

W. Hilton,

Band Pulley.

No. 110247.

Patented Dec. 20, 1870.

Fig. 1.

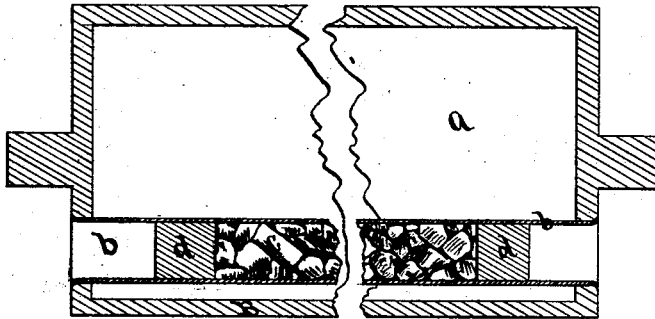


Fig. 2.

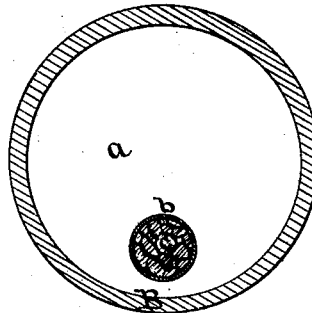


Fig. 3.

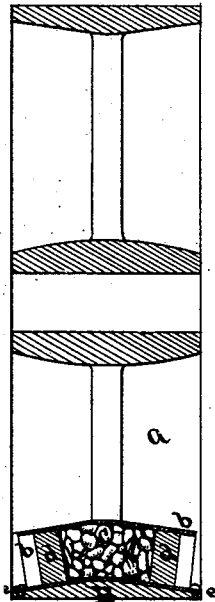
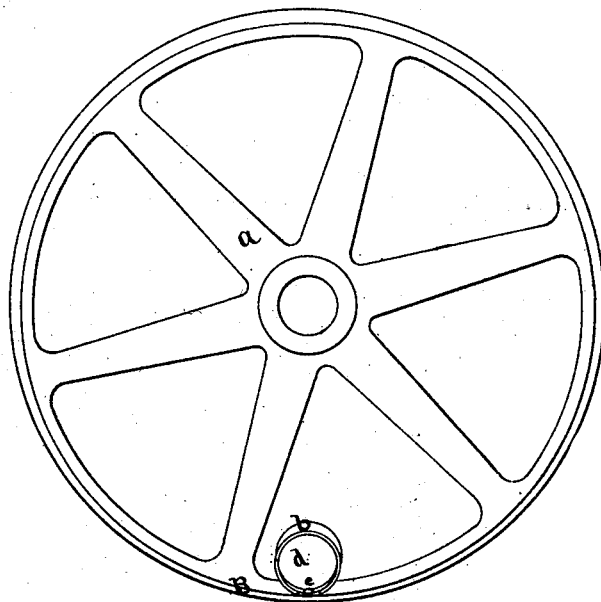


Fig. 4.



Witnesses.  
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WILLIAM KITSON, OF LOWELL, MASSACHUSETTS.

Letters Patent No. 110,247, dated December 20, 1870.

## IMPROVEMENT IN THE MODES OF BALANCING CYLINDERS, PULLEYS, &c.

The Schedule referred to in these Letters Patent and making part of the same.

### To all whom it may concern :

Be it known that I, WILLIAM KITSON, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Balancing Cylinders, Pulleys, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 represents a longitudinal sectional elevation of a cylinder having my improvement applied thereto.

Figure 2 is a transverse section of fig. 1.

Figure 3 is a sectional elevation of a pulley or cylinder having no heads or ends;

Figure 4, an end elevation of the same;

Each of the two latter figures showing my improvement applied.

This invention relates to the method, mode, or means of balancing cylinders or other rotary movers which revolve at a high velocity, and which require to be evenly balanced to prevent their throwing or shaking connected parts or surrounding objects in the apartment where they are operated; also, to prevent unevenly wearing their bearings or journal-boxes, and the liability of their bursting or breaking when revolving at a high velocity.

This invention consists of a balancing tube, *b*, provided with plugs or stopples *d*, and applied to a cylinder or a pulley, whereby sufficient balancing material, *c*, may be placed within the tube and secured by the plugs, all as clearly shown in the drawing.

When applied to a cylinder having two heads or ends, the tube is inserted in holes made through the latter in close proximity with a shell or cylindrical portion *B*, and the ends of the tube secured by staking or riveting, or otherwise, first finding the lightest side of the cylinder by suspending it on centers or on straight edges, in the usual way, thereby applying the tube at or near such light side of the cylinder, and while on the centers or on the straight edges, inserting the balancing material *c* until the cylinder is evenly balanced or until it will turn on the straight edges one way as well as in another, or rather until it will remain at rest in any position with its bearing on the straight edges.

It sometimes happens that cylinders require balancing in two or more places; in such cases I insert two or more tubes and apply the balancing material in

each sufficient to overcome the weight on opposite sides of the cylinder.

In balancing pulleys or cylinders having no heads or ends, I generally secure the tube to the rim or shell *B* by screws *e* inserted through ears projecting from the ends of the tube or through the sides of the latter into the shell *B*, as clearly shown in figs. 3 and 4.

Centrifugal action of the revolving pulley or cylinder has a tendency to press the tube against the inner side of the rim or shell; consequently two screws will generally hold the tube firmly in position, but other fastenings may be inserted or applied if found necessary.

The tube *b* shown in fig. 1 should properly be set close to the rim or shell *B* of the cylinder, leaving no space between them.

Sectional cylinders or those having their shells or circumferential surfaces formed of lags, bars, or blades with wide or narrow spaces between them, may be readily balanced by using my improvement and applying the same to the inner surfaces or the inner peripheries of such bars, lags, or blades, or through broad flanged heads or ends which hold the latter in position, and the balancing material placed within the tube and secured, as clearly shown and described.

I contemplate that, in balancing some kinds of cylinders or pulleys or other rotary movers, the metal tube alone will be sufficient to balance the instrument without the material *c* being applied within the tube, or requiring little or no such balancing material.

I therefore wish it distinctly understood that I do not rely wholly upon the balancing material *c* when it is not required, and when the weight of the tube proves to be sufficient to balance the cylinder, I consider the balancing material included in such tube.

The balancing material may be pieces of lead, stone, or other article of specific gravity commonly used for balancing purposes.

I claim as my invention—

A balancing tube, *b*, provided with plugs or stopples *d*, and applied to the cylinder or pulley, as shown and described, whereby such cylinder or pulley may be balanced by the tube *b* or by additional balancing material *c*, in the manner and for the purpose specified.

Witnesses:

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JOHN E. CRANE,

EDWIN O. THURSTON.