(No Model.)

2 Sheets—Sheet 1.

J. C. ECKARDT.

FRICTION CLUTCH.

No. 287,915. Patented Nov. 6, 1883.

Fig: 1.

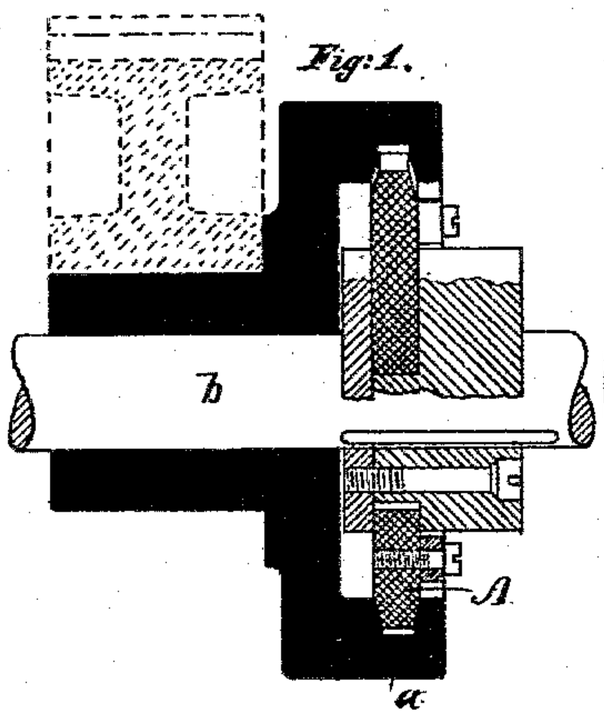


Fig: 2.

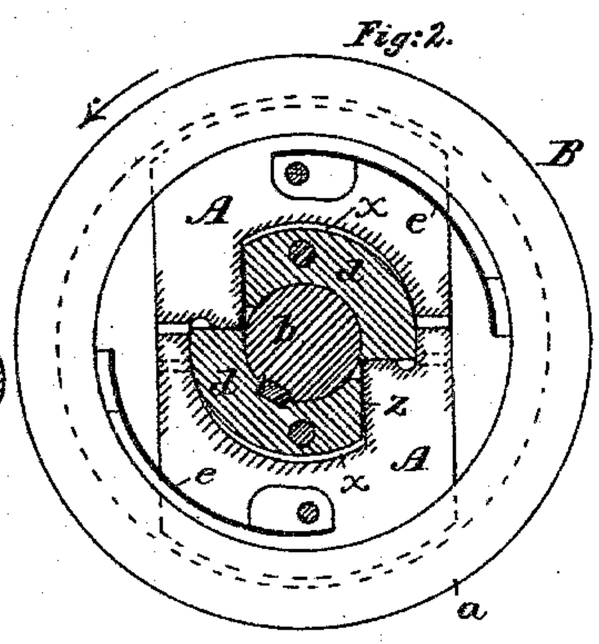


Fig: 3.

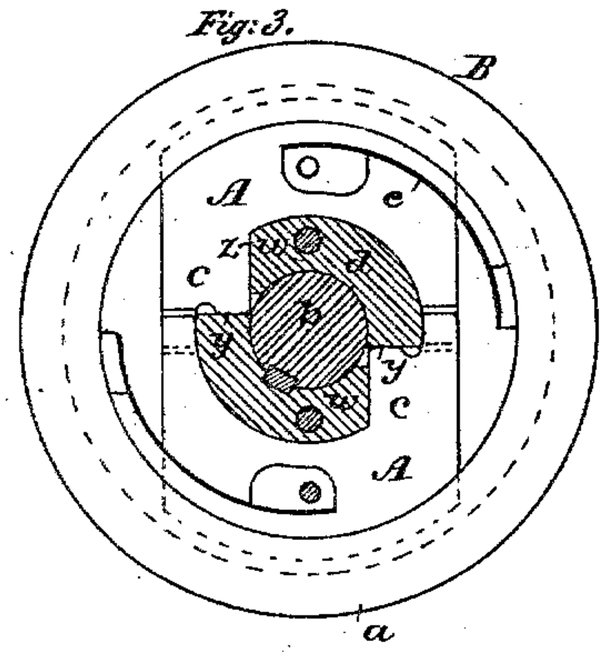
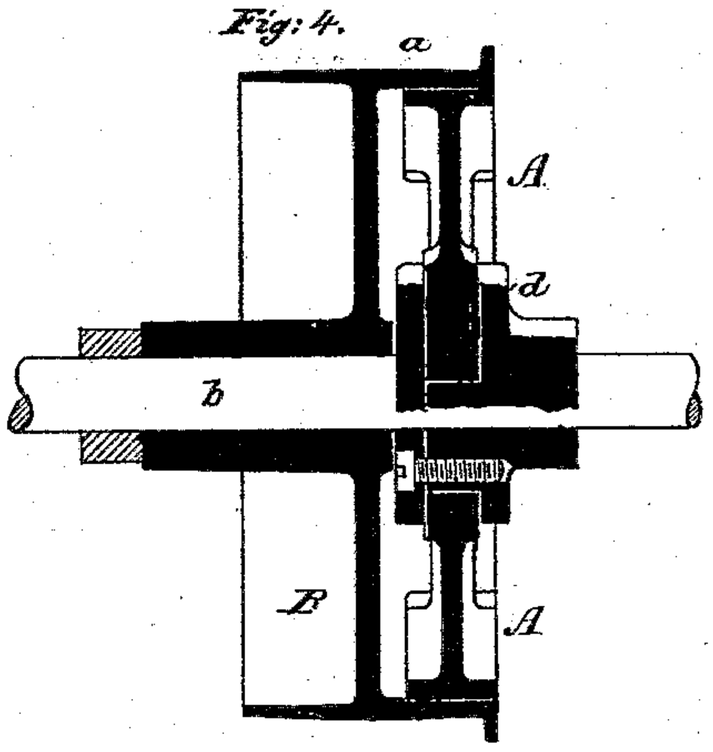


Fig: 4.



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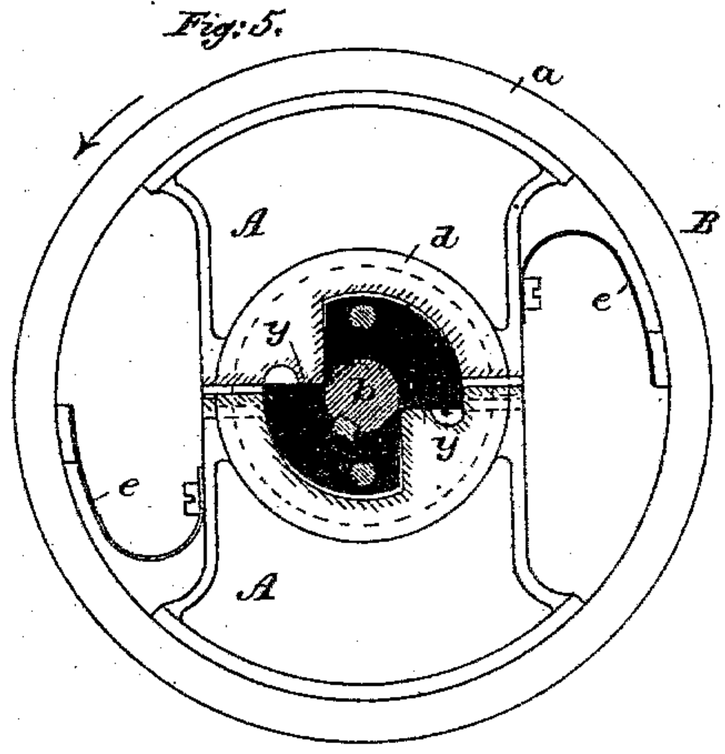
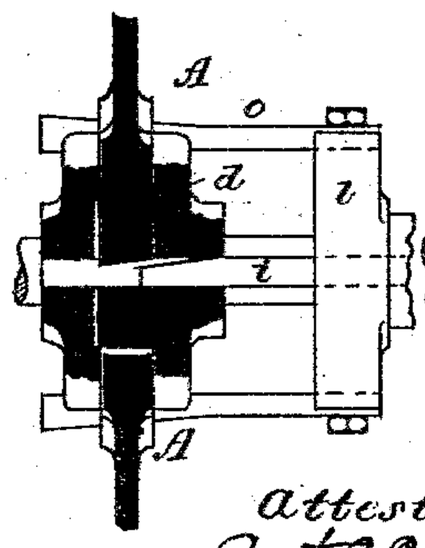


Fig: 6.



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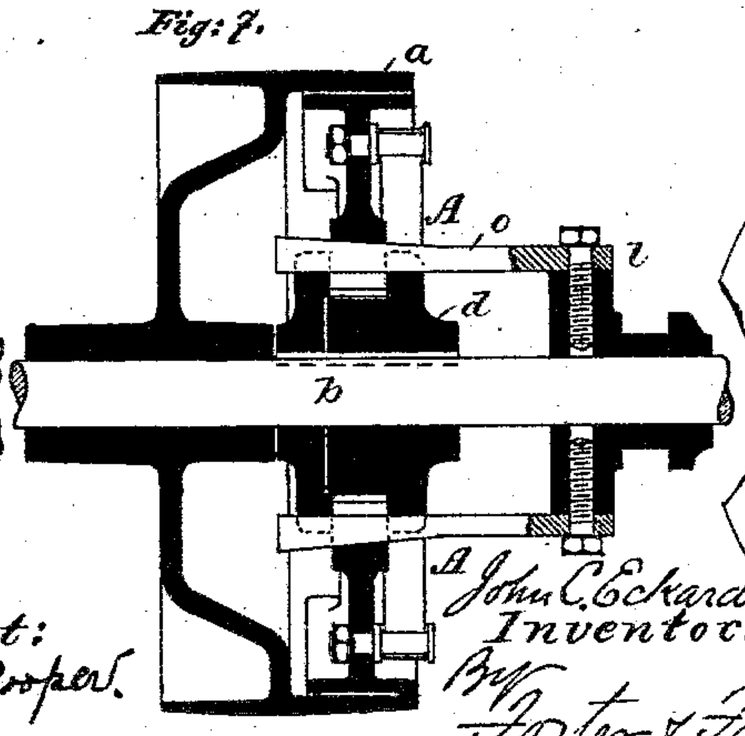

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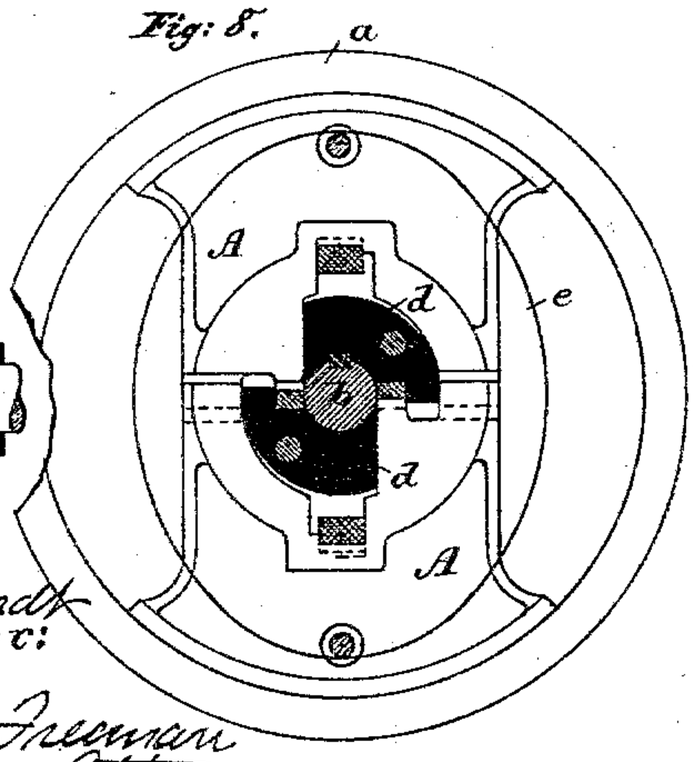


Attest:
Court. A. Cooper.
Josephine Campbell.

John C. Eckardt
Inventor:
By
Foster & Freeman
Attys.

(No Model.) 2 Sheets—Sheet 2.

J. C. ECKARDT.

FRICTION CLUTCH.

No. 287,915. Patented Nov. 6, 1883.

Fig: 9.

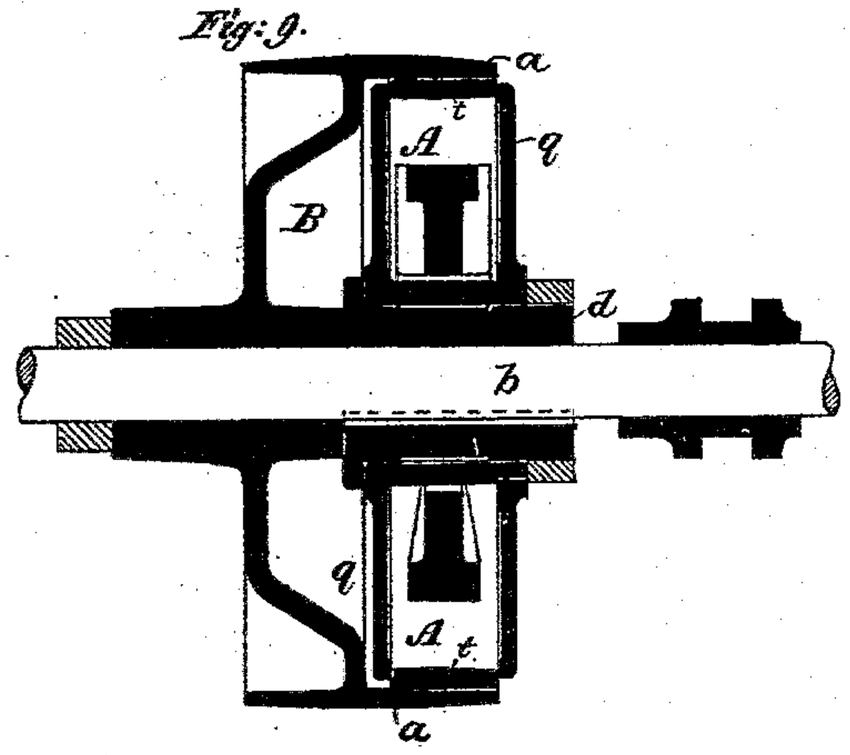


Fig: 10.

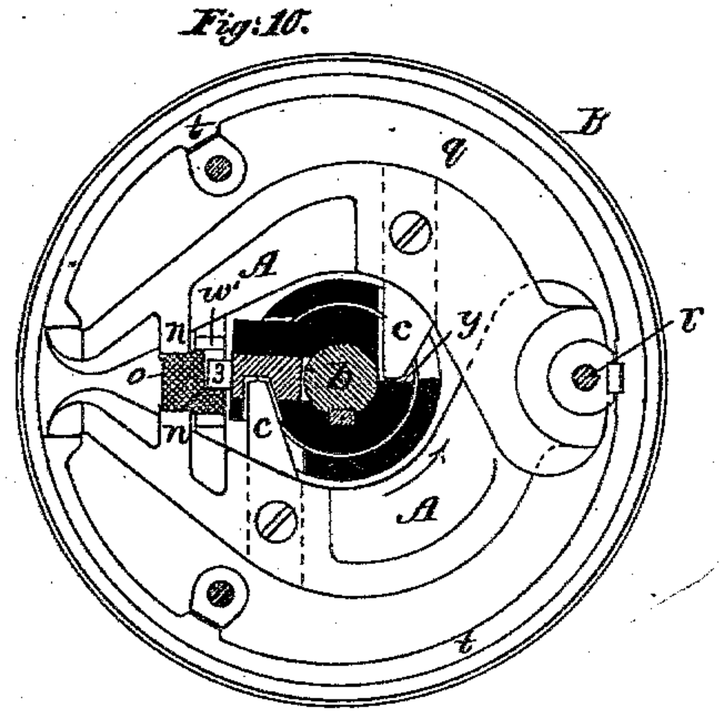


Fig: 11.

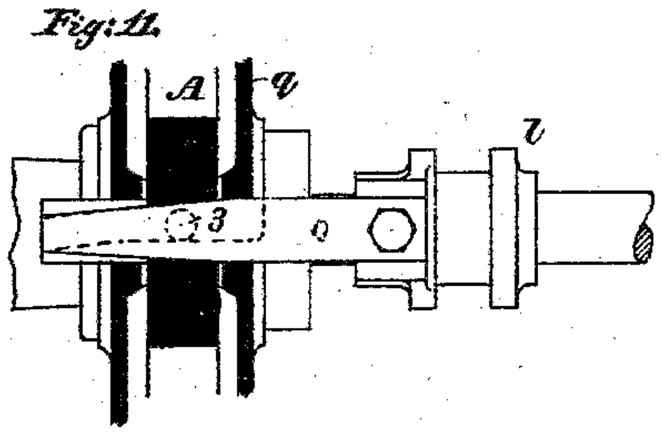


Fig: 12.

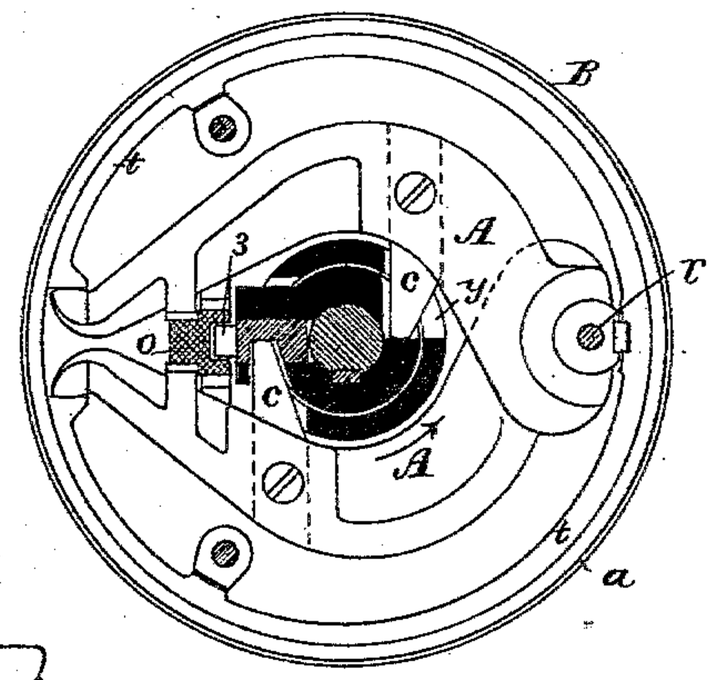


Fig: 13.

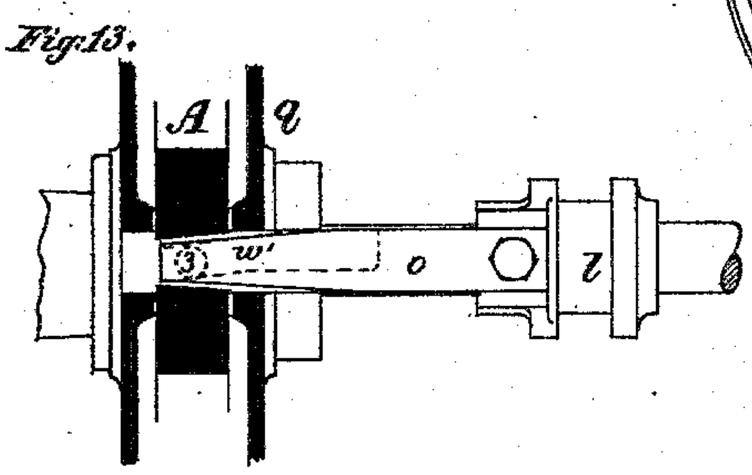


Fig: 14.

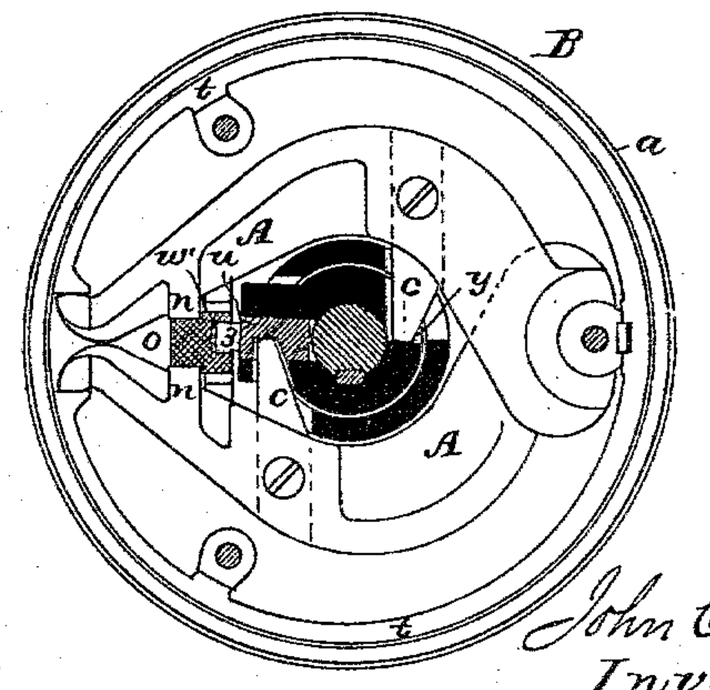
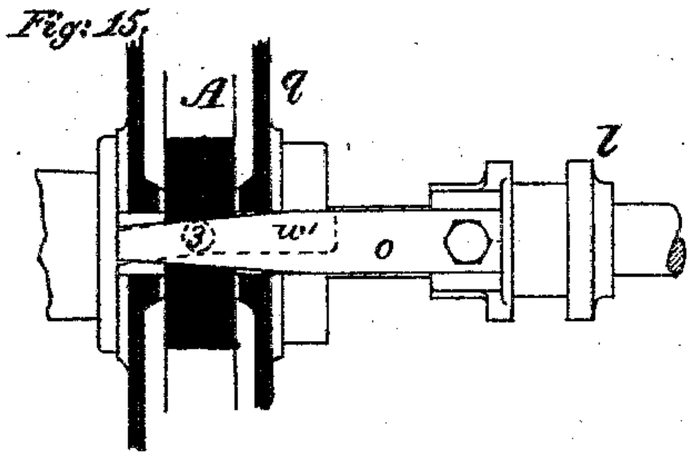


Fig: 15.



Attest:
Court. A. Cooper.
Josephine Campbell

John C. Eckardt
Inventor:
By Foster & Freeman
Attys.

UNITED STATES PATENT OFFICE.

JOHN CARL ECKARDT, OF STUTTGART, GERMANY.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 287,915, dated November 6, 1883.

Application filed May 21, 1883. (No model.) Patented in England December 1, 1881, No. 5,260, and in Germany July 28, 1882, No. 19,927.

To all whom it may concern:

Be it known that I, J. C. ECKARDT, a citizen of the Kingdom of Würtemberg, German Empire, residing at Stuttgart, Marienstrasse 3, have invented certain new and useful Improvements in Friction-Clutches, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention is a friction-clutch constructed, as fully described hereinafter, so that the power of the driving-shaft will act automatically upon the sleeve, pulley, or other object to be driven, and insure a clutching action between the two proportioned to the force to be transmitted.

In the drawings, Figure 1 is a longitudinal section, showing my improved clutch device applied to a shaft. Figs. 2 and 3 are side views in part section. Fig. 4 is a longitudinal sectional view, showing a modification. Fig. 5 is a side view, in part section, of Fig. 4. Figs. 6 and 7 are longitudinal sections in another modification. Fig. 8 is a side view, in part section, of Fig. 7. Figs. 9, 11, 13, and 15 are longitudinal sections, showing other modifications; and Figs. 10, 12, and 14 are side views thereof in part section. Figs. 6 to 15 show shifting clutches.

While the above-described figures show various constructions, the same principle is embodied in all—that is, the revolution of the driver part—either the shaft or the pulley—imparts movement to the part to be driven through the action of intermediate clamping appliances, which clutch the parts more firmly in proportion as the resistance increases.

In Figs. 1 to 8 the clamps consist of dogs or jaws A, each of which is a plate having its outer curved edge in contact with an annular flange or rim, *a*, while its inner end has a recess, *x*, corresponding to a portion of a hub, *d*, secured to the shaft *b*. The hub *d* is cut away at one side, so that an arm, *c*, of the clutch-plate extends through the cut-away portion and bears upon a shoulder, *y*, of the hub, as shown. Springs *e*, secured to the rim *a* of the pulley or sleeve B, are also connected to the jaws A, and tend to force them outward with a slight pressure. If motion in the direction of the arrow, Fig. 2, is imparted to the sleeve B, each jaw A by the frictional contact of its periphery with the sleeve will be carried around the axle, and its arm *c*, being brought against the shoulder *y*, will cause a temporary arrest of motion at this point, whereby the jaw is canted to the position shown in Fig. 2, and thus wedged, as it were, between the bearing *y* and the inner bearing-face of the rim *a*, and caused to bite against both the bearings, so as to insure the transmission of the motion from the sleeve to the shaft. In proportion as the resistance to the movement of the shaft increases, the jaws are caused to bite automatically with increased power, so that there can be no slip. If the motion of the sleeve B is reversed, the flat side *z* of the arm *c* at each jaw will be brought against the corresponding face, *w*, of the hub *d*, when each jaw will be uncanted and brought to a radial position with its curved edge parallel to that of the inside of the flange *a*, which will therefore rotate around and over said edge with little friction and without canting the jaw, so that the rotary movement of the sleeve is not imparted to the shaft.

In Figs. 4 and 5 the construction is substantially the same, the springs *e*, however, being so applied as to tend to cant the jaws when the pulley is driven in the direction of its arrow.

In Figs. 6, 7, and 8 the jaws are similar in shape to those in Fig. 5, and the action is very much the same; but wedge-bars *o i* are extended through slots in the jaws and hub, and are connected to a shifting sleeve, *l*, so that when the latter is carried to the right the jaws will be forced outward by the wedges *o*, and when the sleeve is shifted to the left the wedges *i* will act in like manner. The rotation of the pulley in one direction will, however, cant the jaws, as before, when the bars are in an intermediate position.

In Figs. 9 to 15 the clutches A A are pivoted arms hung to a pin, *r*, within a casing, *q*, which also contains a split ring, *t*, the ends of which bear upon the ends of the clutches, while the periphery is inclosed by the rim *a* of the pulley or sleeve. A projection or arm, *c*, on each jaw bears against a shoulder of the hub, so that as the latter is turned in the direction of the arrow, Fig. 10, the jaws will

be separated and the ring *t* expanded into frictional contact with the rim *a*.

With these devices may be combined others to secure the advantages of a shifting clutch, as in the modification described in Figs. 6 to 8. Thus to a sliding sleeve *l* is connected an arm or wedge *o*, which extends between bearings *n n* on the jaws A A, and is provided with a groove or slot, *w'*, to receive a pin, 3, upon a block, *u*, sliding in a radial opening in the hub *d*. The rotary motion is transmitted from the hub to the casing *q* through the medium of the pin 3 and the sliding key *o*. When the key is carried to the right, Figs. 14 and 15, the jaws come together and the ring *t* is contracted. By further moving the key to the right, as in Figs. 12 and 13, the hub is turned in the direction of its arrow, and the jaws are separated to bring the ring into frictional contact with the rim.

I claim—

1. The combination, in a clutch, of a wheel or sleeve provided with an annular flange, a shaft provided with a hub, and intermediate jaws bearing upon said hub at opposite sides thereof, and constructed to be separated and to be brought into frictional contact with the rim when the latter or the shaft is turned in one direction, and to be withdrawn on a reverse motion, substantially as set forth.

2. The combination, with the shaft *b* and hub *d*, having shoulders *y* and faces *w*, and with the sleeve or pulley having an annular rim, *a*, of jaws A A, bearing upon the shoulders *y* and arranged within the rim *a*, substantially as set forth.

3. The combination, in a clutch, of a wheel or sleeve provided with an annular flange, a shaft provided with a hub, and intermediate jaws bearing upon said hub at opposite sides thereof, and constructed to be separated and to be brought into frictional contact with the rim when the latter or the shaft is turned in one direction, and to be withdrawn on a reverse motion, and sliding keys or wedges extending between the jaws and the shaft, substantially as and for the purpose set forth.

In testimony whereof I affix my signature, in presence of two witnesses, this 19th day of September, 1882,

JOHN CARL ECKARDT.

Witnesses:

O. WM. G. TUNKS,

SIG. LINDAUER.