

No. 713,967.

Patented Nov. 18, 1902.

P. L. CROWE.

MEANS FOR RAISING OR LOWERING GRATES.

(Application filed Aug. 29, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

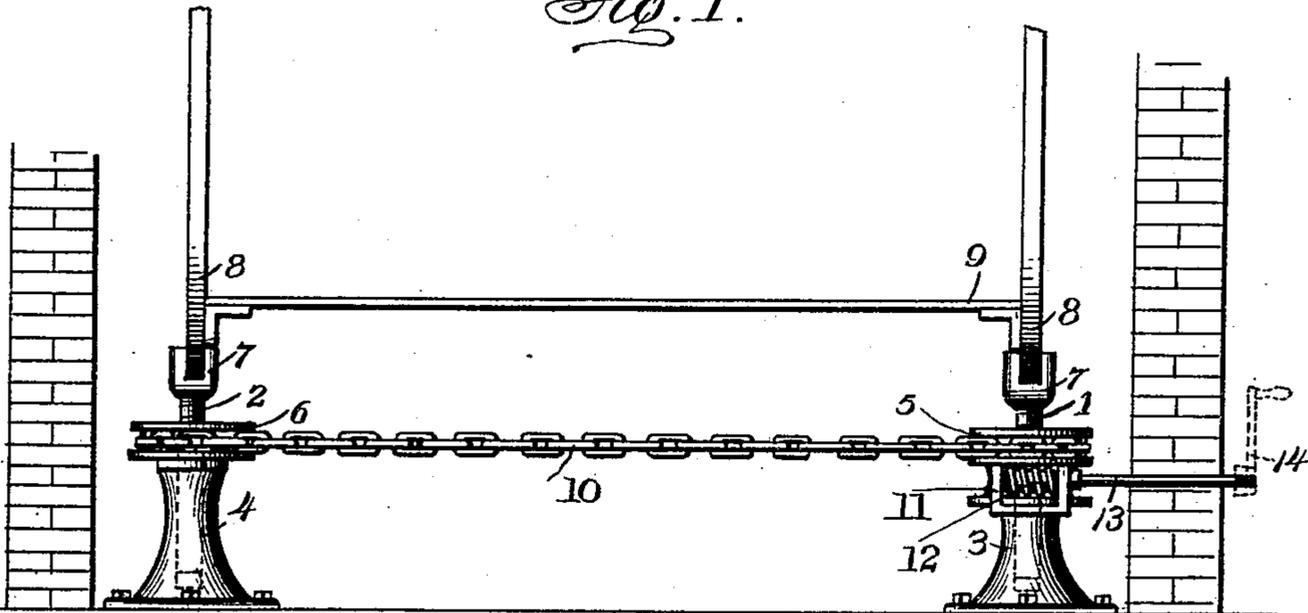
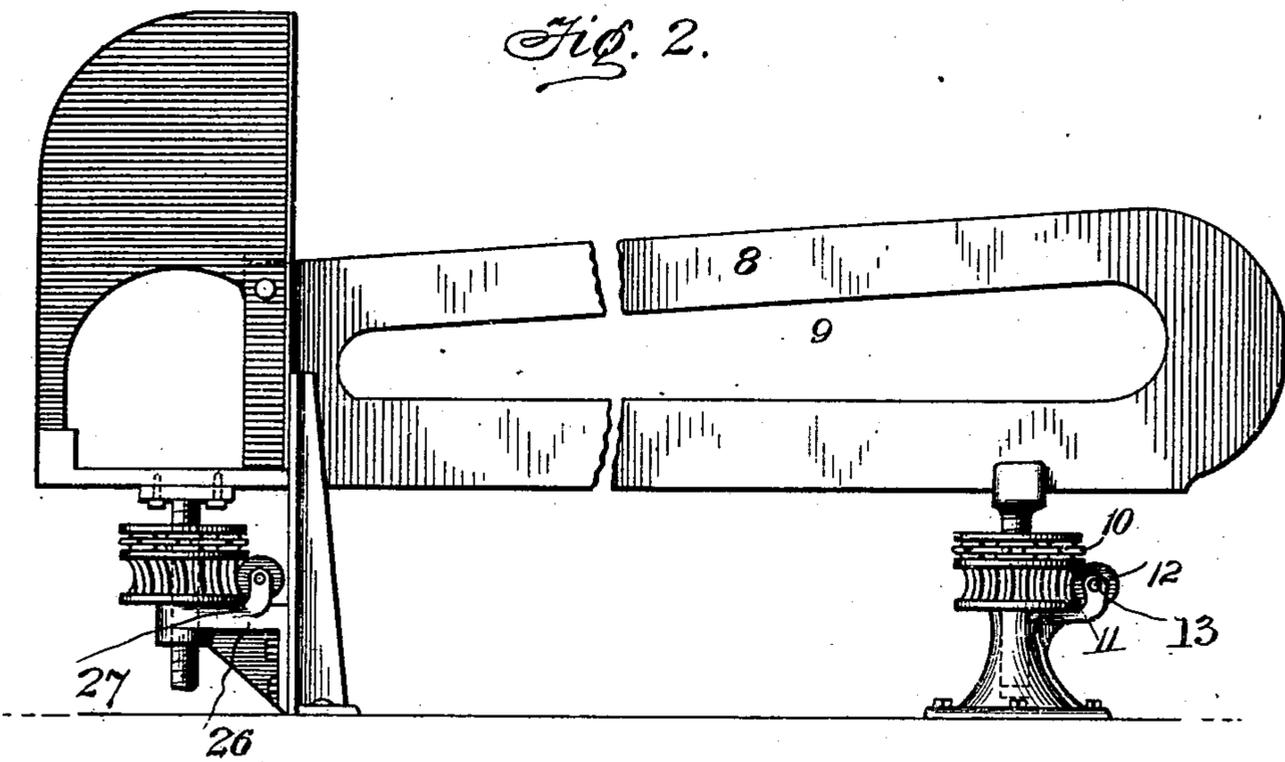


Fig. 2.



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2 Sheets—Sheet 2.

Fig. 3.

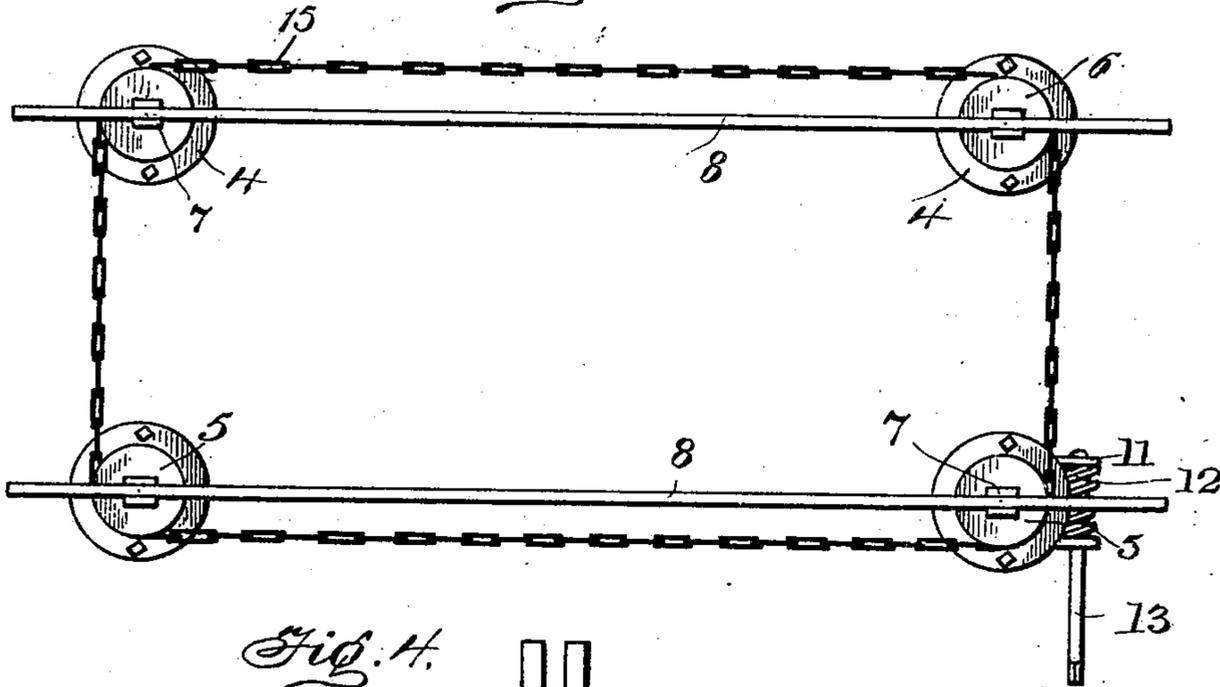


Fig. 4.

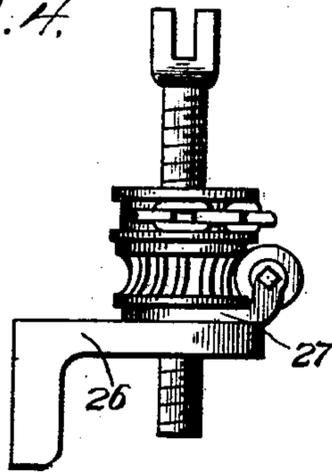
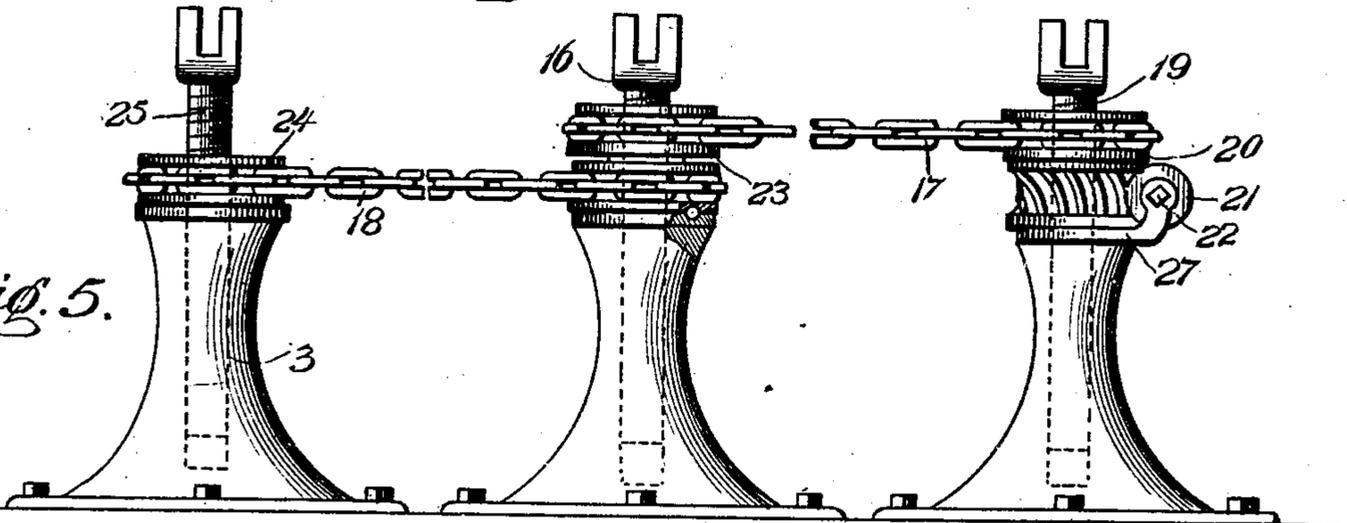


Fig. 5.



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UNITED STATES PATENT OFFICE.

PAUL L. CROWE, OF DULUTH, MINNESOTA.

MEANS FOR RAISING OR LOWERING GRATES.

SPECIFICATION forming part of Letters Patent No. 713,967, dated November 18, 1902.

Application filed August 29, 1900. Serial No. 28,412. (No model.)

To all whom it may concern:

Be it known that I, PAUL L. CROWE, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Means for Raising and Lowering Grates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in means for raising and lowering various articles, and particularly to mechanism for raising and lowering grates or grate-frames in furnaces.

In the accompanying drawings, Figure 1 represents an end elevation of a grate-frame having my improved lifting or depressing means arranged beneath the same. Fig. 2 represents a side elevation of the same. Fig. 3 represents a top plan view of a series of lifting-jacks for raising or lowering a grate-frame. Fig. 4 represents a detail view of a jack mounted upon a bracket instead of upon a pedestal or standard; and Fig. 5 represents a series of lifting-jacks, showing the manner of connecting up an intermediate jack with the end jack.

This invention is designed for raising and lowering various articles or devices, and is particularly useful in the raising of grates or frames therefor when movable grate-frames are employed in furnaces for carrying the grates.

The invention comprises the use of one or more jack-screws, as 1 2. The screws are preferably mounted on standards or suitable pedestals, as 3 4. The pedestals are preferably hollow to accommodate the jack-screws and are adapted to receive and support upon their upper ends horizontally-arranged gear-wheels, as 5 6. The upper ends of the jack-screws are formed to accommodate the particular article which it is to raise. For the sake of illustration I have shown the heads 7 7 of the jack-screws as bifurcated, so as to receive the lower edges of the side pieces 8 8 of the grate-frame 9. The resting of the article to be lifted upon the said screws will serve to prevent the screws from rotating, as will be seen by the description of the means em-

ployed for raising or lowering the screws. Each of the jack-screws may be supplied, if desired, with a separate means independent of the others for raising or lowering the said jack-screws. This would necessitate, however, the operating of each of the said screws separately and would make it possible to adjust all of the screws to different heights, if desired. When using my invention, however, for lifting the frame of a grate within a furnace, I generally arrange the jack-screws so that two or more of them may be operated simultaneously. With this end in view one of the jack-screws, as 1, is provided upon its pedestal 3 with a combined worm-gear and sprocket-wheel 5, as clearly seen in Figs. 1, 2, and 5 of the drawings. The sprocket portion of the wheel 5 is adapted to engage an ordinary sprocket or chain, as 10, used to connect the same with the sprocket-wheel 6, mounted upon the pedestal 4 beneath the other side of the grate-frame. In order to rotate the wheel 5, I form a bracket, as 11, upon the pedestal or standard 3, which is provided with an upwardly-extending bifurcated portion adapted to receive an actuating-worm 12, which is arranged to mesh with the teeth of the worm portion of the said wheel 5. The worm 12 is carried by a shaft 13, which finds suitable bearings in the bracket 11. The shaft 13 is made of sufficient length to extend through the wall of the furnace, where it may be easily reached and may be rotated by applying a handle 14 of ordinary construction to the squared end thereof. By rotating the shaft 13 a rotary motion may be imparted to the combined worm and sprocket-wheel 5 through the agency of the worm 12. Both the wheels 5 and 6 are internally threaded, the said internal threads being adapted to engage the threads upon the lifting-jacks 1 and 2. By this construction when the wheels 5 and 6 are rotated through the agency of the gearing just described and the sprocket-chain 10 the jack-screws will be simultaneously raised or lowered, according to the direction in which the said gearing is operated. The pedestals or standards 3 and 4 will operate to hold the jack-screws in proper position and to support their weight through the agency of the actuating-wheels 5 and 6. If desired, anti-friction-bearings may be interposed between the

upper supporting-surfaces of the said standards or pedestals and the rotating actuating-wheels 5 and 6. When connecting the jack-screws upon the opposite sides of the furnace-frame in this manner, it is necessary to place a pair of jack-screws beneath each end of the furnace-frame, as clearly seen in Fig. 2 of the drawings. In raising the frame thus mounted the shafts 13 are operated either at the same time or separately for giving the desired elevation to each end of the grate-frame. By having them arranged in pairs under each end of the grate-frame one end of the said frame may be arranged in a higher or a lower plane than the other end, as may be desired. This arrangement will be found of special value and utility in supporting grate-frames which carry chain-grates, as it is found necessary to adjust such grates to different heights with respect to the bridge-wall of the furnace in which they are employed. It may, however, be desirable to so connect the jack-screws that all of them may be operated simultaneously, in which case a connecting sprocket-chain, as 15, may be extended around all of the sprocket-wheels which engage the jack-screws, as seen in Fig. 3 in the drawings. In this case it is only necessary to employ one combined worm-gear and sprocket-wheel 5, with its actuating worm and shaft, as illustrated in said Fig. 3. By the operation of one shaft in this construction all of the jack-screws may be raised or lowered simultaneously.

It is sometimes necessary when the frame or other object to be raised or lowered is quite long or exceedingly heavy to employ intermediate jacks to assist in raising the said object. In this instance, as seen in Fig. 5 of the drawings, I may connect the intermediate jack, as 16, with the other jacks by means of separate sprocket-chains, as 17 and 18. The chain 17 connects the intermediate jack 16 with a jack 19, to which an actuating mechanism is applied. The jack 19 is therefore engaged by a combined worm and sprocket-wheel, as 20, which may be operated by the worm 21 and shaft 22, similar to the worm 12 and shaft 13 heretofore described. In this construction also the jack 16 is preferably provided with a double sprocket-wheel, as 23, one preferably being arranged above the other and the combined sprocket-wheels being internally threaded to engage the threads of the jack 16. The sprocket-chain 18 connects the combined sprocket-wheel 23 with a sprocket-wheel 24, which engages a threaded

jack 25. Each of the sprocket-wheels is supported, as above described, upon a suitable standard or pedestal. By this construction and arrangement the actuation of the jack 19 to raise and lower it will at the same time cause the actuation of the jacks 16 and 25 to raise and lower them in a corresponding manner.

As seen in Fig. 4 of the drawings, instead of employing a standard or pedestal, as heretofore described, which is adapted to rest upon a floor or the ground I may employ a bracket, as 26, which may be bolted or otherwise secured to a wall or other support, all within the scope of the present invention. The bracket 26 will support the jack and actuating-gearing in the same manner as heretofore described with respect to the pedestal or standard. As seen in Figs. 4 and 5, the brackets which support the actuating-worms need not be made integral with the standards or brackets, but may be formed separate therefrom, as at 27. The brackets thus formed are provided with central apertures to engage jack-screws, so that they will be held in place upon the pedestals or supporting-brackets.

It will be evident that brackets thus formed will be capable of holding the worms in engagement with the worm-wheels in the same manner as brackets formed integral with the pedestals.

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

An adjustable grate-supporting mechanism, comprising a grate-frame, a series of jack-screws having bifurcated heads for supporting the grate-frame and being prevented thereby from turning, a series of flanged sprocket-wheels engaging the said jack-screws, sprocket-chains engaging the teeth of the sprocket-wheels between the said flanges, the flanges preventing the said chains from dropping out of engagement with the teeth of the sprocket-wheels, gear-toothed extensions upon some of said sprocket-wheels for turning them, worm-gears engaging said gear-toothed portions to actuate the sprocket-wheels and turn them for raising and lowering the jack-screws, and means for supporting the said sprocket-wheels, substantially as described.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

PAUL L. CROWE.

Witnesses:

JAMES T. WATSON,
WILLIE MCKAY.