

No. 709,771.

P. A. HOUGHTALING.
CLUTCH.

Patented Sept. 23, 1902.

Application filed June 3, 1902.

(No Model.)

2 Sheets—Sheet 1.

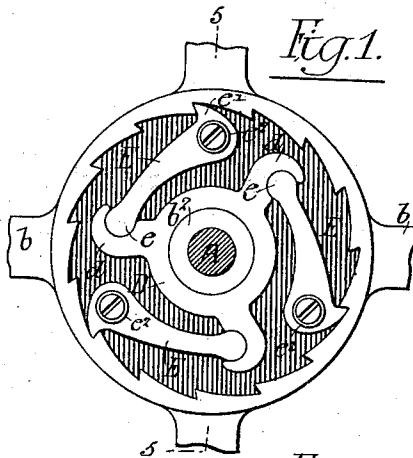


Fig. 1.

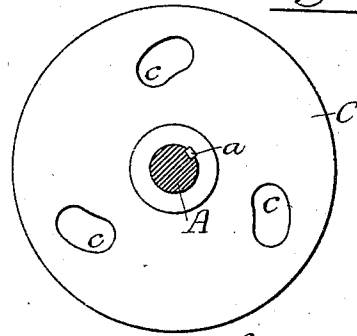


Fig. 2.

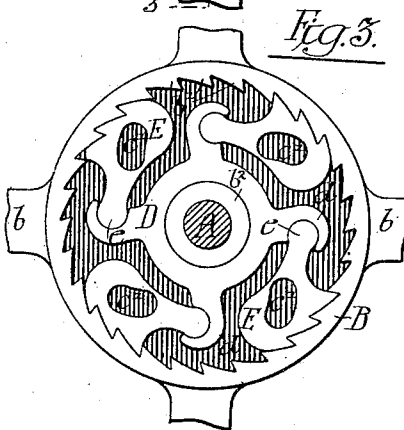


Fig. 3.

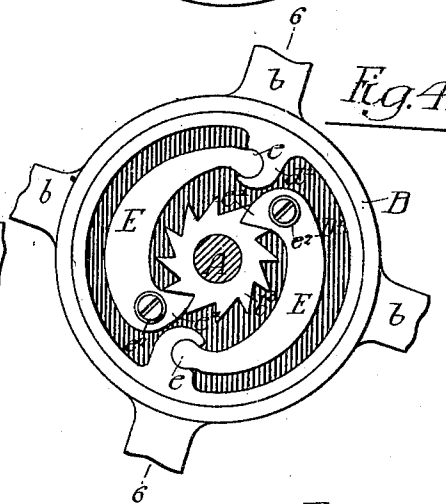


Fig. 4.

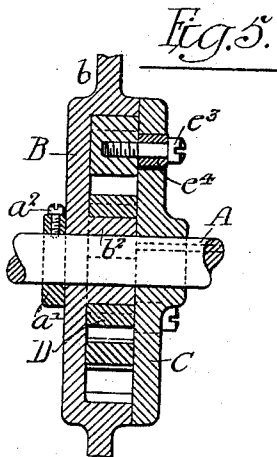


Fig. 5.

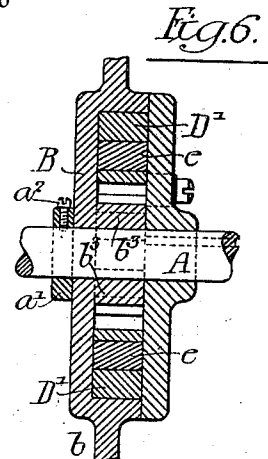


Fig. 6.

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Inventor:-

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No. 709,771.

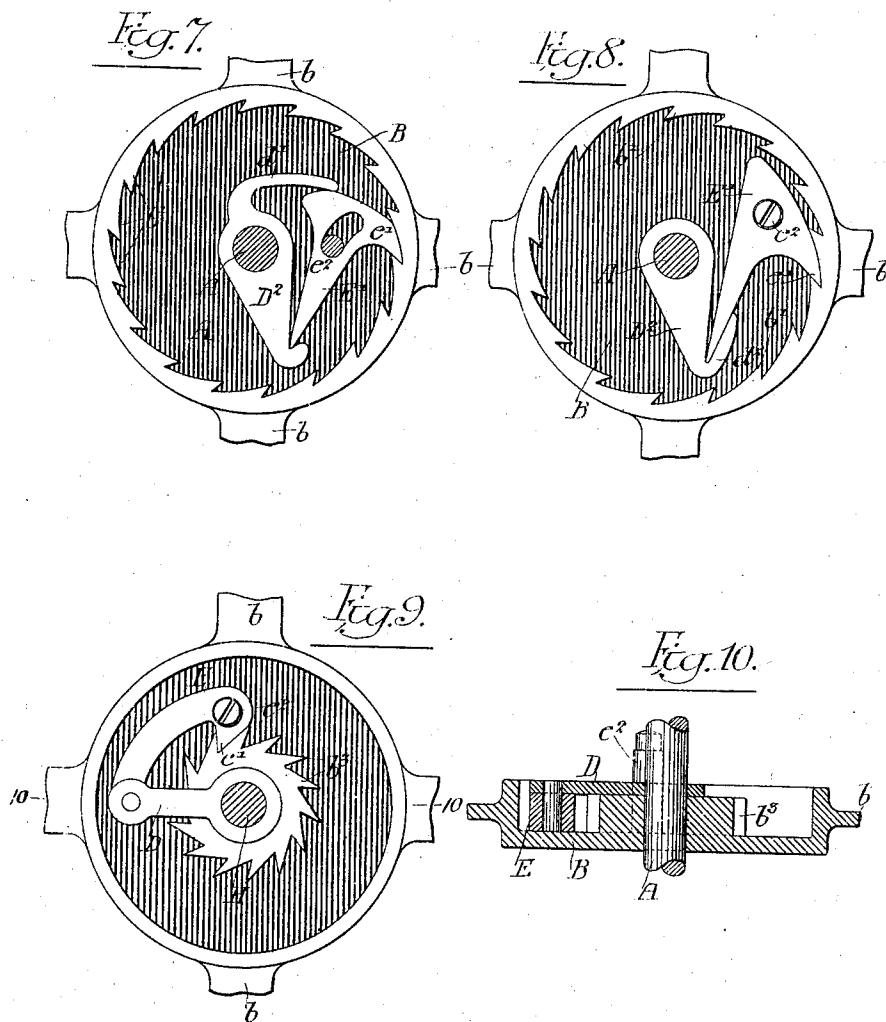
P. A. HOUGHTALING.
CLUTCH.

Patented Sept. 23, 1902.

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(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

PAUL A. HOUGHTALING, OF RIVERTON, NEW JERSEY.

CLUTCH.

SPECIFICATION forming part of Letters Patent No. 709,771, dated September 23, 1902.

Application filed June 3, 1902. Serial No. 110,059. (No model.)

To all whom it may concern:

Be it known that I, PAUL A. HOUGHTALING, a citizen of the United States, residing in Riverton, New Jersey, have invented certain Improvements in Clutches, of which the following is a specification.

My invention consists in certain improvements in clutches, and more particularly to an improved form of the clutch for which Letters Patent of the United States No. 688,644 were granted to me on the 10th day of December, 1901.

The object of my invention is to provide a device of simple and inexpensive construction which shall be actuated to operatively couple or disconnect two rotatable members when certain variations of the relative speeds of these members take place. This object I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of the interior of one form of my improved clutch. Fig. 2 is a plan view of one of the rotatable members of the clutch, showing the eccentric slots by which the mechanism of the same is operated. Figs. 3 and 4 are plan views showing the interior construction of two modifications of my invention. Fig. 5 is a sectional elevation of my improved clutch, taken on the line 5 5, Fig. 1. Fig. 6 is a sectional elevation of the modified form of my invention shown in Fig. 4 and taken on the line 6 6 in said figure. Figs. 7, 8, and 9 illustrate other modified forms of my improved clutch, the plate forming one member thereof being removed in each case; and Fig. 10 is a vertical sectional elevation of the clutch, taken on the line 10 10, Fig. 9, the plate member being also omitted from this figure.

In the above drawings, A is a shaft or spindle, upon which is loosely carried a member, (indicated by the letter B,) this being in the present instance the hub of a wheel, a portion of whose spokes are shown at *b*. Keyed to the shaft A is a plate C, in which are formed any required number of cam-slots *c*, made eccentrically to the said shaft, the said plate being, in the forms of my device illustrated in the drawings, held to the shaft A by means of a key *a*. It will be seen that in Figs. 1, 3, 7, and 8 the member B is made in the shape

of a circular box or casing, over which the plate C fits as a cover, the interior of this casing being provided with teeth *b'* and forming what is known as an "internally-toothed ratchet-wheel."

From Figs. 5 and 6 it will be seen that this casing or ratchet-wheel B is formed with an inwardly-projecting part *b*² where the shaft A passes through it, and upon this bearing is supported an annular carrier D, provided with any desired number of arms *d*, which have in them recesses or depressions for the reception of the correspondingly-formed ends of pawls E. As will be noted from the various figures, practically any desired number of pawls may be employed, the said figures illustrating the use of either one, two, three, or four of the same. The said pawls E are in some instances made with cylindrically-formed ends *e*, designed to fit the recesses in the arms *d* of the carrier D, while their other ends have one or more toothed portions *e'*, designed to engage with the teeth formed on the inside of the casing B. Fig. 3 illustrates the use of pawls constructed with three teeth, and it is to be understood that this number may be varied within any desired limits, according to the amount of power to be transmitted through the clutch.

The form of my invention illustrated in all the figures except Figs. 3 and 7 shows pins *e*² projecting from one face of the pawls, this pin consisting of a screw *e*³, entering the pawl and provided with a roller *e*⁴ where it comes into engagement with the sides of the slots *c* of the member C. If desired, the pins may be carried by the member C and operate in slots *c'*, formed in the pawls, as illustrated in Figs. 3 and 7 of the drawings. Further, it will be seen that, if desired, the carrier for the pawls may be supported upon the inner surface of that portion of the casing B which is shown in Figs. 1 and 3 as provided with ratchet-teeth, the teeth in such construction being formed upon the inwardly-projecting portion *b*² of the casing B, which formerly supported the carrier. Thus in Fig. 4 the carrier B' therein employed is shown as formed in the shape of a ring fitting the inside of the casing B. The inwardly-projecting arms *d'* of this carrier are, as before, provided with recesses for the reception of the

ends e of the pawls E , and the outer ends e' of these latter are formed so as to engage the toothed inwardly-projecting portion b^3 , which is preferably formed integral with the body of the casing or hub portion B , as illustrated in Fig. 6.

Further modifications of my invention are shown by Figs. 7 to 10, inclusive, in which the carrier D^2 is shown as revolubly hung directly upon the shaft A . In the first two of these figures the carrier is illustrated as having but a single pawl E' , being provided with a hooked arm for the reception and support of the rather pointed end of said pawl, which in one instance is retained in position by an arm d' , projecting from the same. In the other form the pawl is of such a size and the hooked end d^2 of the carrier is such a length as to effectually prevent the pawl from becoming detached from said carrier. A logical outcome of the form of clutch illustrated in Fig. 4 is shown in Fig. 9, in which the pawl E is pivoted to a carrier hung directly on the shaft A and lying in a plane other than that of the pawl and ratchet-teeth.

Any desired device may be employed to retain the casing B in a relatively fixed position upon the shaft A , and in the present instance I have shown a collar a' , provided with a set-screw a^2 , for performing this function.

In operation it will be seen that if it be desired to transmit power from the shaft A to the wheel or similar device of which the casing B is the hub revolution of said shaft, and hence of the plate C , causes the pins e^2 to be cammed to have their positions changed relatively to said shaft by virtue of the cam action upon them of the sides of the slots c . Such action causes the pawls E to turn in the recesses of the arms d as pivots, thus almost immediately bringing their toothed ends e' into engagement with the teeth upon the interior of the casing B , when further revolution of the shaft A and plate C will revolve the said casing and its attached parts. If now from any reason motion of the shaft A diminishes or ceases, the pins e^2 are forced inwardly by the sides of the eccentrically-placed slots, thereby throwing the toothed ends of the pawls out of engagement with the ratchet-teeth and disconnecting the two members of the clutch. Should the casing B and its attached parts tend to continue in rotation after the two members of the clutch have been operatively disconnected, as above set forth, the carrier D , resting upon the bearing-surface formed by the inwardly-projecting portion b^2 of said casing, will act as a brake to prevent such revolution, an action which may be greatly increased by the use of the construction illustrated in Fig. 4. Here the surface of the carrier in contact with the interior of the casing B is of relatively great extent, and upon the pawls being thrown out of contact with the ratchet-teeth the braking action may be, by proper construction of the parts, quite pronounced.

It will be noted from the drawings that it is entirely immaterial whether the casing B or the shaft A be considered as the driving member of the clutch, since the pawls are swung on their pivots whenever there is a change in the relative rate of motion of these two members, it being similarly immaterial as to whether the pins e^2 are on the pawls and the slots c in the plate C , or vice versa.

I claim as my invention—

1. In a clutch, the combination with a driving and a driven member of a device including a toothed wheel, pawls constructed to be engaged therewith and disengaged therefrom, a carrier for the pawls supported by a portion of the toothed wheel, pins for operating said pawls and transmitting the power from the driving to the driven member, and cams for actuating said pins and causing them to engage or to disengage from the toothed wheel, substantially as described.

2. In a clutch, the combination of two members, one of the same including a casing having ratchet-teeth and a bearing-surface formed integral with said casing, a device provided with pawls carried on said bearing-surface, pins for transmitting power from one of the members of the clutch to the other and also serving to operate said pawls, with means for causing the pawls to engage or disengage from the ratchet-teeth, substantially as described.

3. The combination in a clutch, of two members, one of the same including a structure having two substantially cylindrical surfaces extending parallel to each other, ratchet-teeth on one of the surfaces and a pawl-carrier supported on the other, pawls on the carrier, with means on the second member for causing the pawls to engage with or disengage from said ratchet-teeth when the relative speed of the members is varied, substantially as described.

4. The combination in a clutch of two members, one including an internally-toothed casing having a bearing portion, a pawl-carrier supported on said bearing portion, pawls pivoted to said carrier and placed to engage with the teeth of the casing, the second member including a shaft and a structure fixed thereto, said structure and the pawls comprising two parts of which one has cam-slots and the other has pins projecting into said slots whereby the pawls are caused to engage with or disengage from the said teeth under certain conditions of speed variation of the two members, substantially as described.

5. In a clutch, the combination of a toothed ratchet-wheel, a carrier, a pawl or pawls supported thereby, means for operating the pawls, the same including projecting portions for directly transmitting power from one member of the clutch to the other and means other than the portion of the carrier for the support of the pawl, whereby the pawl or pawls are retained in operative position within the clutch, substantially as described.

6. In a clutch, the combination of a toothed

ratchet-wheel, a carrier, a pawl or pawls supported thereby, means for operating the pawls, the same including projecting portions for directly transmitting power from one member
5 of the clutch to the other, and an arm on the carrier other than the portion thereof for supporting the pawl, said arm retaining the pawl or pawls in operative position within the clutch, substantially as described.

10 7. In a clutch, the combination of a toothed ratchet-wheel, a pawl or pawls lying in approximately the plane of the teeth of said wheel, a carrier for said pawls lying in a plane outside of but parallel to the said plane of

pawls and ratchet-teeth, with means for op- 15
erating the pawls, the same including projecting portions and a device for operating the same whereby said portions are made to directly transmit power between the members of the clutch, substantially as described. 20

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PAUL A. HOUGHTALING.

Witnesses:

ROY RAUDENBUSH,
JOS. H. KLEIN.