(No Model.)

A. L. STANFORD.

FRICTION CLUTCH.

No. 312,400. Patented Feb. 17, 1885.

Fig. 1.

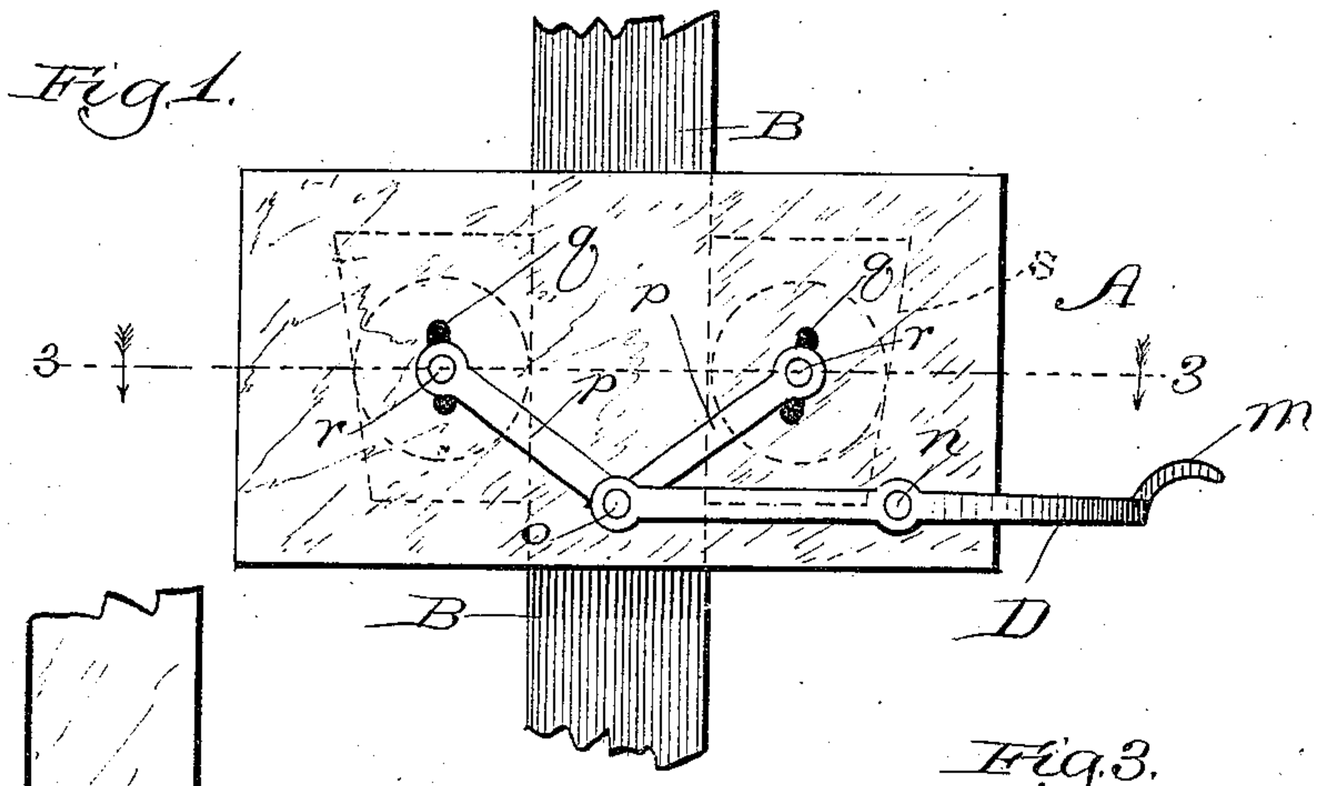


Fig. 2.

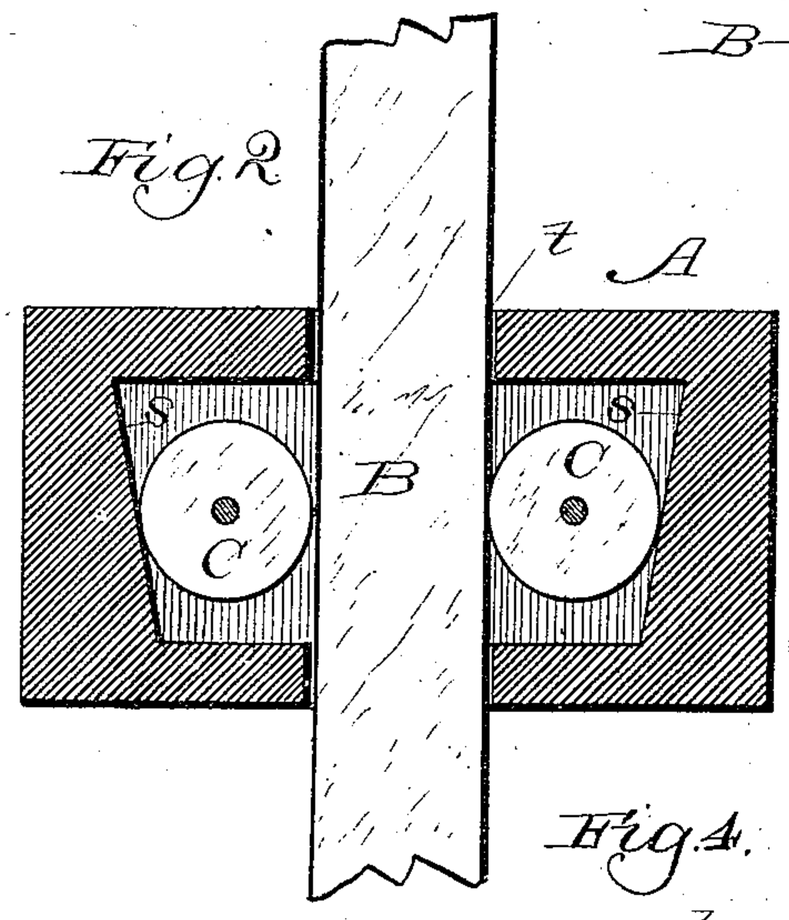


Fig. 3.

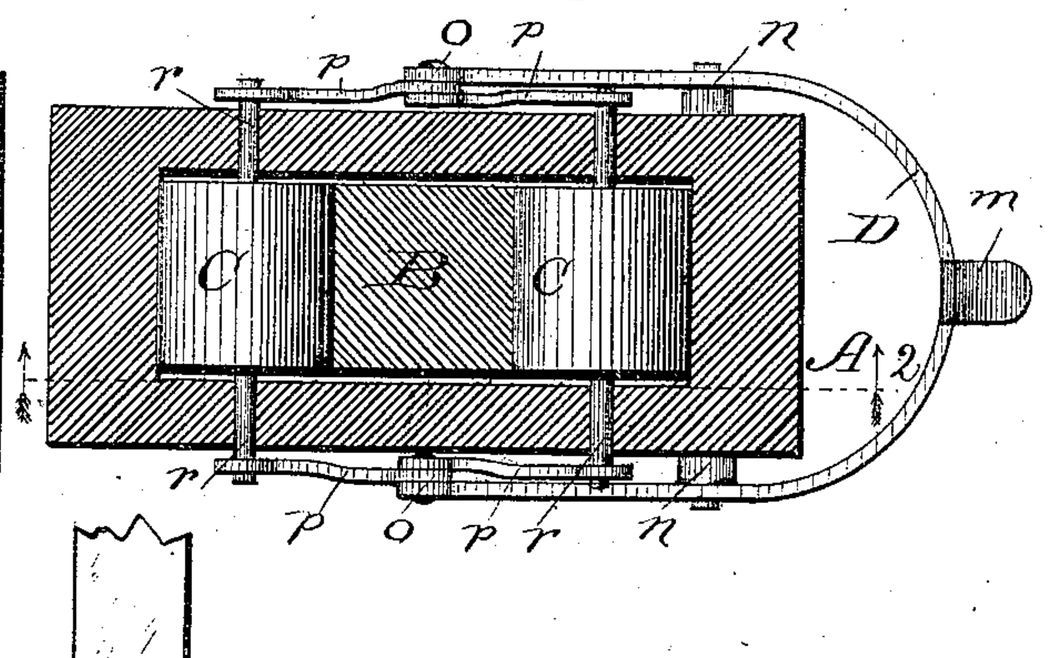


Fig. 4.

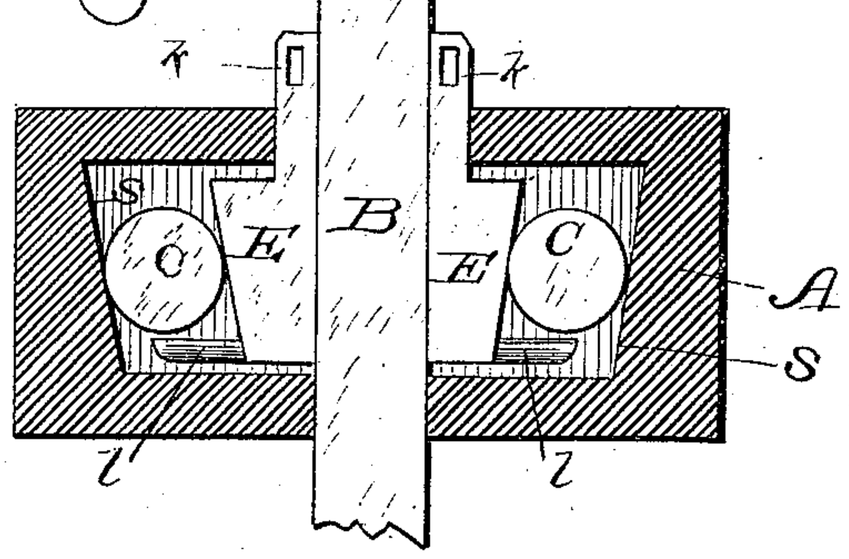
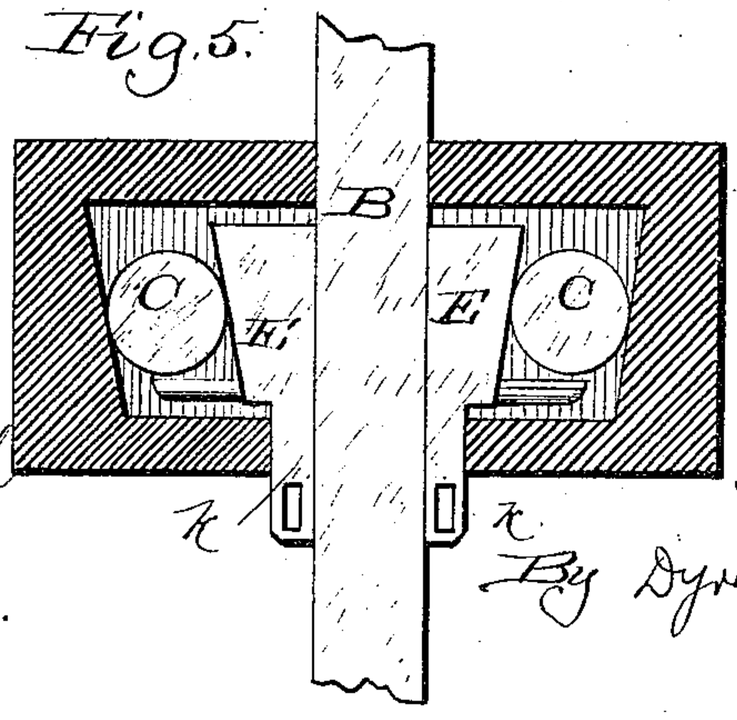


Fig. 5.



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UNITED STATES PATENT OFFICE.

ARTHUR L. STANFORD, OF FORT HILL, ILLINOIS.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 312,400, dated February 17, 1885.

Application filed November 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR L. STANFORD, a citizen of the United States, residing at Fort Hill, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Friction-Clutches; and I hereby declare the following to be a full, clear, and exact description of the same.

Friction-clutches of the general class to which my invention belongs are employed in various mechanical devices—such, for example, as lifting-jacks and stump-extractors.

A friction-clutch similar to the one herein shown and described forms an element of a machine for cutting green wood, for which I have made an application for Letters Patent of the United States, but in which no claim is made to the friction-clutch above, this being preserved for the present application.

In the drawings, Figure 1 is a side elevation of my improved clutch mounted upon the bar which it grips, and provided with releasing mechanism for the purpose of loosening the grip when occasion requires. Fig. 2 is a vertical section of the device shown in Fig. 1 through both rollers, and with the release mechanism omitted. Fig. 3 is a horizontal section taken on the line 3 3 of Fig. 1, and Figs. 4 and 5 are sectional views of modifications.

A is a hollow metal body, formed either in one part or more, and preferably rectangular upon its exterior surface. Formed vertically through this body is an opening, *t*, for the passage of a bar, B.

In applying the clutch to lifting-jacks the bar B is the lifting-bar, and is movable, and is carried upward, with the superimposed weight, by the operation of the clutches. On the other hand, in some applications of the device—for example, the wood-cutting machine hereinbefore referred to—the bar is pivotally fixed at its lower end, and the operation of the clutches carries them downward upon it. The latter is the construction employed in all cases where an object is to be forced downward against a resistance, and the former (the sliding bar B) is the construction employed in all cases where an object is to be forced upward against a resistance. The inner end walls of the hollow body are beveled, as shown at *s*, so that they approach nearest the bar B at their lower ends, and in the spaces between the walls *s* and the bar B rollers C are interposed. These rollers may be of a length about equal to the inner transverse diameter of the body A, or less; but the former is generally to be preferred. From this much of the description the principle of the operation will be readily understood, for it will be seen that the clutch can easily be moved downward upon the bar B, but that any attempt to move it upward thereon causes the rollers to wedge themselves between the end walls and the bar, and thus produce a binding which increases with the force exerted. The same is true of any attempt to force the bar downward between the rollers when the latter are left free to descend within the wedge-shaped spaces.

While it is preferable to form both walls against which the rollers bear upon a bevel, as shown, this is not absolutely necessary, since the binding would be effected also in a proportionate degree if only one roller rested in contact with an inclined wall, the other resting against a vertical wall and serving only as an anti-friction bearing. The latter construction is, therefore, within the spirit of my invention.

As applied to mechanical agents two friction-clutches of this class are commonly employed, one being the lifting-clutch or pulling-clutch, as the case may be, which is operated by means of a lever having a fixed fulcrum, (the clutch being journaled to the short arm of this lever,) and the other being the retaining-clutch, the purpose of which is to hold the bar B firmly while the other clutch is being lowered upon the bar by means of the lever to the position for a fresh grip. In devices wherein the bar B is to be raised with a superimposed weight the retaining-clutch is journaled to a fixed bearing, and is ordinarily, though not necessarily, located below the lifting-clutch. On the other hand, in devices wherein the bar B is fixed, and serves only as the bearing for the clutches, the retaining-clutch is journaled to the agent which is to be carried downward, and in this case it is ordinarily, though not necessarily, located above the pulling-clutch.

Examples of both forms of application are to be found in various mechanical arts—for example, among lifting-jacks and stump-ex-

tractors, and in the wood-cutting machine of my invention above referred to. When it becomes necessary to let the bar B descend, as is the case with lifting-jacks, or to allow the agent forced downward to resume its normal position, as is the case in my wood-cutting machine, it is obvious that the rollers C must be raised and maintained above the position at which they will bind the bar B. Fig. 1 shows one form of effecting this release. The rollers C are provided with trunnions *r* at each end, which pass through slots *q* in the side walls of the body A parallel, or nearly so, with the plane of the walls *s*. To the projecting ends of the trunnions arms *p* are pivoted, and these arms are pivoted together at their lower ends in pairs, as shown at *o*. A yoke-shaped lever, D, is connected by the same or a similar pivotal joint, *o*, to the lower ends of the arms *p*, and is fulcrumed to each side of the body A, as shown at *n*. Thus it will be seen by pressing down upon the thumb-piece *m* of the lever D the rollers C are thrown upward through the medium of the arms *p*, trunnions *r*, and slots *q*, and carried out of contact with the bar, which may thus pass downward between them, or along which they may then pass upward without obstruction. Where occasion requires, the release mechanism may be operated through the medium of an attachment to the lever which operates the lifting or pulling clutch, acting simultaneously upon the release mechanism of both clutches—as represented, for example, in my wood-cutting machine.

The form of construction represented in Figs. 1 and 2 is designed especially for use with a hard-steel bar, B, since, in this case, the rollers come into immediate contact with the bar, and if the bar were of iron or other soft metal they would be liable to indent it, and thus impair the working of the device. For a soft-metal bar, therefore, I provide the construction shown in Fig. 4, in which hard-steel bearing-blocks E, less in height than the interior of the wedge-shaped chambers, are interposed between the rollers and the bar, preferably of the form shown—that is, with the sides adjacent to the rollers so inclined as to be parallel with the walls *s* of the body A, though they may be vertical, if desired. There is an advantage in having them parallel with the walls *s*, which is that thereby there is less tendency of the rollers to slip out of place than when confined between converging surfaces. When this construction, involving bearing-blocks, is employed, the releasing may be effected by lifting the rollers C through the medium of the blocks E, which are accordingly provided with feet *l*, projecting under the rollers. The blocks E may be lifted for the purpose of releasing either by a device entirely analogous to that shown for lifting the rollers in Fig. 1 or by a lever arranged to bear upward upon extensions *k* of the blocks E, extending up through the top of the body A, as shown in Fig. 4, or down through the bottom, as shown in Fig. 5. The last-named construction is a convenient one for effecting the release when the lifting-bar is still supporting the weight, which is done by lowering the clutch together with the loaded bar until the downward extensions of the blocks come into contact with a fixed surface. With the other constructions shown a downward extension from the inner end of the lever D may be provided for this purpose when required.

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

1. In a friction-clutch, the combination, with a hollow metal body having a central opening through it for the passage of the bar to be clutched, of two movable clamping-rollers within the hollow body, one on each side of the central opening, and one or both resting in contact with a beveled surface, substantially as described.

2. A friction-clutch comprising, in combination, a hollow metallic body having the inner surfaces of its end walls beveled as shown, and having openings *t* for the passage through it of the bar, internal rollers between which the bar passes, and mechanism, substantially as described, for raising the rollers at will above their normal position to prevent gripping of the bar.

3. A friction-clutch and release comprising, in combination, a hollow metallic body having the inner surfaces of its end walls beveled as shown, and having openings *t* for the passage through it of the bar, and slots *q*, internal rollers, C, having trunnions *r*, extending through the slots, arms *p*, pivoted together and to the trunnions *r*, and yoke-lever D, pivoted to the arms *p* and fulcrumed to the body A, substantially as described.

4. The combination of the hollow metallic body A, having its inner end walls beveled, and having a central opening through it for the passage of the lifting-bar, rollers C, bearing-blocks E, and mechanism, substantially as described, for raising the rollers at will above their normal position to prevent gripping.

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