R. D. NAPIER.

Machinery Brake.

No. 93,469. Patented Aug. 10, 1869.

Fig. 1

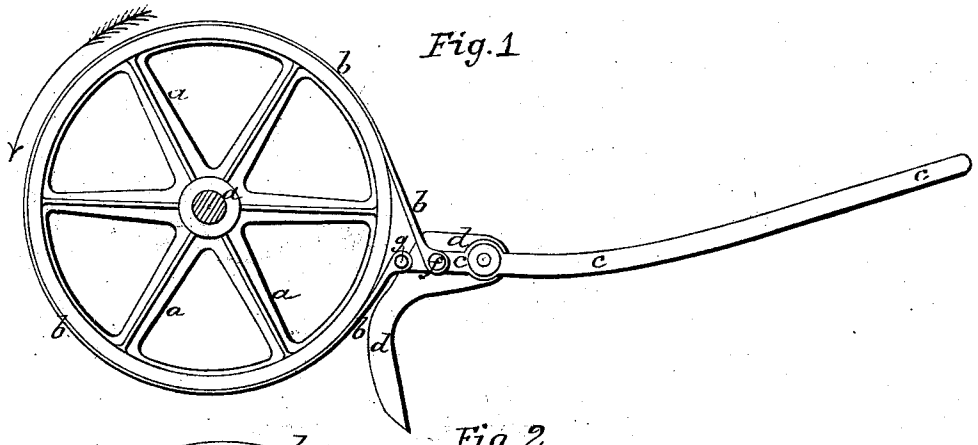


Fig. 2.

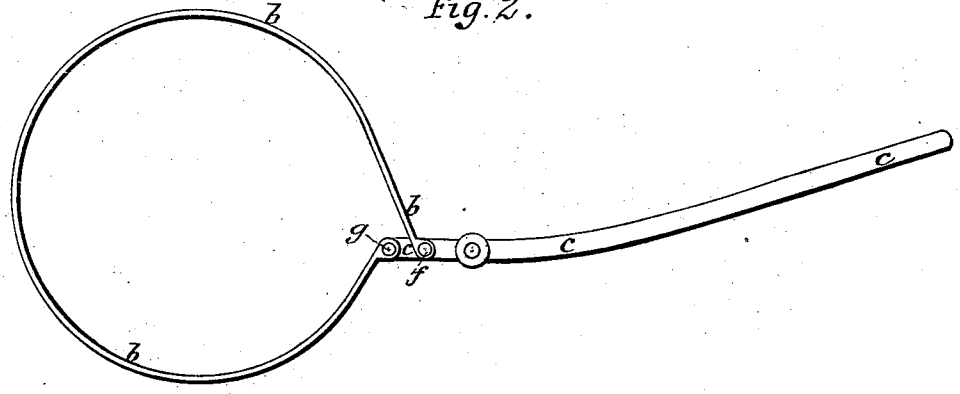
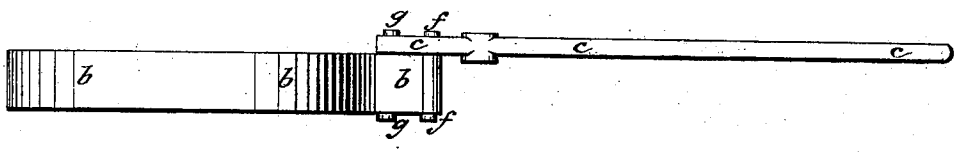


Fig. 3.



Witnesses.

John Ring
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United States Patent Office.

ROBERT DAVID NAPIER, OF BIRKENHEAD, ENGLAND.

Letters Patent No. 93,469, *dated August* 10, 1869.

IMPROVED BRAKE FOR MACHINERY.

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, ROBERT DAVID NAPIER, of Birkenhead, in the county of Chester, in that part of her Britannic Majesty's dominions called England, engineer, have invented a certain new and useful "Improvement in Brakes;" and I do hereby declare that the following is a full and exact description of the construction and mode of operation thereof, reference being had to the accompanying sheet of illustrative drawings, and to the figures and letters of reference thereon; that is to say—

My invention relates to that class of brakes in which a brake-band or strap is passed around or applied to the periphery of a wheel, pulley, or drum.

The ends of the brake-band are connected, directly or otherwise, to a lever by joints, which said joints are, both of them, on the same side of the fulcrum on which the lever works, and in such positions that the joint nearest the fulcrum is in a line, or nearly in a line, between the fulcrum and the joint furthest from it.

By so constructing or arranging the brake-band and lever, the friction between such brake-band and the wheel, drum, or pulley, caused by the turning of the wheel, drum, or pulley, in one direction, tends to open or slacken the band, and the turning in the reverse direction tends to tighten it.

The distances of the joints from the fulcrum may be such that the brake will be made self-holding, or as nearly so as may be desired, when the wheel, drum, or pulley is moved, or has a tendency to move, in that direction in which the brake-band is tightened.

On the drawings—

Figure 1 represents a side elevation of the brake-band applied to a wheel, the lever and part of the frame on which it rests being also shown;

Figure 2 represents a side elevation of the brake-band and lever detached; and

Figure 3, a plan view of fig. 2.

In these views, the same letters denote like parts.

a is the wheel.

b, the brake-band.

c, the lever.

d, part of fixed frame, on which the lever *c* is centred by the stud-pin *e*.

b is fastened to *c* by the stud-pin joints *f g*.

When *a* is caused to rotate in the direction indicated by the arrow on the drawing, the tightening-action is called into play by the differential action between the two ends of the band *b*.

This differential action consists in the joint *f* and its end of *b* moving through a shorter distance than *g* and its end of *b*, in consequence of *f* being placed nearer to the centre of motion of the lever *c* than *g*.

Brakes constructed according to my invention can be used in the place of and for any of the purposes to which ordinary brakes now in use can be applied; as instances, I mention machines for hoisting and lowering weights, winches on board ship and elsewhere, steam and other cranes, wheeled vehicles, and chain-stoppers, windlasses, and veering or paying-out apparatus used on board ship.

To the three machines or apparatus last mentioned, my invention is particularly applicable, as will be obvious.

In the case of windlasses, pawls may be dispensed with.

Any skilled mechanic will be enabled to carry my invention into effect from the description herein given. It will be requisite, however, to keep in mind the direction in which the wheel, drum, or pulley rotates, for it is only when revolving in one direction that the tightening-action is called into operation. As an illustration, if it is supposed that, on the shaft of the wheel *a*, shown on the drawings, or on a barrel thereon, a rope or chain is wound, and a weight is suspended from the said rope or chain, then, to allow the said weight to be lowered, it will be necessary to raise the outer end of the lever *c*, so as to slightly slacken the band.

When the lever *c* is left free, and a weight is attached to the supposed rope or chain, the brake-band tightens, and becomes self-holding.

I am aware that it has been before proposed to employ a flexible band or strap, joined at both ends to a lever, so that the turning of the lever shall shorten the band at both ends; but the idea was developed in so imperfect a form that it has never come into use.

My invention lies in an improved arrangement of the respective centres, whereby I am able to attach the two ends of the strap to the lever much closer together, and thereby to attain much greater mechanical advantage in tightening the strap than was possible with the old arrangement.

Where the fixed centre or stud-pin is between the ends of the strap, it necessarily compels the attaching of the strap-ends to the lever at points a considerable distance apart; but my arrangement, by putting the stud-pin or fixed centre outside of such space, and further from the wheel, leaves the designer of the machine at liberty to set the centres or strap-ends as close together as may be required, to obtain any amount of purchase desirable. My improved arrangement of the centres also involves a different operation of the lever.

The difference in the operation of the lever by my arrangement induces a tendency of the lever to be moved or turned around its fixed centre by the friction of the wheel on the strap, which may, in many cases, when properly managed, afford a great advantage in putting on or taking off the brake quickly.

It will be readily understood, that in case it is de-

sired that the force of the friction shall aid in putting on the brake, the ends are attached in one position, and that, in case it is desired that the friction shall aid in taking off the brake quickly, the ends are attached in the reverse position. In either case, the arrangement is peculiar, in having the fixed centres of the lever outside of and altogether independent of the space between the strap-ends.

Having now fully described my improved construction and arrangement,

I claim as new, and desire to secure by Letters Patent—

The within-described arrangement of the pins or joints *e f g*, relatively to each other, and to the lever *c*, brake-band *b*, and wheel *a*, so that as the end joined to *g* is tightened, the end joined to *f* is slackened, but to a less extent, for the purposes herein set forth.

In testimony whereof, I have hereunto set my name, in presence of two subscribing witnesses.

ROBERT DAVID NAPIER.

Witnesses:

JOHN P. KING,
Of No. 4 Clayton Square, Liverpool.

JOHN DAVIES,
His Clerk.