided, provided said shell is made water-tight, which can be easily accomplished. If the space between the shell and scroll is once filled with water, there can be no further waste of water.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the adjustable scroll *b* with the stationary shell *a*, substantially in the manner and for the purpose herein set forth.

2. The movable slide *c'*, in combination with the adjustable scroll *b* and lip *a\** of the shell *a*, applied and operating in the manner and for the purpose substantially as herein shown and described.

3. The guides *c<sup>3</sup> d d'* and corresponding slots, *c<sup>4</sup> d\* d'\**, in combination with the chute and scroll *b*, and with the top and bottom plate of the stationary shell *a*, constructed and operating substantially as and for the purpose herein set forth.

Witnesses:

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