

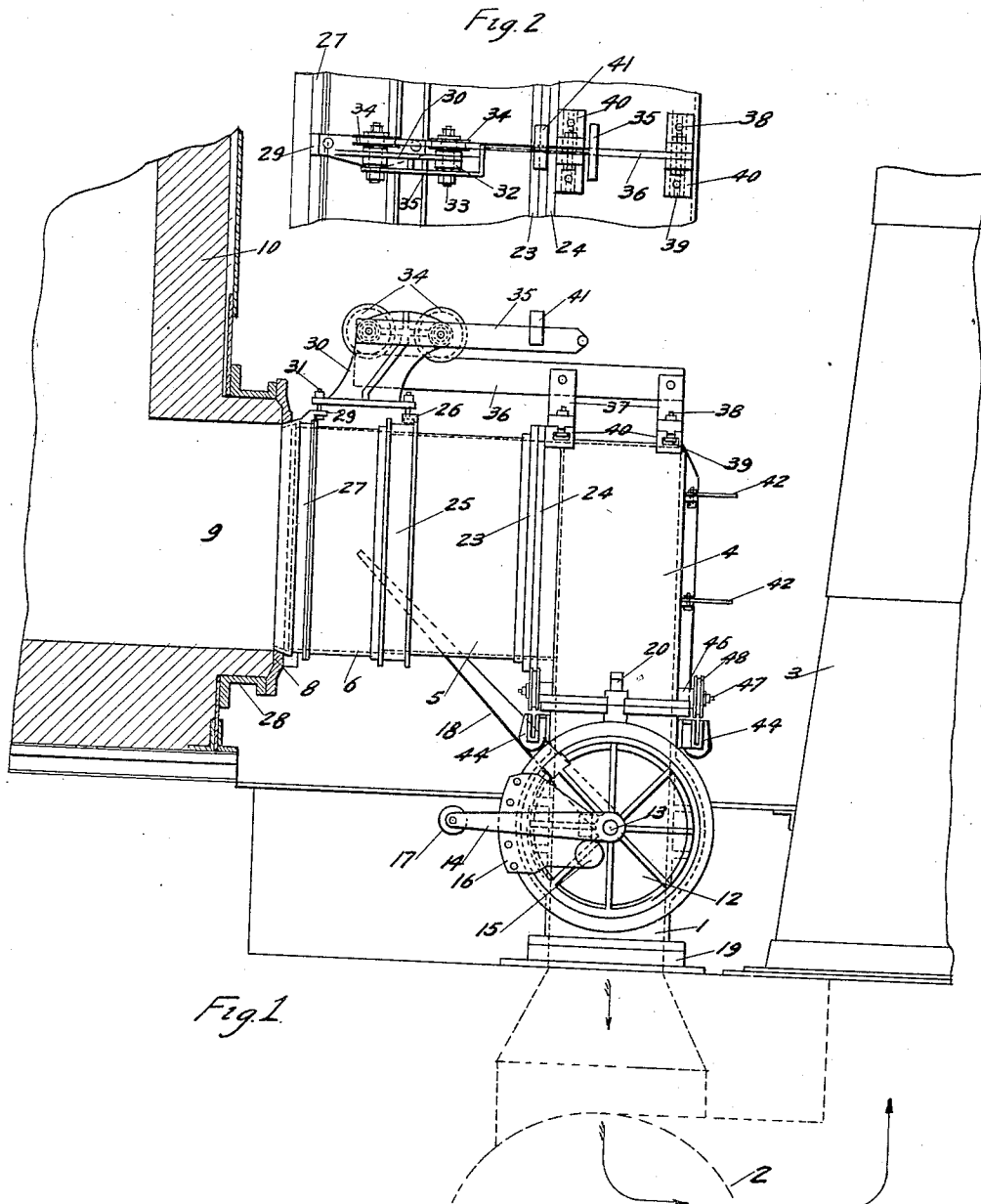
K. LANDGREBE & M. W. JOHNSON, JR.
CHIMNEY VALVE FOR BLAST FURNACE STOVES.

APPLICATION FILED JUNE 27, 1912.

1,056,106.

Patented Mar. 18, 1913.

3 SHEETS—SHEET 1.



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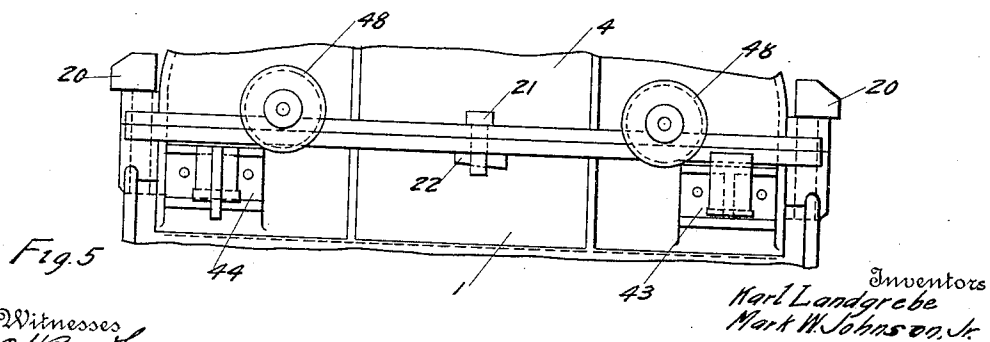
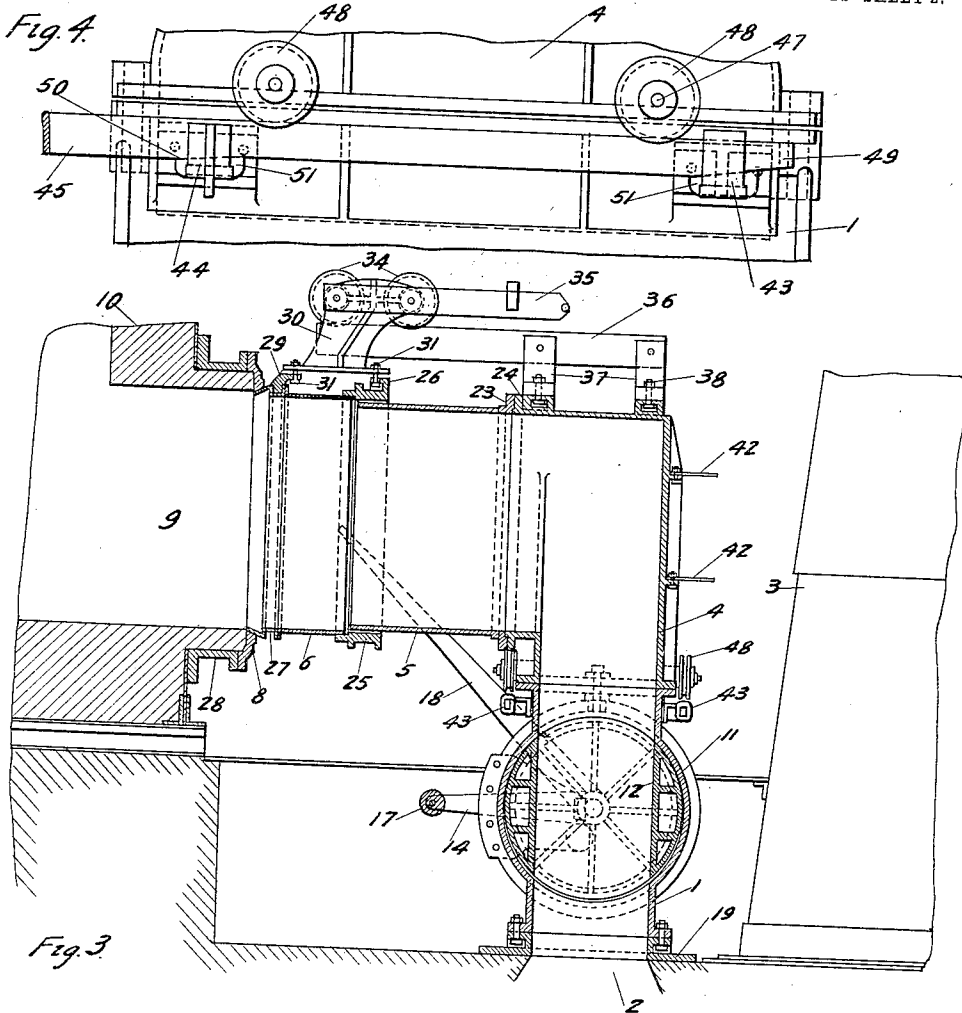
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3 SHEETS—SHEET 2.



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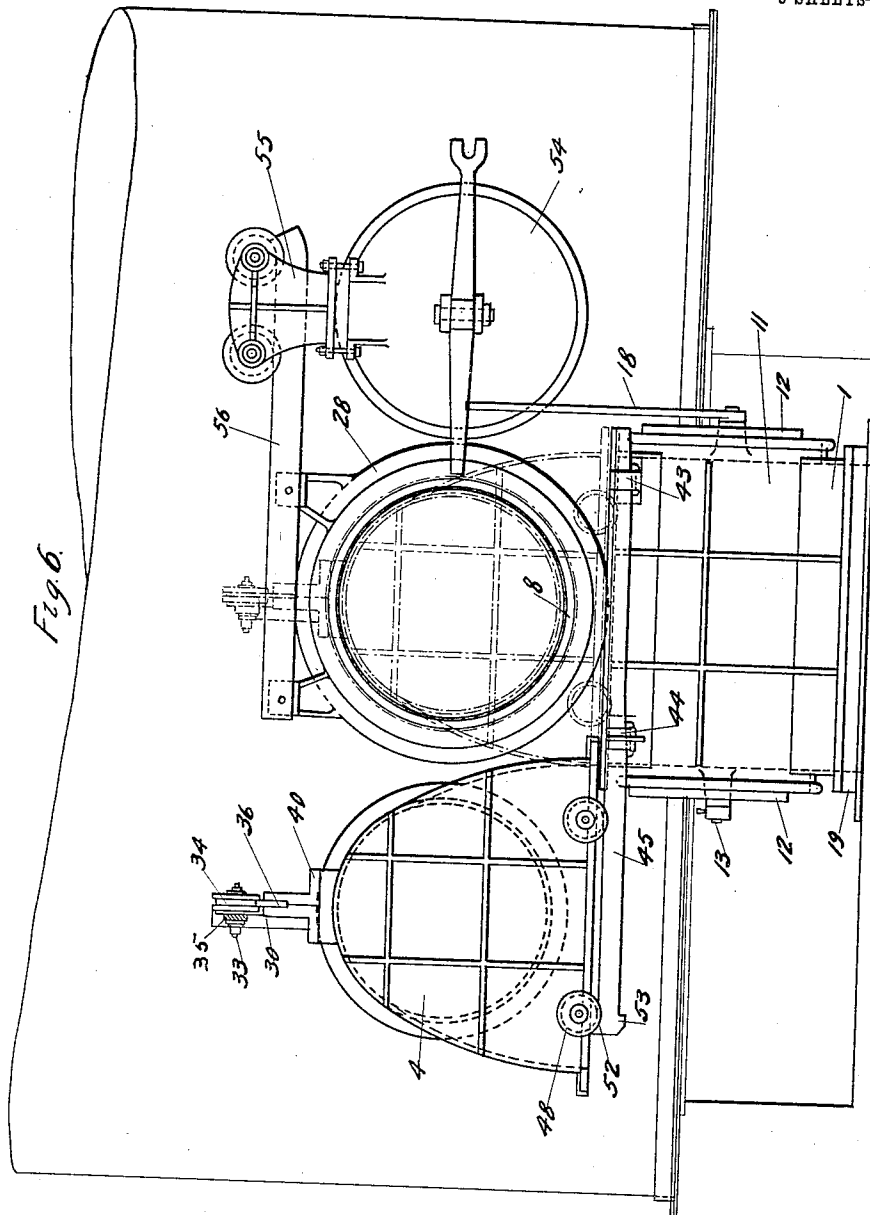
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3 SHEETS-SHEET 3.



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UNITED STATES PATENT OFFICE.

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CHIMNEY-VALVE FOR BLAST-FURNACE STOVES.

1,056,106.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed June 27, 1912. Serial No. 706,243.

To all whom it may concern:

Be it known that we, KARL LANDGREBE and MARK W. JOHNSON, Jr., citizens of the United States of America, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Chimney-Valves for Blast-Furnace Stoves, of which the following is a specification.

Our invention relates to certain improvements for chimney valves which are more particularly designed for use in connection with the gas mains that connect the stoves of a blast furnace installation with the stack. As at present designed these chimney valves are exceedingly heavy, cumbersome and expensive, being difficult to handle and subject to frequent and expensive repairs. The tendency now is to continually increase the size of the valve which will naturally increase the objections to the present constructions.

The object of our invention is to produce a chimney valve which can be quickly and easily handled, and the repairs on which will be comparatively small.

A further object is to provide the valve casing with an elbow having an adjustable extension which is relatively light and can be easily moved to connect with or be disconnected from the stove port, thus avoiding any adjusting or handling of the valve itself or its casing in connection with the opening or closing of the valve.

A still further object is to make the elbow detachable from the valve casing which supports it and providing means whereby the elbow and all parts which would interfere with free access to the stove port may be easily shifted laterally sufficiently to enable the stove to be cleaned or repaired and without making it necessary to move the valve casing.

Our invention possesses many other advantages in design, construction and operation, which are hereinafter more particularly set out, and comprises the details of construction and arrangement of parts which are fully described and claimed in the accompanying specification.

In the drawings, in which the preferred embodiment of our invention is described, Figure 1 is a side elevation of our improved chimney valve showing the inlet port of the stove in cross section. Fig. 2 is a detail plan view of the trolley hanger for the adjustable

sleeve on the elbow extension. Fig. 3 is a vertical sectional view through Fig. 1, and Figs. 4 and 5 are detail views, the former showing the elbow mounted on the detachable rails on which it may be rolled away from the stove port, and the latter view showing the rails removed and the elbow resting on and connected to the valve casing, which is its position when in use. Fig. 6 is an end elevation showing the elbow in full lines as shifted away from the stove port and resting on its supporting rails.

Similar reference numerals refer to similar parts throughout the drawings.

The valve casing 1 has a bottom port which connects with the gas main 2 leading to the furnace stack 3. The top port of the casing connects with an elbow 4 having an extension 5 upon which is slidably mounted a sleeve 6. A tapering collar 7 is mounted on the outer end of the sleeve and adapted to make a close fit in the tapered seat 8 of the port 9 in the stove 10. The vertically disposed valve casing 1 has a central horizontally disposed circular valve chamber 11 in which is disposed a rotary cylindrical one way valve 12 having trunnions 13 which are journaled in the inner ends of two bars 14, the inner ends of which rest on fulcrum pins 15 carried by plates 16 which are bolted to each end of chamber 11. These bars 14, are connected to a counterbalance weight 17 which supports the valve in contact with the upper ported portion of its chamber. An arm 18 for operating the valve is connected to one of the trunnions 13. The valve construction, thus described, forms the subject matter of Letters Patent No. 1,024,785, issued to Mark W. Johnson, Jr., on the 30th day of April, 1912, and is peculiarly adapted to enable the large and heavy valve, such as is required for chimney valves, to be handled easily and yet to make an effective seal.

The flanges at the lower end of the casing 1 are connected by bolts to a base plate 19. The flanges at the upper end of the casing are adapted to receive and support the bottom flanges of the elbow 4 and the end flanges of casing and elbow are normally connected by means of heavy dowel pins which are driven through alining openings therein. The front flanges are also adapted to be connected by a key bolt 21 slotted at its lower end to receive a wedge key 22. The elbow 4 is preferably formed of a single casting and both the valve casing 1 and elbow 4

have reinforcing external ribs. The extension 5 of the elbow is preferably formed as a separate casting therefrom to cheapen repairs and has an end flange 23 which is faced off and adapted to make a tight joint with the flange 24 of the elbow to which it is bolted. The outer cylindrical surface of the extension 5 is finished smooth so that the sleeve 6 will slide easily thereon with a close clearance. This sleeve comprises a heavy back collar 25 formed by a cylindrical casting having at its top, when in operating position, a slotted overhanging lug 26. The forward end of the collar is turned inwardly to receive the midportion of the sleeve which is made of thin steel plate having at its outer end an outturned flange which is riveted to a front collar 27. This collar 27 is preferably a thin steel casting with its outer end drawn in on a taper to make a snug fit with the beveled stove port seat 8 which is formed by a metallic ring collar bolted to the door frame 28. The front collar 27 is provided with an overhanging lug 29 having a slot therein which faces the slot in lug 26 and is disposed opposite to and in alignment therewith. The sleeve as a whole is supported by a trolley which comprises a hanger 30 through the base of which are inserted bolts 31 which engage in the slots in the sleeve lugs 26 and 29. The hanger, at its upper end, has bosses 32 through which bearing pins 33 pass and project on both sides, being adapted, on one side, to receive the trolley wheels 34 and, on the other side, to pass through the forward end of a handle bar 35. Nuts at each end of the bearing pins, which are threaded, hold the parts therein in assembled position and, if desired, any suitable roller bearings may be interposed to reduce the friction of the wheels 34. These trolley wheels run on a track formed by a bar 36 supported by brackets 37, which are adjustably connected by bolts 38 to top lugs 39 on the elbow 4. These lugs each have a transverse inverted T-slot, which slots receive the lower heads of the bolts 38 and permit the brackets 37 to be adjusted laterally and bring the bar 36 into proper position over the sleeve 6. The handle 35 has a counterbalance weight 41 adjustably mounted thereon for the purpose of distributing the weight uniformly on the trolley. Steps 42 are bolted to the ribs on the rear face of the elbow and furnish a means to enable the operator to mount the chimney valve and move the sleeve 6.

In order to give access to the stove port 9 for the purpose of cleaning out or repairing the stove and to avoid the expense and difficulty of moving the entire chimney valve, we have designed a special means for shifting the elbow and the parts carried thereby out of alignment with the port without disturbing the valve casing.

Referring more particularly to Figs. 4, 5 and 6, it will be noted that the upper end of the front and rear walls of valve casing 1 are provided, at one side, with a pair of steel cast lugs 43 and, at the other side, with a pair of steel cast lugs 44. These lugs are rigidly bolted to the casing and are each provided with alining slots which extend through the lugs from side to side; the slot in each casting 43 is closed overhead, as seen in Fig. 3, while the slot in each casting 44 is left open overhead, as shown in Fig. 1. This manner of designing the slots will facilitate the insertion of rails 45 into the slots. The elbow 4 at the four bottom corners of its front and rear sides is provided with bosses 46 which receive bearing pins 47 upon which flanged wheels 48 are journaled, suitable roller bearings being used for the wheels if desired. These wheels stand above and in line with the slots in the castings 43 and 44 and slightly above the top edge of the rails 45, when the latter are first inserted in position in the lugs. It will be noted from Fig. 4, that the forward end 49 of each rail is tapered and that the rails are likewise tapered at an intermediate point 50 which comes opposite to and above the castings 44. Gibs 51, having each an upper tapered surface, are adapted to be inserted in the slots in the castings 43 and 44. When the rails are first inserted in the castings, the tapered surfaces 49 and 50 will rest on the tapered faces of the gibs so that, when the rails are driven in to a tight fit in the castings, the rails will be gradually raised until they first engage the wheels 48 and then raise the latter and with them the elbow which will have been previously disconnected from the valve casing by the removal of bolt 21 and pins 20. The outer ends of the rails 45 are enlarged to form stops 52 and also have underhanging gib heads 53 to enable them to be driven out of the castings on the valve casing.

In operation, when the parts are in the position shown in Figs. 1 and 3, the chimney valve door 54 will be shifted to the right, its trolley hanger 55 moving on track 56 which is suitably connected to the stove. The valve 12 will then directly control the flow of gas from the stove to the stack, the sleeve 6 having been thrust forward until its front collar 27 makes a tight fit with the seat 8 of the port. When it is desired to close the valve, the handle 18 is thrown to the right and the valve will swing freely on its floating bearings and close the port through the valve casing. The operator can now mount the steps 42 and, by means of the handle 35, can easily and quickly draw the sleeve 6 on its trolley supports away from the port 9 so that the door 54 may be moved to close the stove port. The sleeve will slide freely on the elbow extension 5 and it will be noted that no part of the elbow 4, extension 5, or

valve casing 1 require moving. The sleeve is comparatively light and, being well balanced on its trolley supports, can be moved with great ease to connect the elbow extension 5 with the port 9 or to disconnect it therefrom. If conditions require the cleaning out or repairing of the stove, free access to the port 9 is necessary and this we accomplish by removing dowel pins 20 and key bolt 21 and driving in the rails 45 until they are forced by the co-acting wedge surfaces to engage the wheels 48 and raise the elbow until the latter and all parts connected therewith are supported solely by said wheels on the rails 45. When this is the case (see Fig. 4), the flanges on the elbow and on the valve casing are out of contact and the elbow may then be moved to the left, as shown in Fig. 6, its anti-friction roller supports making it possible to do this easily, quickly and with but little power. After the repairs have been completed, the elbow is rolled back into position opposite the port 9 and the rails 45 are driven out, thereby gradually lowering the elbow until it is supported by its flanges on the valve casing and in position to be connected therewith by the dowel pins and key bolt in the manner described.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In a chimney valve, a stationary valve casing comprising a valve and its operating means, an elbow detachably mounted on said casing and disposed opposite the stove port, and a laterally disposed track carried by said casing and adapted to receive said elbow when the latter is shifted bodily on said casing to expose said port, substantially as described.

2. A chimney valve comprising an adjustable elbow normally disposed in front of a stove port, a stationary valve containing casing which supports said elbow, lateral and detachable supports carried by said casing, and means to shift the elbow bodily onto said supports to move it from position in front of said stove port, as and for the purposes described.

3. A chimney valve comprising a valve containing casing mounted stationarily in front of the stove port, an elbow detachably mounted on said casing and disposed opposite the said port, and means to shift the whole elbow laterally on said casing to fully expose said port, said means comprising rollers and detachable track sections, substantially as described.

4. In a chimney valve, a valve casing, an elbow detachably mounted thereon, rollers journaled on the elbow, track rails detachably mounted on the casing, and means to raise the rails until they engage said rollers and support the elbow thereby free of said casing, substantially as described.

5. In a chimney valve, a valve casing, an elbow detachably mounted thereon, slotted lugs carried by the casing, track rails arranged to be inserted in the slots in said lugs and be supported by the lugs to form a laterally disposed track, means to transfer the weight of said elbow to said track rails, and rollers to support the elbow on said rails, substantially as described.

6. In a chimney valve, a valve casing, a pair of lugs on each side of the top thereof having alining slots, the slots in the lugs at one side being open at the top and at the other side being closed, track rails having tapered ends which fit in the closed slots and tapered intermediate portions which enter the open slots, an elbow mounted on and normally supported by the valve casing, and rollers on the elbow which are arranged to be engaged by the rails, as the latter are raised by the forcing of their wedged surfaces through the slotted lugs, substantially as described.

7. In a chimney valve, a valve casing, a pair of lugs on each side of the top thereof having alining slots, the slots in the lugs at one side being open at the top and at the other side being closed, gibs inserted in said slots and having tapered upper faces, track rails having tapered ends which fit in the closed slots and tapered sides which rest on the gibs of the open slots, an elbow mounted on and normally supported by the valve casing, and roller projections on the elbow which are arranged to be engaged by the rails as the latter are driven toward the lugs and raised by the coöperation of their wedge surfaces with the wedged surfaces of the gibs, substantially as described.

8. A chimney valve comprising a valve casing, an elbow mounted thereon, a sleeve slidably supported on the horizontal end of the elbow and arranged to project beyond same to connect it with a stove port, and trolley means to adjustably support said sleeve, substantially as described.

9. A chimney valve comprising a valve casing, a heavy metal elbow mounted thereon and having a short horizontal end spaced from the stove port, a light metal sleeve mounted with a slip fit on said horizontal end of the elbow and arranged to project beyond same to connect it with a stove port, trolley means to adjustably support said sleeve from the elbow, and a track on which said elbow is adapted to be shifted laterally, substantially as described.

10. In a chimney valve, an elbow, a sleeve extension arranged to slip longitudinally over the horizontal end of the elbow, a trolley hanger connected to the sleeve, and a laterally adjustable track for the trolley hanger mounted on the elbow, substantially as described.

11. The combination with the elbow of a

chimney valve, of a sleeve which slidingly fits over and is arranged to project beyond the horizontal end of said elbow, a hanger connected to the sleeve, rollers mounted in the hanger and disposed to the rear of the center of gravity, and rearwardly extending means connected to the hanger and arranged to counter-balance the weight of the sleeve and distribute same uniformly on said supporting rollers.

12. In a chimney valve, a valve casing, an elbow mounted thereon, a comparatively light adjustable sleeve which fits loosely over the horizontal end of the elbow, a trolley hanger connected to the sleeve, a track for the trolley, and a rearwardly extending handle connected to the hanger.

13. In a chimney valve, a valve casing, an elbow mounted thereon, a comparatively light sleeve which fits slidingly over the horizontal end of the elbow, a trolley hanger connected to the sleeve, a track for the trolley, a rearwardly extending handle connected to the hanger, and steps on the elbow, by means of which the said handle can be reached, substantially as described.

14. In a chimney valve mechanism, a stationary valve casing, an elbow detachably mounted on said casing, means on the casing for providing a laterally disposed track onto which said elbow may be shifted, and a light metal sleeve longitudinally adjust-

able on and arranged to extend beyond the horizontal end of the elbow, substantially as described.

15. A chimney valve comprising a stationary valve casing, an elbow formed by a main elbow body detachably connected to the top of the valve casing, and an elbow extension connected to said body, an extension sleeve which is mounted with a slip fit over said extension and is arranged to project beyond same, and means to adjust said sleeve, comprising a laterally adjustable track on the elbow and a trolley hanger mounted on the track and detachably connected to said sleeve, substantially as described.

16. In a chimney valve, the combination with a valve casing and the elbow, of a sleeve adjustably mounted on the elbow and comprising a heavy back collar, a relatively lighter front collar, an intermediate shell like body portion connecting said collars, and trolley supporting means for the sleeve which are connected to said collars, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

KARL LANDGREBE.
MARK W. JOHNSON, JR.

Witnesses:

NOMIE WELSH,
R. D. JOHNSTON.