# J. WOODRUFF.

## Damper for Furnaces.

No. 160,497 Patented March 2, 1875.

Fig: 3

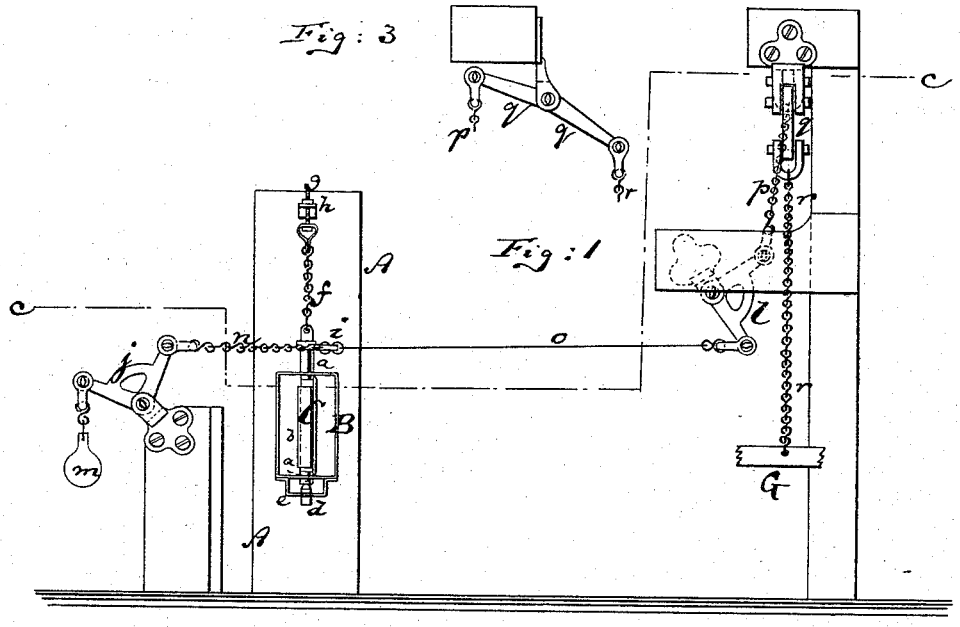
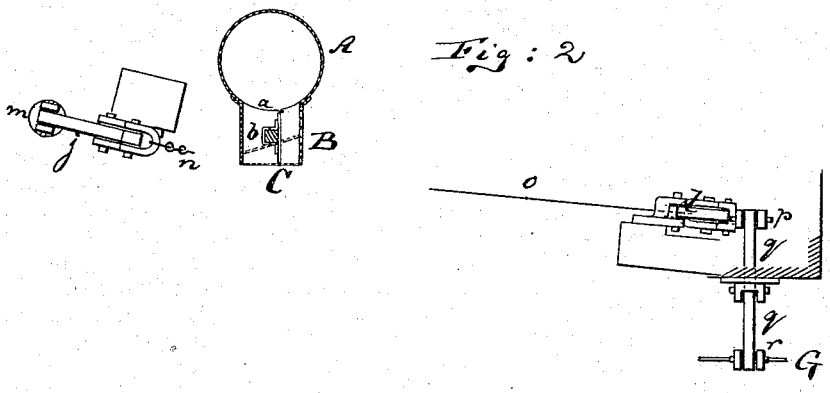



Fig: 1

Fig: 2




**Witnesses:**

A. Moraga
O. Weidner

**Inventor:**

J. Woodruff
by his attorney
A. v. Briesen

# UNITED STATES PATENT OFFICE.

JOSEPH WOODRUFF, OF RAHWAY, NEW JERSEY.

## IMPROVEMENT IN DAMPERS FOR FURNACES.

Specification forming part of Letters Patent No. **160,497**, dated March 2, 1875; application filed February 1, 1875.

CASE B.

*To all whom it may concern:*

Be it known that I, JOSEPH WOODRUFF, of Rahway, in the county of Union and State of New Jersey, have invented a new and Improved Damper for Furnaces, and mode of hanging the same, of which the following is a specification:

Figure 1 is a front elevation of a chimney, showing my improved damper and the mode of connecting the same. Fig. 2 is a horizontal section of the same on the line *c c*, Fig. 1. Fig. 3 is a detail front view of one of the transmitting links or levers used therein.

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

This invention relates to new arrangement of the parts that are connected with a vibrating damper, which is fitted on a vertical shaft; and consists, first, in suspending said damper from an adjustable chain, and resting the lower end of its pivot on a pointed step; and, secondly, in a novel combination of parts for operating said damper, all as hereinafter more fully described.

A represents the chimney, having a horizontal flue, B, in which the damper C is arranged. Said damper is mounted upon a vertical shaft or arbor, *a*, which it embraces by means of a strap, *b*, as indicated in Fig. 2, or to which it is attached by other suitable means. The lower end of the arbor *a* extends through the bottom of the flue B, and rests on a pointed step, *d*, which is secured in a band, *e*, that is attached to the lower part of the flue B, as shown in Fig. 1. The pointed end of the pin *d* enters a conical socket that is formed in the lower end of the arbor *a*, so that thus the arbor, in turning on the step, will create as little friction as possible. The upper part of the arbor *a* extends through a hole in the top of the flue B, and is, by means of a chain, *f*, connected with an adjustable screw, *g*, that is held in a stationary lug or support, *h*, said lug projecting either from the chimney A or from any other suitable stationary apparatus. The screw *g* is in line with the arbor *a*, as indicated, and serves, when turned, to slacken or stretch the chain *f*, and thereby to suspend the damper C, so that said damper in operation will barely rest on the step *d*, said step serving more as a guide for the lower part of the damper than as a support, though acting, also, as a support whenever the chain should, from any cause, become too slack and cease to suspend the damper. A projecting crank, *i*, on the arbor *a* connects with suitable apparatus for operating the damper. One such apparatus is shown to consist of two bell-cranks, *j* and *l*, applied in stationary frames at opposite sides of the damper, one bell-crank, *j*, being weighted at *m*, and connected by the chain *n* with the crank *i*, while a rod, *o*, connects the crank *i* with the other elbow *l*, the latter connecting, also, by the chain *p* with the lever or link *q*, Fig. 3, which, in turn, connects, by another chain, *r*, with the lever G of a suitable regulating apparatus. When the lever G is raised the weight *m* will preponderate and close the damper, but when the lever G, which is heavier in weight than the weight *m*, is lowered it will open the damper in the manner indicated in Fig. 1. It will be observed that the pivots of the lever *q* and bell-cranks *l j*, and also the pins at the ends of said lever and bell-cranks, where the connecting-chains take hold thereof, are made with knife-edges in the direction of the strain on each lever, as clearly indicated in Fig. 1, so that thus, also, the actuating mechanism will have as little friction in operating as possible.

I claim as my invention—

1. The damper C, mounted on the vertical arbor *a*, which rests partially on the step *d*, and is partially suspended by the chain *f*, substantially as and for the purpose described.

2. The adjustable screw *g*, fitted in a stationary lug, *h*, and combined with the chain *f*, and with the arbor *a* of the damper C, substantially as set forth.

3. The combination of the weighted bell-crank *j* with the arbor *a* of the damper C, and with the bell-crank *l*, link *q*, and operating-lever G, all arranged for operation, as specified.

JOSEPH WOODRUFF.

Witnesses:

E. C. WEBB,

F. V. BRIESEN.