No. 661,335. Patented Nov. 6, 1900.

R. E. CRYDER.

ELECTROMECHANICAL CLUTCH.

(Application filed Mar. 30, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

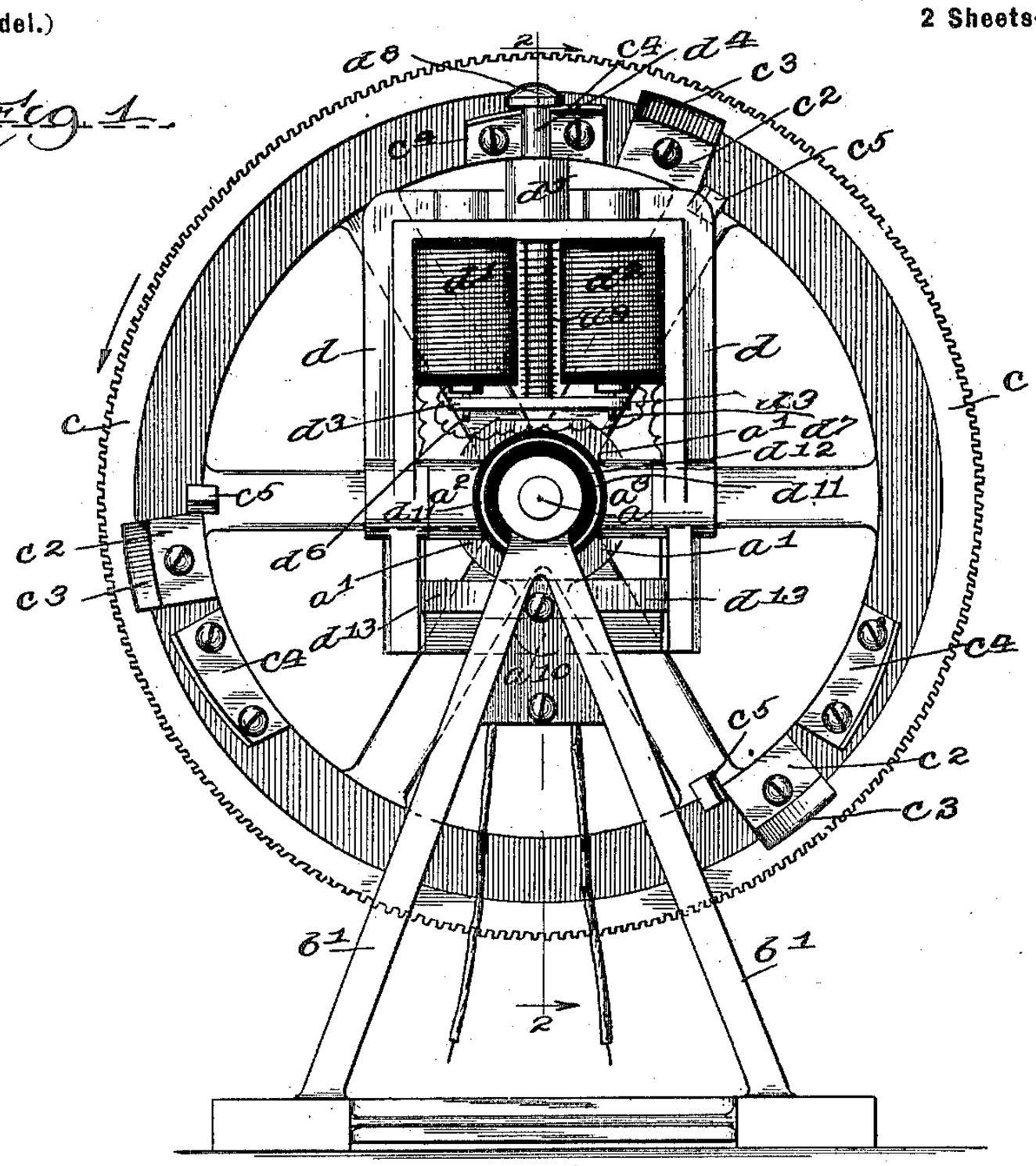

Fig. 2.

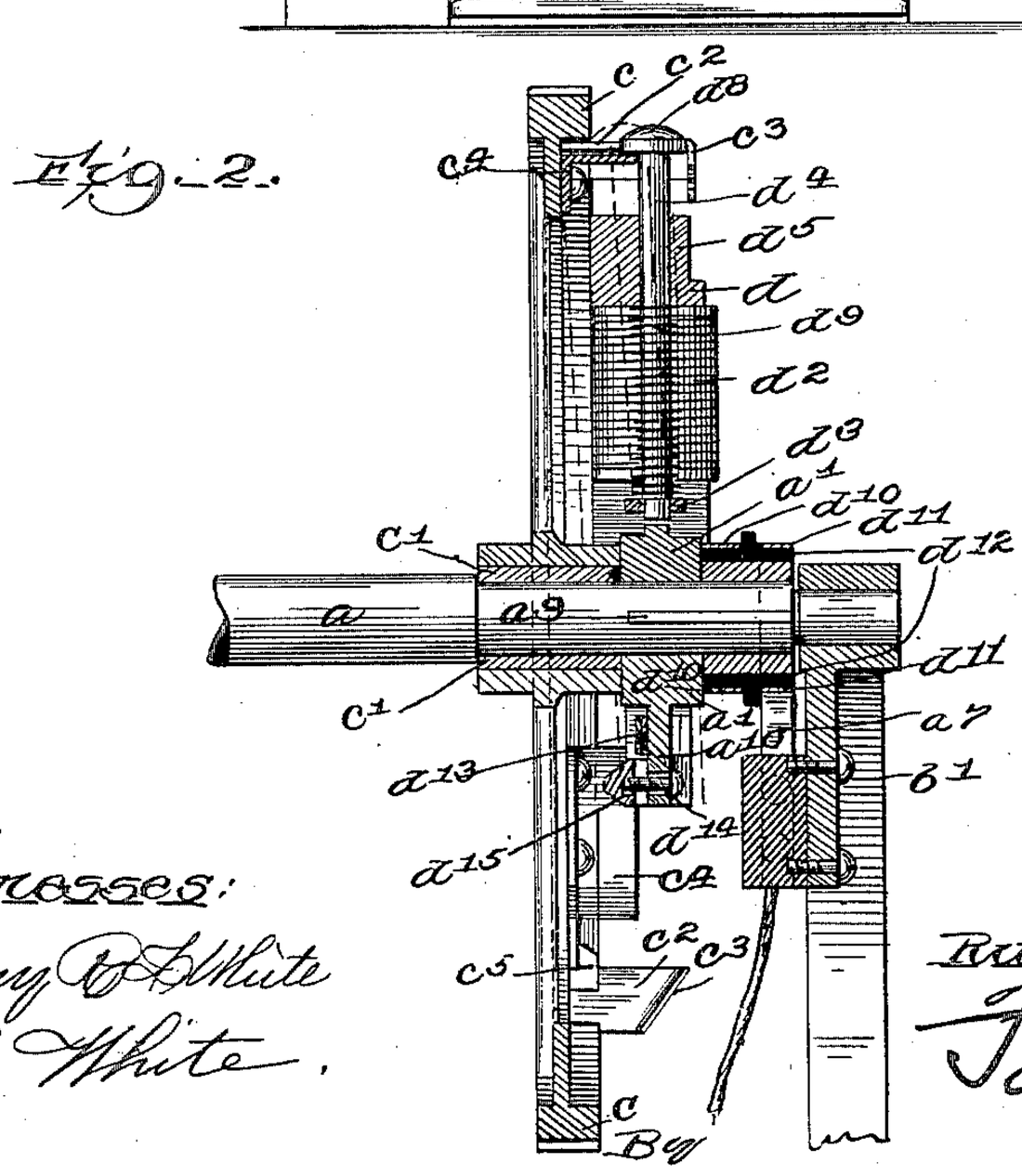

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Fig. 3.

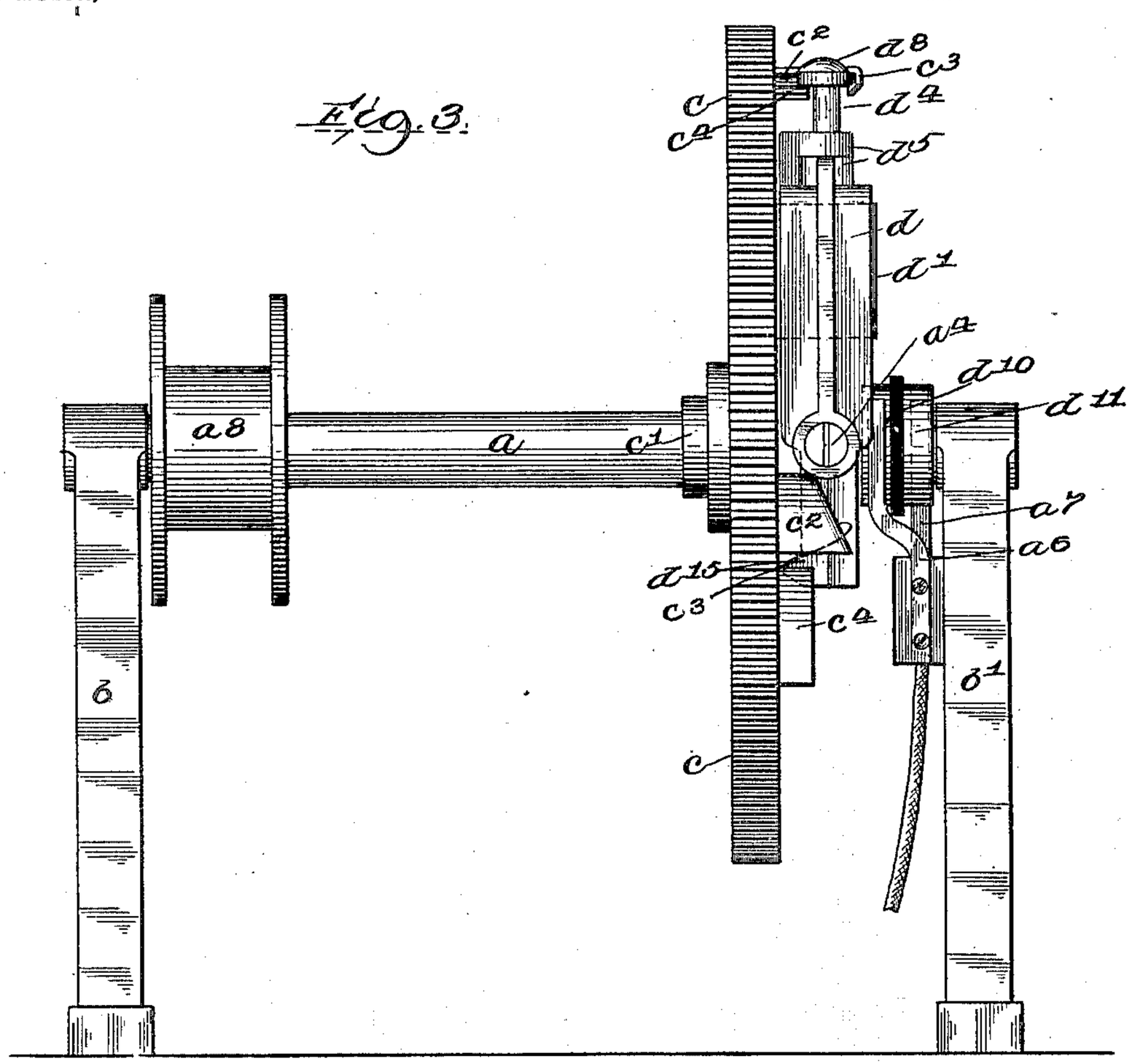
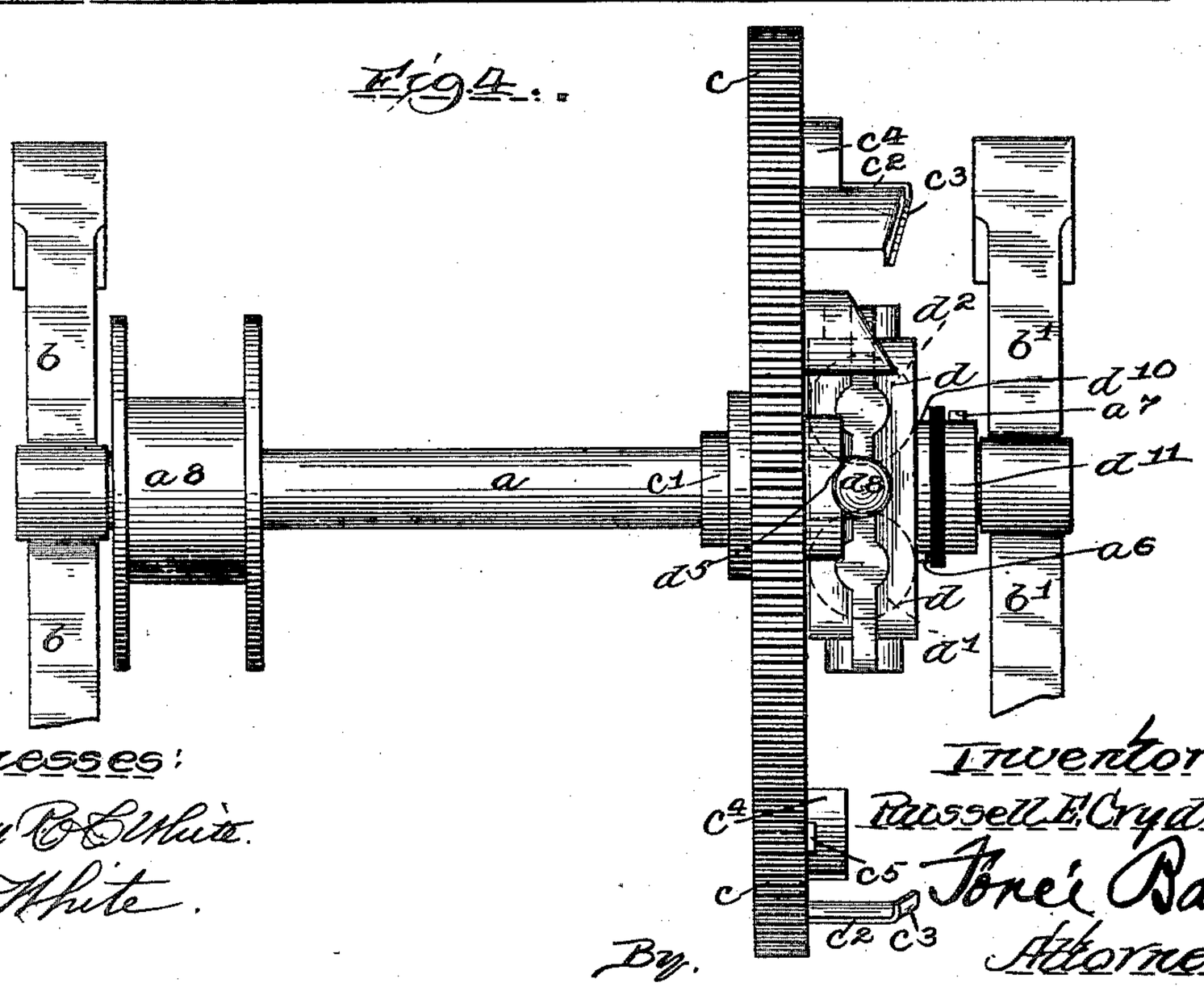


Fig. 4.



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UNITED STATES PATENT OFFICE.

RUSSELL E. CRYDER, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHARLES F. CHAPMAN, OF SAME PLACE.

ELECTROMECHANICAL CLUTCH.

SPECIFICATION forming part of Letters Patent No. 661,335, dated November 6, 1900.

Application filed March 30, 1900. Serial No. 10,726. (No model.)

To all whom it may concern:

Be it known that I, RUSSELL E. CRYDER, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Electromechanical Clutches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable persons skilled in the art to which it appertains to make and use the same.

One object of my invention is to provide a clutch such as is usually used for operatively connecting a constantly-rotating mechanism with a portion of the mechanism or with another mechanism that may be required to be rotated at intervals.

A further object of my invention is to provide a means whereby the two described mechanisms may be firmly and positively rotatably associated by the simple act of closing an electric circuit and whereby the two said elements will become absolutely and immediately disassociated when the said electric circuit is opened.

A still further object of my invention is to provide a means whereby a minimum of electric power will be required to accomplish the object in view.

In the drawings, Figure 1 represents a front view of a driven wheel and my clutch mechanism. Fig. 2 is a section on lines 2 2 of Fig. 1. Fig. 3 is a side view. Fig. 4 is a plan view.

The shaft a rotates in two bracket-supports b and b'. The driving-wheel c revolves freely upon a collar c', that is carried by the shaft a. A collar a', provided with two laterally-extending arms a^2 a^3, is fixed to the shaft a by means of the key a^9. A frame d is pivoted to the arms a^2 a^3 of the collar a' by means of the screws a^4 a^5. A pair of electromagnets d' d^2 are fixed to the end of the frame, and the magnetic circuit is through that part of the frame to which the magnets are attached. An armature d^3 is suspended by and is attached to a vertical rod d^4, which has a guide-bearing in the frame between the magnets at d^5. The armature d^3 is guided in its reciprocating travel before the ends of the magnets by diamagnetic pins d^6 d^7. The upper end of the rod d^4 is capped with a loosely-attached collar d^8, which normally rests upon the upper surface of the bearing d^5. An open spiral spring d^9 surrounds the rod d^4 and has its abutments against the upper surface of the armature d^3 and the lower surface of the bearing d^5, and by this means the collar d^8 is normally held in its lowest position, and the armature is correspondingly removed from the ends of the magnets.

Two conducting-rings d^{10} d^{11} are insulated from each other and are carried upon an insulating-collar d^{12}, the latter being fast upon the shaft a. The terminals of the two magnets d' d^2 are connected to the two described conducting-rings. Conducting-brushes a^6 a^7 bear upon the two rings, respectively, by means of which the circuit is completed through the revolving magnets. The frame d may be deflected on its bearings a^2 a^3 from its perpendicular position shown in Fig. 2 to the position shown in dotted lines. A flat elliptical spring d^{13} has its ends supported in the frame d and passes under an arm a^{10}, which is a part of the collar a'. A screw d^{14} passes loosely through the arm a^{10} and is fixed in a cross-bar d^{15} of the frame d. By this means the lateral movement of the frame d is limited. Attached to the driving-wheel c is a segmental piece c^2, which has an inwardly-projecting lip c^3, which tapers in the direction toward the wheel c. A similar segment-piece c^4 is provided with a lateral projecting lip and is placed with respect to the center of the wheel, so that the lip is in line with a gradually-increasing radius. The shortest radius will allow the lip of the piece c^4 to pass under the collar d^8 of the rod d^4, and a further progress of the wheel c will cause the rod d^4 to be thereby raised, as shown in Figs. 1 and 2. A driving-lug c^5 is fixed to the wheel c, with which the frame d engages when the said frame has been deflected, as shown in dotted lines in Fig. 2. The arrow shown in Fig. 1 indicates the direction of rotation of the driving-wheel c.

The operation of my device is as follows: When the wheel c is revolving freely on the collar c' of the shaft a, the shaft-clutch and drum a^8 remain stationary. When the segment c^4 passes under the washer d^8, it raises it up until the armature d^3 almost touches

the cores of the magnets d' d^2. If the magnets are not energized at this time, the spring d^9 will force the system back until the washer d^8 of the rod d^4 rests upon the top of the bearing d^5, and the shaft and system will not be moved by the rotation of the wheel c. Suppose it is desirable to revolve the shaft a and the drum a^8 or other mechanism that may be connected therewith. All that is necessary to be done is to close the electric circuit through the magnets. The current flowing in the circuit need not be strong enough to lift the armature d^3 against the spring d^9, because the segment c^4 will lift the armature by means of the washer d^8, as described. Then a very weak current will hold it in the position against the magnet-cores. In its elevated position the washer d^8 will pass under the segment c^2, and, bearing against the lip c^3, the frame d will be thereby deflected toward the wheel c until a projection from d^5 of the frame d is brought into contact with a driving-lug c^5, which is fixed to the wheel c. This position is shown dotted in Fig. 2. The shaft a will be revolved by this means during the time the electric circuit is maintained closed and while the rod d^4 is held in its extreme outward or upward position by the attraction of armature d^3 by the magnet d' d^2. As soon as the circuit is opened the spring d^9 will force the rod d^4 into its normal position, and from under the lip c^3 the frame d' will again occupy its normal parallel position with reference to wheel c. The lug c^5 and the frame d will become disengaged by virtue of the movement of the frame d and the shaft will cease to revolve. The spring d^{13} holds the frame d in its normal position. Two, three, or more sets of segments and driving-lugs may be placed on the wheel c, so that the wheel need make only a short travel after the circuit has been closed before engaging with the clutch.

By the use and operation of my invention a very powerful and positive clutch is provided, a small electric power is required to operate it, and a maximum clearance of the engaging parts is secured when the clutch is not in operation.

I do not wish to limit my invention to the exact construction shown, as a wide variation may be made therefrom without departing from the spirit thereof.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An electromechanical clutch comprising a driving member, a driven member, an engaging device on one or the other of the members, a means on either of the members for mechanically moving the said engaging device into position for engagement, and an electromagnet for retaining the said device in said engaging position, substantially as set forth.

2. An electromechanical clutch comprising a driving member, a driven member, a movable engaging device on the driven member, a device on the driving member for mechanically moving said engaging device to a position for engagement with the driving member, and an electromagnet for holding said engaging device in said position, substantially as set forth.

3. An electromechanical clutch comprising a driving member, a driven member, a frame pivoted on the driven member, an electromagnet in the said frame, an engaging device, an armature for said magnet for controlling said engaging device, a device on the driving member for lifting said engaging device into an engaging position, and a cam or part of a cam on the driving device whereby said frame is moved on said pivots, into engagement with a driver on the said driving member, substantially as set forth.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 24th day of March, 1900.

RUSSELL E. CRYDER.

Witnesses:
CHARLES F. CHAPMAN,
FORÉE BAIN.