6964X

J. Fox,

Steam-Boiler Water-Feeder,

Patented Mar. 14, 1832.

Plate 2, Fig. 1,

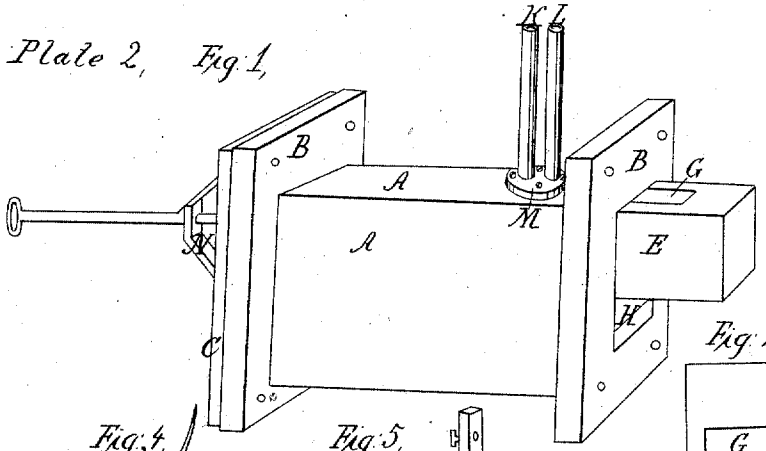


Fig. 2,

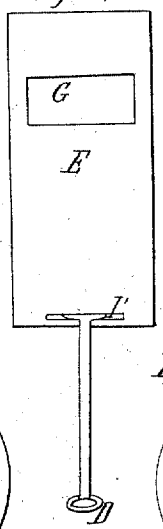


Fig. 3,

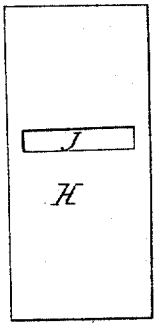


Fig. 4,

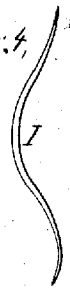


Fig. 5,

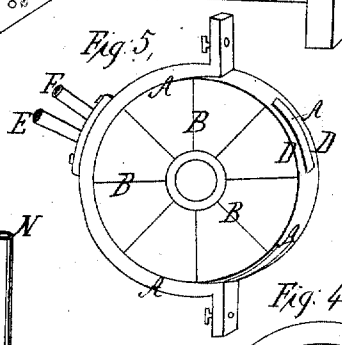


Plate 1, Fig. 1,

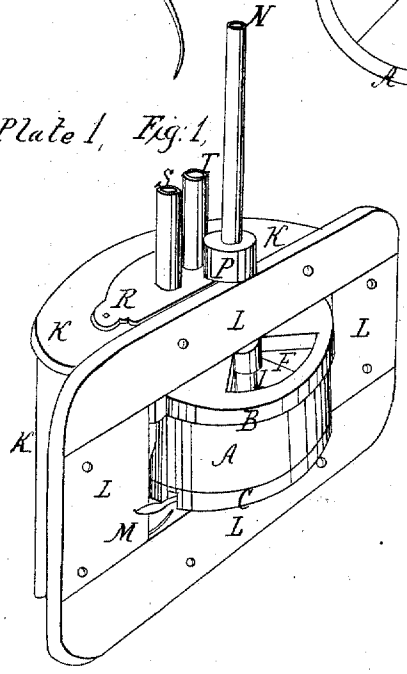


Fig. 4

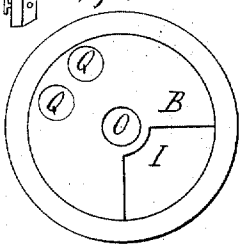


Fig. 5,

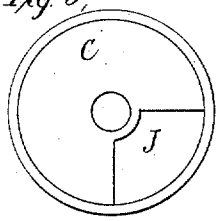


Fig. 2,

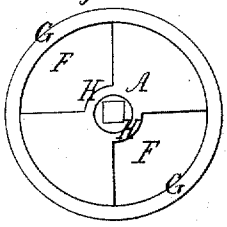
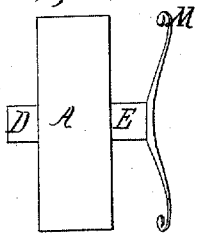


Fig. 3,



A.M. PHOTO-LITHO. CO. N.Y. (OSBORNE'S PROCESS.)

Jesse Hoy.

The Schedule referred to in the annexed Letters Patent and making part of the same containing a description in the words of the said Jesse Hoy himself of his improvement in the mode of supplying Steam Boilers or Boilers wherein Steam is generated, with water.

To all to whom these presents shall come. Be it known that I Jesse Hoy of Lowell in the County of Middlesex and Commonwealth of Massachusetts mechanician, sends Greeting. Be it known that I the said Jesse Hoy, have invented made and applied to use a new & useful improvement in the mode of supplying Steam boilers or boilers wherein Steam is generated, with water, which invention and improvement, and the principles thereof, and the manner of applying the same to use, are described and explained as follows, that is to say, perspective views of Machines needful for the purpose aforesaid, and drawings of parts of such Machines are given in the plates or drawings of parts of such Machines are given in the plates or drawings hereto annexed, numbered one two and three for the better understanding thereof, which drawings are to be taken as parts of this my specification. A in plate numbered one Figures 1st 2d, is a moveable wheel, having a fixed arbor, whose journals turn & revolve in two plates, one on each side of the wheel, the upper plate is marked B in figures 1st & 2d. and the under plate is marked C, in figures 1st & 2d. These plates are each one half of an inch in thickness and are circular. The wheel A is four & an half inches in diameter and one inch and one half in thickness. The plate B is five inches in diameter, and the plate C. is four inches & three eighths in diameter. The arbor of the wheel A, which passes through its center, is three sevenths of an inch in diameter & extends on each side of the wheel five eighths of an inch, forming the journals D & E. represented in figure three of plate 1. In the wheel A are two sectional apertures or openings through the wheel from one side to the other, marked F F; these apertures are on opposite sides of the arbor as represented in figure 2 of plate 1. and occupy the greater part of the quadrants of the wheel; the periphery G. G. being one fourth

Drawing

fourth of an inch thick, and the parts around the arbor B.H. being one fourth of an inch thick. in the upper plate B. and the under plate C. are apertures or openings I. J. corresponding to the apertures E.E. in the wheel A. it would be better that the aperture in the upper plate B. should be a little smaller than that in the lower plate C; and that the apertures E.E. in the wheel A should be a little smaller at the top or upper side of the wheel and gradually increase to the bottom, or underside thereof. K.K.K. is a semicircular case half an inch in thickness, six inches in diameter and four inches in depth with a flange L.L.L.L. of the same thickness and one inch and one fourth in width, with holes therein to receive bolts by means whereof & nuts & screws the same is secured to the boiler. In this case are the plates B.C. and the wheel A. aforesaid placed as is represented in figure 1. of plate numbered 1. The upper plate B is secured to the case by wedges, one on each side, driven between it and a projection on each side of the case, & the joint between the case and the plate B, is made steamtight by packing; The upper & under plates are kept from turning by steady pins, connecting them with the case. M is a flat bent spring having a hole in the centre to receive the journal B, the ends of which spring rest upon the case and the centre thereof bears against the plate C. & keeps it together with the wheel A up against the upper plate B. The surfaces of the upper & under sides of the wheel A and of the under side of the plate B, & of the upper side of the plate C. which come in contact are first turned & then ground with emery even & smooth, so that the joints made by the upper side of the wheel A and the under side of the plate B, and by the under side of the wheel A & the upper side of the plate C. may be steamtight. In the centre of the upper end of the arbor of the wheel A, is a circular hole five eighths of an inch in diameter drilled down even with the upper surface or side of the wheel A and from thence a hole three eighths of an inch square is cut or made down

even

even with the under side or surface of the wheel A. In a position on the flange E. is drilled a hole three fourths of an inch in diameter, corresponding with the hole O in the upper plate B. and bearing its centre coincide with the centre of the hole O in said plate B. into these holes in the arbor and projections aforesaid is fitted the main or shaft N which has a collar upon it P. resting upon the flange so as to prevent the shaft from going further than within one fourth of an inch of the bottom of the square hole in the arbor of the wheel A aforesaid. That part of the shaft N which goes into the hole aforesaid in the arbor of the wheel A and one fourth of an inch more is made square and of dimensions corresponding nearly with that part of the hole which is square, but a very little smaller so that a slight inclination of the shaft may not affect the position of the wheel A; that part of the shaft underneath the collar, which is in the hole made through the projection in the flange is rounded and made to correspond with that hole. Q Q. are two holes made through the top of the arbor and through the upper plate B one fourth of an inch apart, and opposite to the aperture I in said plate B. occupying a less space than the said aperture, so that, when either of the apertures F F. in the wheel A are by its revolution brought immediately under the said holes, & square, as nearly as may be, in the centre thereof, the outer edge of each of the said holes may then be three eighths of an inch from the edge of the aperture, in order to prevent the steam from passing from the boiler and sinking of these holes. on the top of the arbor is a cap R secured thereto by screws, in which are one two holes a little larger than those last described so as to admit the pipes S T. the centres of which are of the same diameter with to correspond to the holes Q Q in plate B. which pipes are tightly fitted into the said cap. The pipes S T each communicate with separate fountains of water a few feet above the boiler, the level of the fountain with which the pipe S communicates being a little below the level of the fountain with which the pipe T communicates; so as to create a greater pressure of water in the pipe T in order that in case the steam immediately should enter a drop of the water in the pipe S should immediately press the water in the pipe T whose pressure

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is greater may descend and fill the cavities F F, in the wheel A as by its revolution they are made to pass underneath the aperture. A hole of sufficient length and breadth must be cut in the head of the boiler to admit those parts of the plates B. C. & of the wheel A which project beyond the flange L L. L. L. and so that when the case is fixed upon the boiler and secured thereto with packing, the middle of the axis of the wheel A, which is to be so placed as to move horizontally, shall be on the same level as which it is designed to keep the water in the boiler, and that there should be a space of about one fourth of an inch above the upper plate B. & between it & the edge of the hole made in the boiler and a space of about one half an inch underneath the under plate C. and between it and the edge of the hole made in the boiler to admit the steam into the spaces & apertures in the plates by which from the boiler & to allow the water to escape from the spaces & apertures aforesaid into the boiler. The plate C. is made a little smaller than the wheel A so that the pressure of the steam upon it may not be so great as the pressure upon the wheel A in order, that in case the water in the cavities F F, in passing from the pipes into the boiler should expand it may push down the plate C and escape between it and the wheel A into the boiler, instead of pushing down the wheel A and allowing the steam to escape from the boiler up the pipes. The wheel A is to be made to revolve in such direction that the apertures F F, in first come under pipe S & then under the pipe T. The case wheel & plates, may be made of cast iron, or other suitable material. The shaft may be made of wrought iron welding the lower end, which goes into the arbor of the wheel, which as well as said arbor ought to be made of steel. The pipes may be made of copper or other like suitable material. The power to move the shaft N and cause the wheel A to revolve is applied to the said shaft by means of a pulley or a pinion wheel upon the said shaft by means of which the wheel A revolves the apertures F F therein are brought successively over or so as to correspond with the apertures I & J. in the plate B & C, and under the holes below the pipes S & T. When either of the apertures

F F

F.F is beneath the pipes, it is filled with water, which by the revolution of the wheels is carried into the boiler and thereby its specific gravity falls to a level with the water therein, & its place is supplied by steam from the boiler, which having carried round with the pipes is condensed by the water therein, & its place is supplied by water which is carried & falls into the boiler as before. and in case the water in the boiler should be on a level with the surface of the upper side of the wheel A it is obvious that the same quantity of water at each revolution of the wheel would be carried from the boiler as might be carried into it, and the water could rise no higher; and as the water rises above the surface of the lower side of the wheel a proportionably less quantity is left in the boiler in each revolution. A machine of the dimensions above described, when the wheel makes thirty revolution a minute, will convey into the boiler about two hundred & forty cubic inches of water a minute, but in order to provide against occasional extraordinary expenditures of water, it ought not to be applied at that speed, to a boiler when the expenditure of water ordinarily exceeds two hundred cubic inches a minute; and in case the expenditure of water is ordinarily greater than is above mentioned the dimensions of the machine must be proportionably increased, or the velocity of the wheel must be proportionably accelerated; but the velocity of the wheel must not be so great as not to give sufficient time for the water to fall from the cavities in the wheel into the boiler. The object of the above described machine or apparatus is to keep the water in the boiler at nearly an equal and uniform height required under the various degrees of heat & temperature & expenditure of water to which under various circumstances steam boilers may be subjected. Instead of the above apparatus, a solid wheel Plate 9. Fig 6, similar in dimensions to the wheel above described, fitted into a case of similar form to that above described, shewing cavities a. a. a. a. as shewn from the

perifery

periphery thereof, so that the sides may coincide with radii B.B. to the point C around the axis, and so as to leave on each side D.D. one fourth of an inch, and one fourth of an inch at C. around the axis may be made to revolve vertically, instead of horizontally, in the case, which is to be attached to the boiler. In this case the periphery of the wheel & that part of the case in contact with it must be ground even & smooth so as to make a steam tight joint, & the pipes E.E. by which the water is admitted into the cavities A.A.A.A. and by the revolution of the wheel carried into the boiler in like manner as before described must be let into the circular part of the case. The wheel in this case is to be moved by a shaft passing through a slot in one side of the case, through the hub to which it is fixed, and into a horizontal slot on the inside of the opposite side of the case. The object of these horizontal slots is to allow the wheel as it wears to come up always close to the case; and the wheel is made to bear close up against the case by a spring bearing against the shaft on each side of the wheel within the case. In order to prevent the steam from escaping from the horizontal slot through the case a packing box is attached to the shaft on the inside of the case, ground so as to make the joint between it and the case steam tight. The motion of the wheel should be in such direction as that the cavities may come under the hole beneath the pipe F first. These pipes & the holes beneath them, & the fountains of water connected with them are to be made in a similar manner to those herein before described. And this machine in carrying in water to the boiler, & bringing out steam to be condensed operates like the machine first above described. The size and velocity of the wheel must like that in the apparatus first above described be adapted to the quantity of water required to be carried into the boiler in a given time. But the apparatus and mode of supplying boilers first above described, is on the whole far preferable to this. An apparatus however somewhat different from either of those above described, represented in plate 9. Figure 1. may be used for the same purpose; and is described as follows A.A. in plate 9. Figure 1. is a rectangular case from inches

upon

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square on the outside, half an inch thick & seven inches long including the flange BB. These flanges are half an inch thick & project around one fourth beyond the case; by one of which the case is confined to the boiler; and by the other of which the plate C, one half inch thick, covering that end of the case, is fastened. Through this plate passes the rod D one fourth of an inch in diameter around which is a packing box. This rod is connected with the slide E. having prongs which set in the slot F. so as that the slide may be moved backward & forward with the rod. This slide moves backward and forward three inches and is thereby moved into the boiler two inches & three fourths & thence back alternately. it is six inches & three fourths in length, three inches in breadth, and two inches & one fourth in thickness. One inch & three fourths from the end of the slide next to the boiler, is a rectangular hole or aperture & through the slide one inch in width lengthwise of the slide & two & an half inches width wise of the slide. The slide in moving out of the boiler is brought back until the opposite end comes to the inner side of the plate C & the end next the boiler is drawn in into the case one fourth of an inch. H is one half an inch thick and of the same width & length with the slide E. & fitted into the case under said slide and kept tight against it by a spring I. which also keeps the slide tight against the upper surface of the rectangular cavity in the case in which it moves. Two inches & an half of the upper surface of the plate H from the end next to the plate C. is cut down one fourth of an inch so that this part of the surface may not touch the slide. J is a rectangular hole or aperture through the plate H Fig 3 Pl 2. three inches from the end next to the boiler, half an inch wide lengthwise of that plate and two inches & an half long widthwise of the same plate; through which the steam may pass through a space under the plate so as to act against the slide & press it up with more force than the plate is pressed up with thereby allowing the water in the aperture & in case of expansion in passing into the boiler to

ample

escape between the plate & the slide by pressing down the plate instead of pressing down the slide and allowing the steam to escape from the boiler between it, & the upper surface of the inside of the case, through the pipes. The upper and under surfaces of the slide, the upper surface of the plate, & the surface of the cavity in the case against which the upper surface of the slide rests are all ground as even and smooth as possible so as to make steam tight joints. I is a flat steel spring four and a half inches long, & three inches wide the ends of which bear against the under surface of the plate & the center of which bears against the lower surface of the cavity in the case, it is placed at that end of the plate next to the boiler, and is prevented from coming out of the case by the boiler against which one end comes in contact & at the other end is a pin in the plate to prevent it from working further into the box. K L, are two pipes communicating with holes in the case A for the purpose of conveying water into the cavity C. in the slide & thence into the boiler, in the same way as is described above in the other apparatus with which the wheel is connected. These pipes are one half an inch in diameter and are secured steam tight in a cap M screwed to the case. Underneath the pipes K L are holes through the case one eighth of an inch apart & seventeen hundredths of an inch in diameter, to allow the water to pass into the cavity in the slide when it is drawn into the box or case. The pipe L is two inches from the end of the case next to the boiler, which is connected with a fountain the level of which is a little lower than that with which the pipe K is connected, to create a greater pressure of water in the pipe K. so that in case the steam unemployed should enter & drive up & hold in suspense the water in the pipe L. the water in the pipe K, where the pressure is greater, may descend into the cavity C in the slide E N is a guide for the rod to move in secured to the plate. The apparatus last above described will supply a boiler with water, containing & requiring three hundred ~~& twenty~~ five

Units

6 cubic inches a minute, when the slide performs thirty strokes a minute. When a greater expenditure of water is required, the dimensions of the apparatus must be proportionably increased, or the velocity of the slide must be accelerated; but the velocity of the slide must not be accelerated so as not to allow the water time to fall from the cavity into the boiler. When there is considerable pressure it may be well to make the cases above described somewhat thicker at bottom, and the under surface of the upper side of the case A. Plate 2. Fig. 1. for two inches & an half from the end opposite the boiler may be cut or filed away a little so that the upper surface of the slide may not touch it. The apparatus last mentioned operates as well as that first above described in supplying a steam boiler with water, but it occupies more space, and is deemed not to be so durable, & on the whole the apparatus first above described is considered as the best. And the apparatus secondly above described is the least preferable where there is a considerable pressure of steam, as the water in that case will not be so readily discharged from the cavities, and as, in case of the expansion of the water in the cavities, in passing into the boiler, the wheel may be thrown off from or separated from the case so as to allow the steam to escape through the pipes, & under no circumstances by any regard to the apparatus firstly, or leading pipe secondly described. is it considered as forth. The manner of applying the apparatus last described to the boiler will be readily understood by reference to the manner of applying the apparatus first described herein set forth. It is to be made of like materials with the others above described. What is claimed as a new & useful improvement & invention, is the supplying of steam boilers with water by such apparatus or machinery as is above mentioned and so much & such parts of the machinery & apparatus aforesaid in combination as is necessary & proper for effecting the purposes aforesaid. In testimony that the above is a true specification of my said invention and improvement

Thos

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above described. I have hereunto set my hand and seal this tenth day of February in the year of our Lord eighteen hundred and thirty two.

Signed Sealed & Delivered in presence of us

Augustus H. Fiske

Expd. Wm Reed
Mfd. Augustus H. Fiske

(4158 Words)