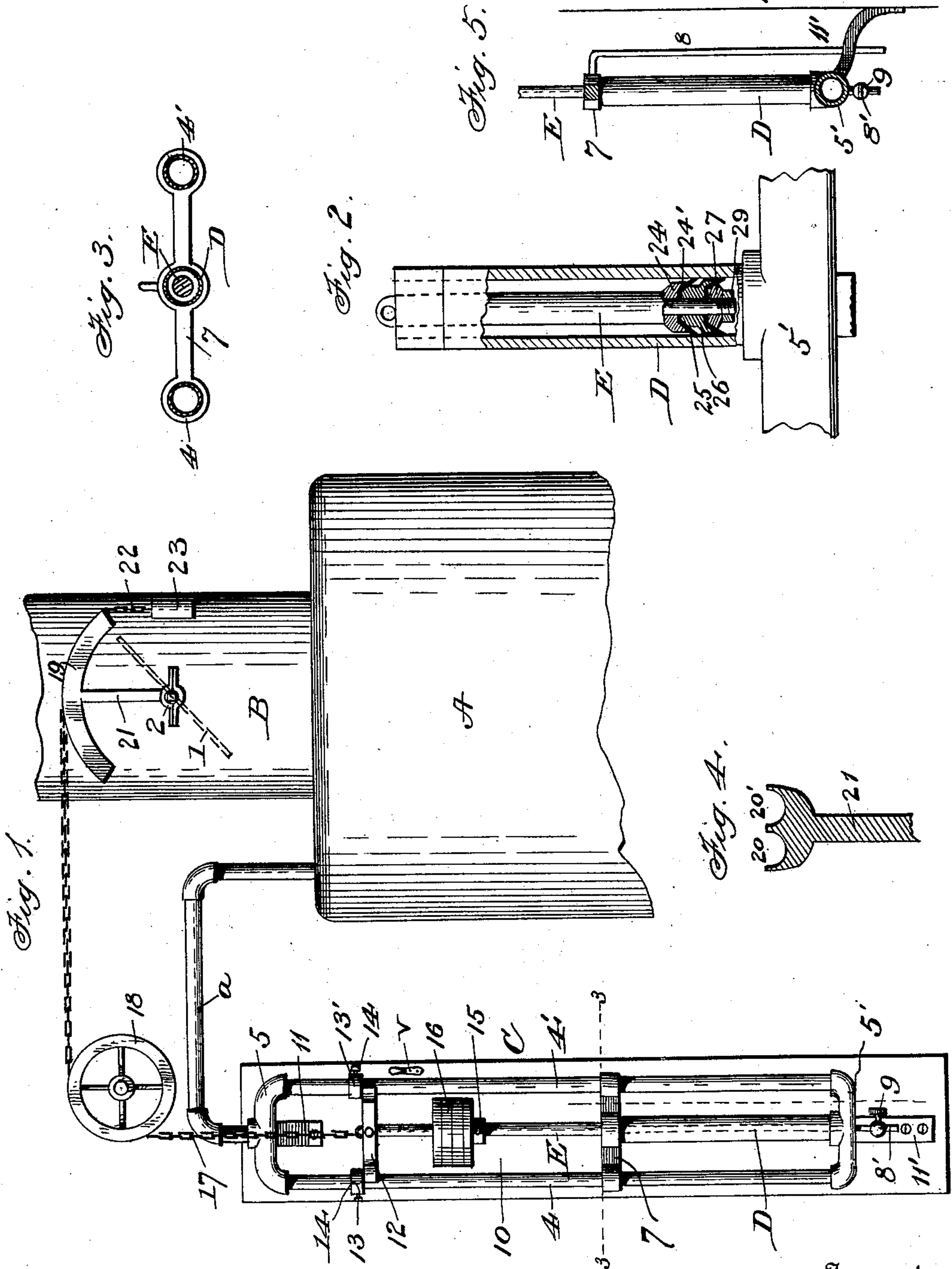


(No Model.)

C. C. KESTY.
DAMPER REGULATOR.

No. 591,554.

Patented Oct 12, 1897.



Witnesses
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DAMPER-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 591,554, dated October 12, 1897.

Application filed January 7, 1897. Serial No. 618,234. (No model.)

To all whom it may concern:

Be it known that I, CHARLES CLOTWORTHY KESTY, a citizen of the United States of America, residing at Northumberland, in the county of Northumberland, in the State of Pennsylvania, have invented a new and useful Damper-Regulator, of which the following is a specification.

My invention relates to improvements in damper-regulators of that class and construction denominated "fluid-pressure," wherein the damper is automatically operated to regulate the draft in a boiler-furnace by the action or pressure of steam in the boiler; and the object is to provide an improved device or apparatus of the kind named and for the purpose mentioned which is simple and durable in construction and certain and efficient in operation.

I accomplish the objects of the invention by the means illustrated in the accompanying drawings, wherein—

Figure 1 is a view in elevation of the complete apparatus, showing it as in operative connection to a boiler and damper. Fig. 2 is a vertical central sectional view through the pressure-cylinder, showing the piston arranged therein with the piston-head or valve. Fig. 3 is a transverse section through the steam-pipe frame and piston-cylinder, taken on the line 3 3 of Fig. 1. Fig. 4 is a detail side view of the rocking arm and grooved segment for carrying the chains or cables and operating the damper. Fig. 5 is a detail view of the cylinder, showing the drip-pipe.

Referring to the drawings, A designates a boiler, which may be of any of the approved makes and construction now in common use for the purpose of heating water, and provided with fire-boxes and combustion-chambers, (not here shown,) and B designates the furnace flue, pipe, or stack wherein the regulating-damper 1 is mounted. This damper 1 consists of a metal disk fitted to the stack and mounted to turn with and secured to a suitable journal 2, diametrically disposed in bearings formed in the shell of the stack or pipe.

C designates a rectangular frame of suitable metal pipes and constituting the frame of the device. This frame C is composed of metal tubes or steam-pipes 4 4', of requisite

dimensions and capacity, arranged parallel with each other, to the respective ends of which are suitably secured tubular cross-heads 5 5', communicating with the pipes 4 4', substantially as shown in the drawings. In the upper cross-head 5 is let a steam-pipe *a*, having its other end opening into the boiler. In the middle of the lower cross-head 5' is secured the lower end of a piston-cylinder D, reaching vertically to the desired height and having its upper end stayed against movement by a suitable cross-piece 7, embracing the upper end of the cylinder and having its ends preferably surrounding the steam-pipes 4 4', as shown. A small drip or escape pipe 8 has one end opening into the upper end of the cylinder and leads down a desired distance to discharge and carry off any water which may find its way into the cylinder above the piston-head during the operation of the device. This drip-pipe is preferably located behind the cylinder when the frame is mounted in position, as indicated in Fig. 5 of the drawings. In the lower cross-head 5' is inserted a short pipe 8', provided with a valve or turning-plug 9 for use in relieving the pipes of any surplus water that may accumulate in them.

The pipe-frame of the apparatus may be suitably secured to a supporting plate or board 10 by means of brackets 11 11', formed on or secured to the respective cross-heads of the pipe-frame, and the whole frame thus made portable and conveniently mounted for being secured to a vertical surface, as indicated in the drawings.

E designates the piston-rod, working in the cylinder D and having rigidly, but detachably, secured to its upper end a cross-rod 12, the ends of which slidably engage the parallel vertical members of the frame which serve as guides to direct the piston-rod in its movements. The stroke of the piston is limited and regulated by means of sleeves or collars 13 13' on the side pipes, the collars being fixed in the desired aligned position by means of set-screws 14 14. On the piston-rod is adjustably secured a collar 15, which supports one or more weights 16 to substantially balance the high pressure from the boiler and to carry the piston down when the pressure is reduced. The upper end of the piston-

rod projects above the guiding cross-bar 12, and is formed with an eye, to which is attached one end of the damper-chain 17, which is carried over a suitably-mounted grooved wheel 18, and from thence over a sector-sheave 19, and has its outer end secured to the outer end of the sector-sheave 19, as shown in the drawings. A hook *v* is secured to the frame at any proper point, so that when it is desired to have the damper remain stationary the chain is disconnected from the piston and connected to the hook. This is desirable when the boiler is not in use at night or it is desirable to carry a very low fire. The sector-sheave 19 consists of a sector-rim formed with two parallel grooves 20 20' in its face and a supporting-standard 21, suitably secured to the projecting end of the damper-journal, substantially as shown in the drawings.

To the inner end of the sector-rim, being the end opposite to that to which the chain 17 is secured, is fastened the end of a chain 22, which rests in the groove 20' of the sector, the said chain being arranged with its free end depending beyond the sector, and has a weight 23 hung thereto to draw the piston upward and turn the damper in the opposite direction to the movement effected by the downward movement of the piston through the action of the chain 17.

The lower end of the piston-rod is made of reduced diameter and is extended a sufficient distance to take on and carry the piston-head. This piston-head is composed of an upper disk 24, dished out or concaved, as at 24', in which is seated a suitable washer or packing-ring 25, the edge of which bears closely against the inner surface of the cylinder in the usual manner; a second element or disk 26, formed with a convex upper surface fitting the concave of the upper disk and pushing and holding the washer 25 in place and having its lower end or face concaved to receive the second packing-ring 27; a washer 28, formed with a convex upper surface to hold the packing-ring 27 in place, and a clamping-nut 29 on the threaded end of the extension of the piston-rod.

The piston-head is preferably made but one-sixteenth of an inch less in diameter than the cylinder, so that the packing-rings project one thirty-second of an inch. The middle section of the piston-head serves as a washer and clamp to hold the upper packing-ring in position, and it will readily be perceived that the upper disk 24 of the piston-head may be formed integral with the stem or piston-rod.

It will be perceived from the foregoing description, taken in connection with the drawings, that I have provided a practical and reliable automatically-operating damper de-

vice or apparatus which opens and closes the damper by the variable action of the steam-pressure from the boiler.

The operation may be stated as follows: The regulator is placed in proper position and the requisite connections made with the boiler and damper. The cylinder is then filled about half full of cold water and the piston inserted in the cylinder. The steam is then raised to the desired pressure and the damper closed. The chain 17 leading to the piston is now connected therewith with the piston raised to its upper limit of movement, and the piston-rod is now weighted until it slightly moves to open the damper. Now when the steam falls the pressure in the cylinder correspondingly decreases and the piston gradually descends, opening the damper through its connection thereto by the chain, thus increasing the draft in the furnace, the increased heat thus engendered eventuating in raising the steam-pressure again to the desired point, when the steam-pressure in the frame-pipes effects the movement of the piston upward and the weight on the sector moves the damper to close the draft, and thus gradually close the draft again.

Having thus described the invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a boiler and a furnace, of a fluid-pressure damper-regulator, comprising an angular steam-pipe frame, a pipe connection therefrom to the boiler, a pressure-cylinder secured to and opening into the lower end of the steam-pipe frame, a piston in the cylinder, a guide cross-bar on the upper end of the piston having its ends slidably engaging the side pieces of the frame, a damper journaled in the furnace-flue, a grooved pulley, a chain over the said pulley and operatively connected to the piston and the damper and a counterbalance-weight on the damper.

2. In a fluid-pressure damper-regulator, the steam-pipe frame herein described, comprising parallel steam side pipes, tubular cross-heads connecting said side pipes at top and bottom, a piston-cylinder extending vertically from the lower cross-head, a piston in the vertical cylinder, a guide cross-rod on the upper end of the piston having its ends slidably engaging the parallel side pipes, and a steam-pipe secured to the upper cross-head.

In witness whereof I have hereto set my hand in the presence of two attesting witnesses.

CHARLES CLOTWORTHY KESTY.

Attest:

PIERCY LITTLE,
J. SIMPSON KLINE.