

(No Model.)

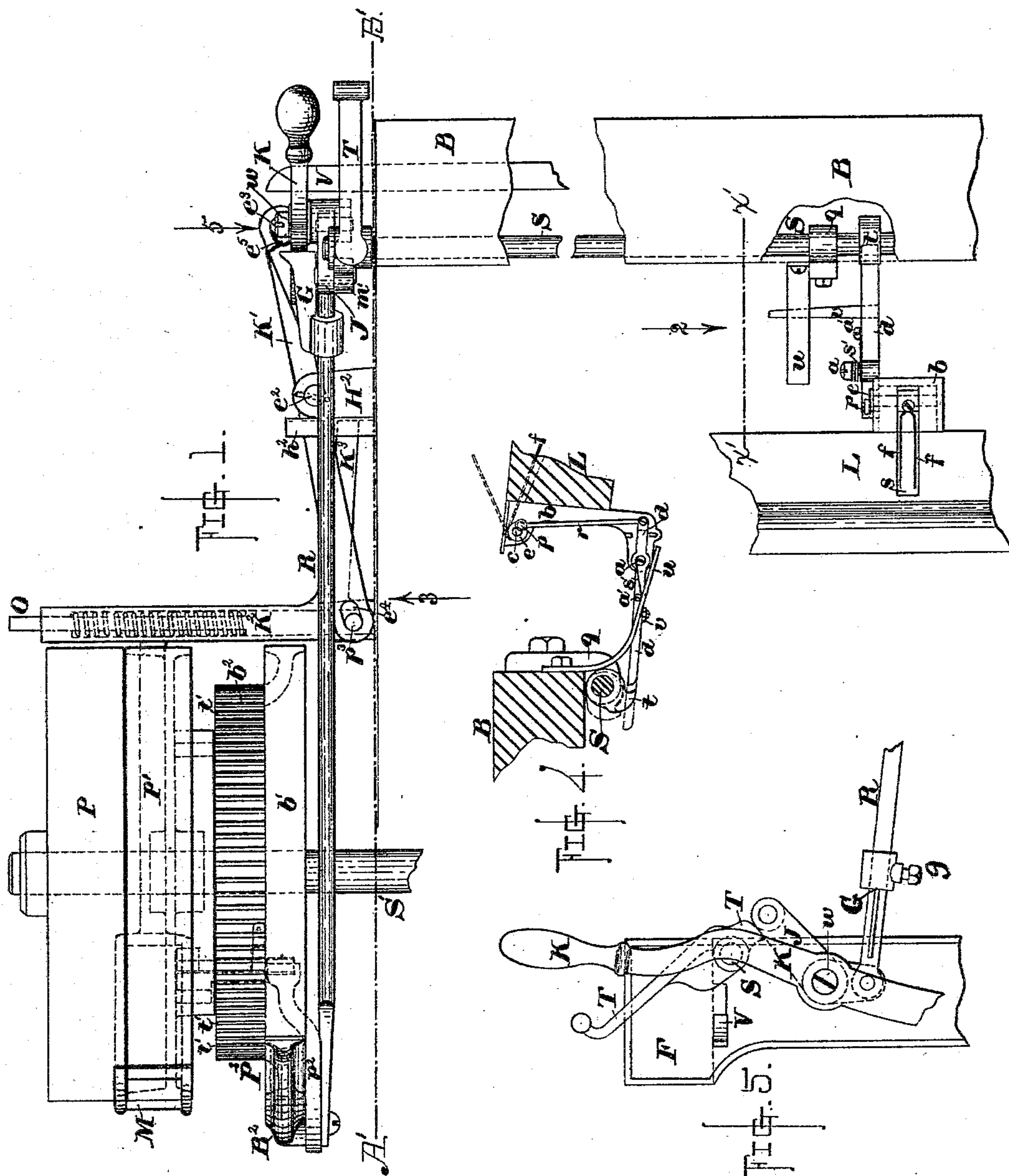
L. J. KNOWLES.

LOOM.

3 Sheets—Sheet 1.

No. 274,502.

Patented Mar. 27, 1883.



~~Witnesses,~~

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H. G. Plonstedt

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(No Model.)

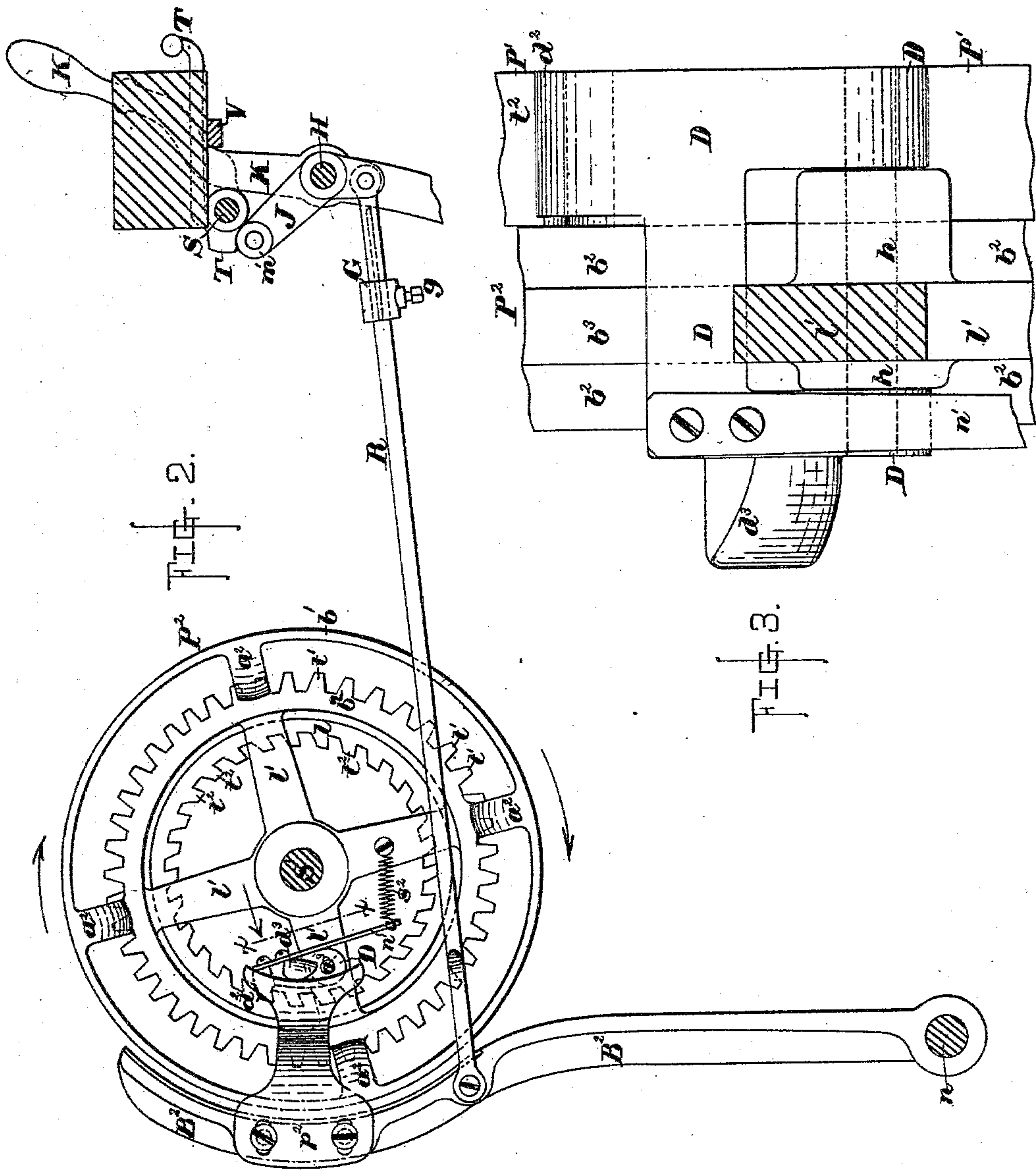
3 Sheets—Sheet 2.

L. J. KNOWLES.

LOOM.

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Patented Mar. 27, 1883.



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(No Model.)

L. J. KNOWLES.
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3 Sheets—Sheet 3.

No. 274,502.

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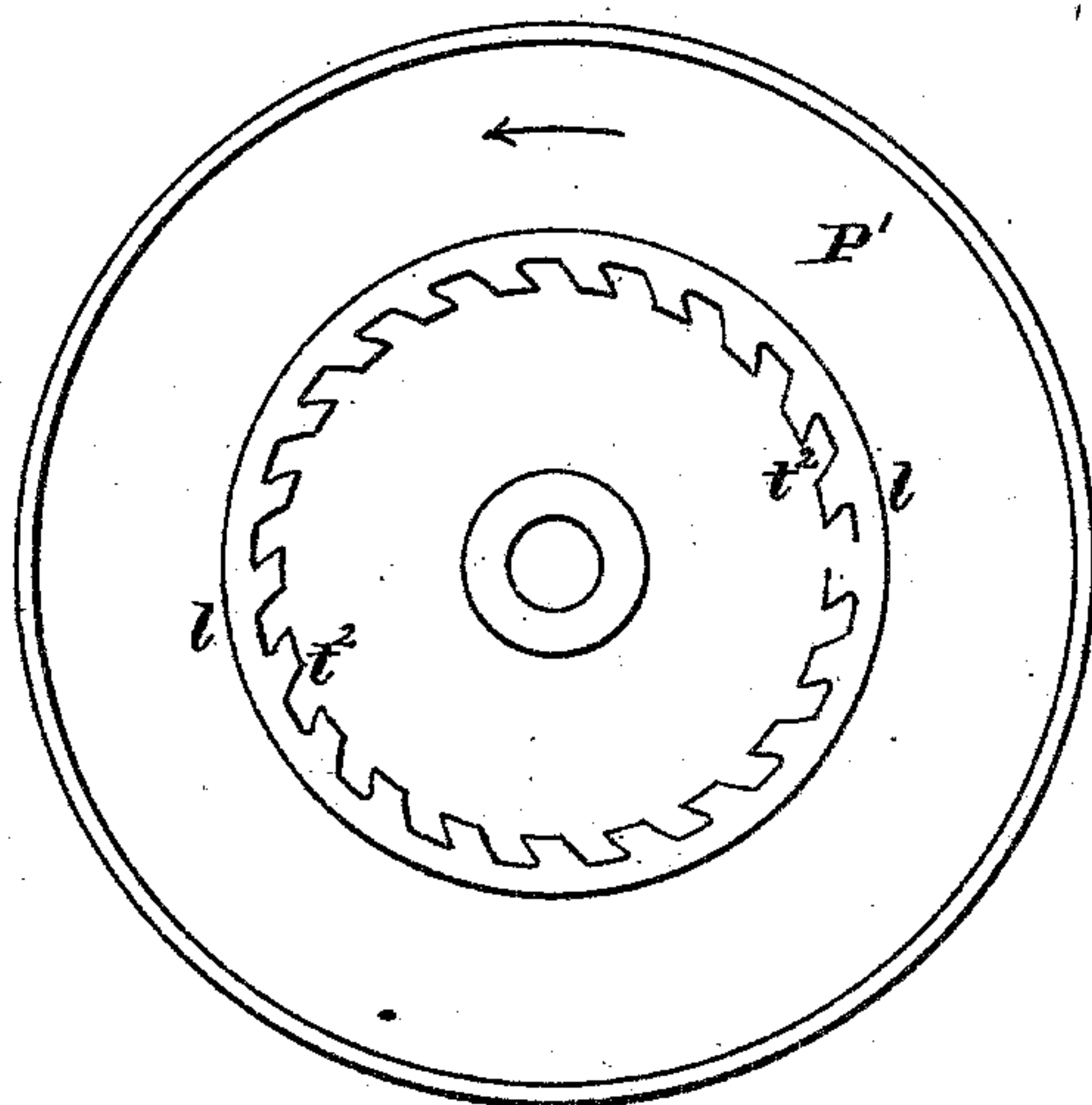


FIG. 6.

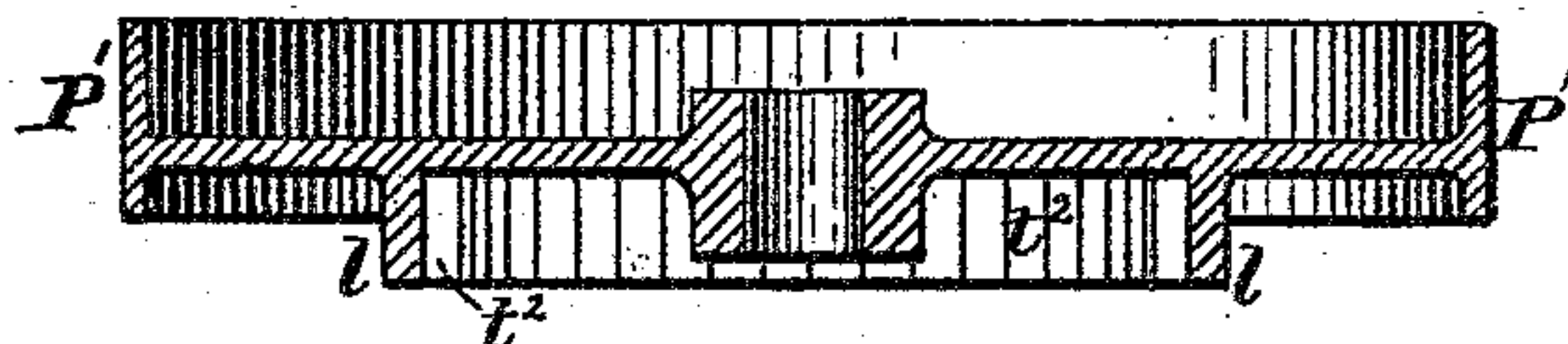


FIG. 7.

WITNESSES.

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UNITED STATES PATENT OFFICE.

LUCIUS J. KNOWLES, OF WORCESTER, MASSACHUSETTS.

LOOM.

SPECIFICATION forming part of Letters Patent No. 274,502, dated March 27, 1883.

Application filed June 17, 1881. (No model.)

To all whom it may concern:

Be it known that I, LUCIUS J. KNOWLES, of Worcester, in the State of Massachusetts, have invented certain new and useful Improvements in Looms, of which the following is a specification.

The invention relates to the driving and brake mechanism of power-loom, more especially of that class of power-loom in which the driving-pulley is convertible into a loose pulley; and a part of the invention consists in the combination of a convertible or fast-and-loose driving-pulley with a brake-wheel and brake, the internal mechanism of the driving-pulley for converting it from a fast pulley to a loose pulley being under the direct control of the brake by means of a rigid projection therefrom.

The invention consists, further, in the combination of a convertible or fast-and-loose driving-pulley, a brake and brake-wheel, and suitable mechanism for operating the brake and converting the driving-pulley into a loose pulley, with an ordinary loose pulley and a belt-shifting device, the shipper-lever of the latter being under the direct control of the mechanism which operates the brake.

The invention has been embodied in mechanism constructed with especial reference to its operation by the dagger of a weft stop-motion, and accordingly the said mechanism is shown and described in connection with a weft stop-motion, by which it may be operated. The novel features of the weft stop-motion here shown have been described and claimed in my applications filed December 2, 1880, and August 3, 1881, and form no part of the present invention. Any ordinary stop-motion might be substituted for the one here shown.

The invention consists, further, in the novel construction of the fast-and-loose driving-pulley, whereby it may be converted into a loose pulley promptly.

In the drawings, Figure 1 is a plan of so much of a loom as is necessary to illustrate the construction and mode of operation of my present invention. Fig. 2 is a section taken on the line A' B' of Fig. 1. Fig. 3 is an enlarged view section on line x x of Fig. 2. Fig. 4 is a section on line x' x' of Fig. 1; and Fig. 5 is a partial end elevation of my devices. Figs. 6 and 7 are respectively a side elevation and a section of pulley P.

L is the lay.

B is the breast-beam.

F is the loom-frame.

S is a rock-shaft in suitable bearings beneath the breast-beam, one of which, *q*, is shown. This shaft is usually known as the "shipper-lever shaft," and is herein at times so designated, although in the construction shown the shipper-lever is not rigidly secured to the shipper-lever shaft, as usual, but is pivoted to an independent stud, and is indirectly moved by the shaft. To the said shaft S, near the middle of the loom, is rigidly secured the knock-off lever *t* to receive the thrust of the dagger of a weft stop-motion, which will be next described.

In the middle of the lay is a slot, *s*, while *b* is a bracket or stop-motion frame secured to the lay in front of the slot. To the lower part of this bracket, at *a*, is pivoted the dagger *d*, while the upper part furnishes bearings for the finger-shaft *c*, to which are secured a finger or fingers, as shown. The finger-shaft *c* and the rear end of the dagger *d* are connected by a crank-disk, *e*, a wrist-pin, *p*, and a connecting-rod, *r*, and accordingly the finger and dagger move together, each in turn partaking of or controlling the motion of the other, but the fingers falling as the point of the dagger rises and rising when the point of the dagger falls. A spring, *s'*, wound about the pivot *a* of the dagger, and pressing against a pin, *a'*, in the dagger, tends to throw the point of the dagger up.

To the breast-beam B is secured a guide-bar, *u*, as shown, and against this guide-bar, under the force of the spring *s'*, presses a horizontal rigid arm, *v*, extending from the dagger. This guide-bar *u* is so inclined for the greater part of its length as to constantly change the direction in which the dagger points during the reciprocating motion of the lay, and this change of position of the dagger causes, by means of the crank-connection above described, a corresponding change in the position of the fingers. Near the breast-beam the incline of the guide-rod is steeper. In the ordinary operation of the loom, when the weft has been properly thrown, the arm *v* no longer follows the guide-bar, for the weft holds up the fingers and prevents the dagger from rising; but when the weft has not been well thrown, and the fingers fail to find it and fall into the slot *s*, the arm *v* follows up the steeper part of the incline or guide-bar *u* and strikes the knock-off lever and

automatically operates the belt-shifting mechanism or the belt-shifting mechanism and brake-wheel mechanism connected with it, as hereinafter described.

5 S' is the crank-shaft, or that shaft in the loom to which power is first communicated, P P' being two pulleys thereon, of which P is an ordinary loose pulley, and P' a fast-and-loose pulley of peculiar construction, which will presently be described.

10 P² is a spoked wheel, also upon the shaft S' and keyed thereto. It has its periphery struck upon two distinct circles, thus presenting two distinct faces or rims, the larger of which, b', is smooth and serves for a brake-wheel, while the smaller, b², has teeth t', which take into the teeth of a larger wheel (not shown) to communicate motion from the shaft S' to other parts of the loom. The rim b' of the wheel P² is connected with rim b² by arms a², which are curved in such manner as not to interfere with the teeth t'.

20 B² is the brake, pivoted to the lower part of the loom-frame at n, and having its upper end shaped, as shown, to fit the smooth rim b' of the wheel P².

25 The pulley P', before mentioned, has upon the side next the wheel P² a cylindrical boss or ring, l, upon the inner face of which, projecting inward, are teeth t². A spring-acted dog, D, pivoted to one of the spokes of the wheel P², has its free end of such shape that it will fit between two of the teeth t² of the ring l of the pulley P'. When the dog is thus held between two of these teeth the wheel P² must turn with the pulley P', and the pulley P' is in effect a fast pulley communicating motion to the loom. When the dog is disengaged from the said teeth the pulley P' can turn free from the wheel P², and is a loose pulley. The dog D is of peculiar construction, and is best shown at Fig. 3, which, as before stated, is an enlarged view taken on line x x of Fig. 2, and in which b² represents the reverse or inside face of the toothed rim of the wheel P², whose outer face has already been designated by the same letter.

35 b³ is a strengthening-rib, and l' the spoke to which the dog D is pivoted, for this purpose the spoke l' containing a hub, h, which is cast with it, and through which passes the shaft a³ of the dog, a large slot in the dog permitting it to embrace both ends of the hub. The free end of the dog which engages with the teeth t² is marked d². Screwed to the dog is an arm, n', which is normally so held by a spring, s², as to keep the dog engaged with teeth t² of the pulley P'. The dog has a projection, d³, and the brake a corresponding arm or projection, p², of such length that it will strike the projection d³ just before the brake falls upon the smooth rim b' of the wheel P².

40 H is a stud in the frame, upon which is pivoted a bell-crank lever, J, to the lower and short arm of which is pivoted one end of a connecting-rod, R, hinged at the other end to the brake B². The upper and longer arm of the bell-crank lever J carries a roller, m'.

To the rock-shaft S, outside of the loom-frame and over the roller m', is rigidly secured a lever, T, the short end of which is so shaped 70 as to form with the roller m' a knuckle-joint. In the normal condition of the loom the lever T has no effect upon the bell-crank lever J; but when the rock-shaft S is rocked, which happens when the knock-off lever t receives 75 the thrust of the dagger, the fingers f, having failed to find the weft, the lever T forces down the long arm of the bell-crank lever J, thus pulling forward the connecting-rod R and operating the brake B² and dog D. The long 80 arm of the lever T permits the knuckle-joint, above described, to be operated by hand as well as by the thrust of the dagger. This arm is so shaped as not to interfere with the movement of a lever, V, belonging to the shuttle-box stop-motion. To the stud H is also pivoted the shipping-lever K, held in place by a nut or screw, w, and operating an ordinary belt-shifting device, as shown at Fig. 1. This device consists of the lever K', swinging horizontally upon an upright pin, e², in a projection, H², from the loom-frame. In the rear end of the lever K' is a slot, e⁴, through which projects upward a pin, p³, set in a sleeve, K², which has a longitudinal motion on a shaft, 95 O, projecting from the loom-frame parallel to shaft S'. To the sleeve K² is attached an ordinary belt-holder, M. A spiral spring wound around the shaft O within the sleeve K² tends to throw the sleeve outward and place the belt upon the loose pulley P. The forward end of the lever K' contains a pin, e³, which works, and normally is locked in a scroll-slot, e⁵, in the lower end of the shipping-lever K, in the manner described and shown in my Patent No. 100 198,202. When the upper arm of the shipping-lever K is pulled forward to lock the pin e³ in the slot e⁵ the sleeve K² is drawn inward upon the shaft O, and the belt is moved upon the driving-pulley P'. When the upper arm is pushed 110 back the sleeve K² is thrown out upon the shaft O by the spiral spring within the sleeve and upon the shaft, and the belt is shifted to the loose pulley P. The belt is thus shifted by hand; but in order that it may be shifted automatically by the dagger belonging to the weft stop-motion at the time the dagger operates the brake and converts the driving-pulley into a loose pulley, the connecting-rod R has a projection, G, which, upon the forward motion of 120 the connecting-rod R upon the fingers failing to find the weft, as before described, strikes the belt-shipping lever K below the stud H at the proper time to shift the belt. That this projection G may be adjustable, it is made 125 separate from the connecting-rod, and in part consists of a thimble, which slips upon the connecting-rod and is held in any required place by a set-screw, g. (See Figs. 2 and 5.)

A projection, K³, from the sleeve K² rides at one end in a slot in the guide h², which is a part of the projection H², to prevent the sleeve K² from turning on its shaft O. 130

I claim—

1. The combination of the fast-and-loose pulley P' , the wheel P^2 , provided with two rims, (one smooth and the other toothed,) mechanism for interlocking said pulley P' and wheel P^2 , the brake B^2 , and its projecting arm p^2 , adapted to disengage said interlocking mechanism, the shaft S , means for actuating said shaft, and intervening mechanism for communicating the movements of said shaft to said brake B^2 , substantially as described.

2. The combination of pulley P' , provided with ring l and teeth t^2 , and the brake-wheel P^2 , provided with two rims, $b' b^2$, teeth t' , and spring-acted dog D , with the brake B^2 and arm p^2 , the shaft S , means for actuating said shaft, and intervening mechanism between said shaft and said brake B^2 , whereby the movement of the shaft is communicated to the brake, all substantially as described.

3. The pulley P' , provided with the ring l and internal teeth, t^2 , in combination with the brake-wheel P^2 , provided with two rims, $b' b^2$, and spring-acted dog D , the latter pivoted to the wheel P^2 and working with the teeth t^2 , substantially as described.

4. The pulley P' , provided with ring l and internal teeth, t^2 , wheel P^2 , provided with two rims, $b' b^2$, and spring-acted dog D , working with the teeth t^2 , in combination with the brake B^2 and arm p^2 , and mechanism for moving the brake, substantially as described.

5. The combination of the loose pulley P , shipping-lever K , and belt-shifting mechanism operated by said lever, the pulley P' , provided with ring l and teeth t^2 , brake-wheel P^2 , provided with rims $b' b^2$, teeth t' , and spring-acted dog D , with the brake B^2 , provided with the arm p^2 , shaft S , means for actuating said shaft, and connections between said shaft and said brake, and between said shaft and said shipping-lever, by means of which a rocking of the shaft may be communicated to both brake and shipping-lever, substantially as described.

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Witnesses:

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C. M. BENT.