

No. 681,999.

Patented Sept. 3, 1901.

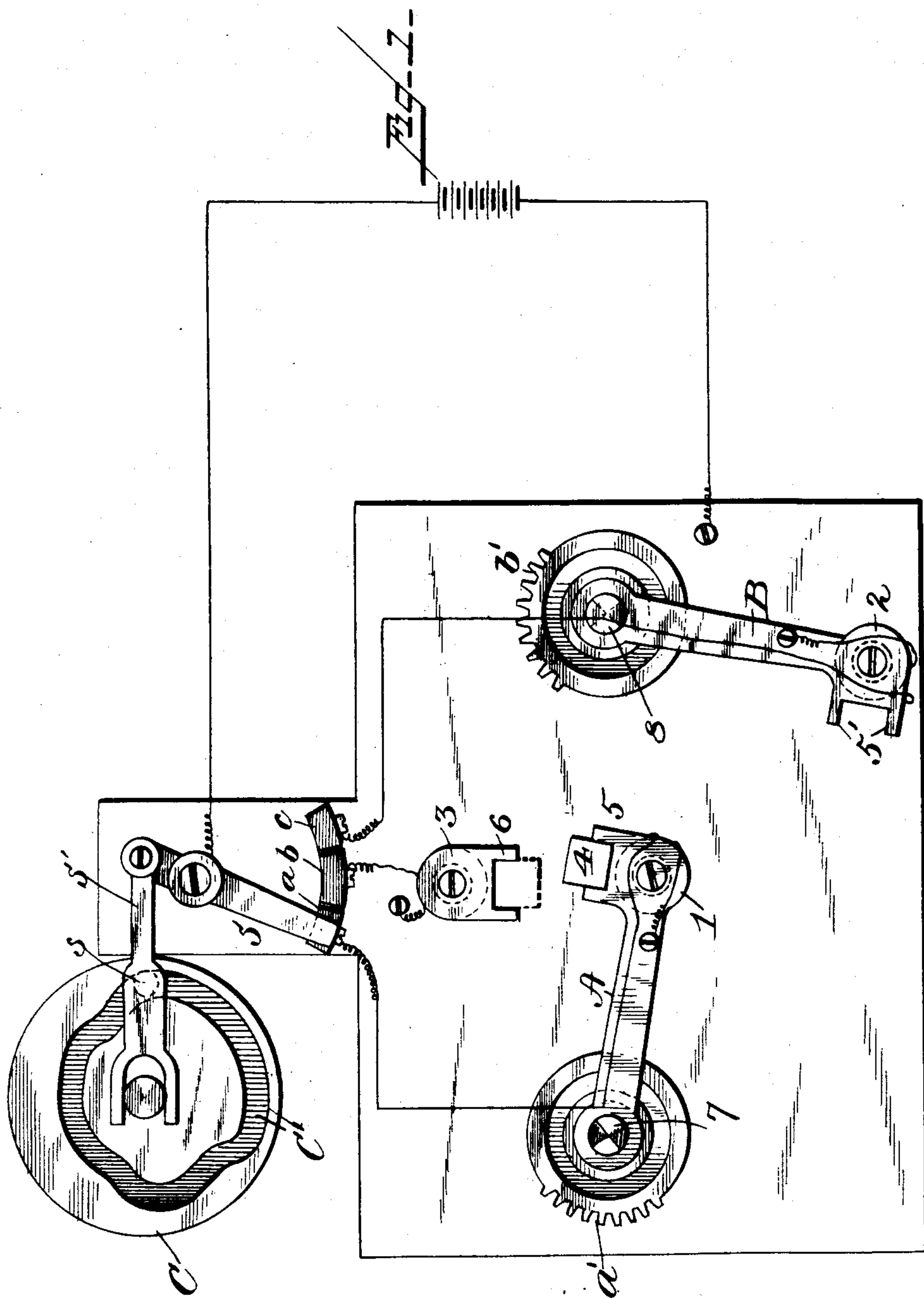
J. P. SWIFT.

ART OF TRANSMITTING BODIES BY MEANS OF ELECTROMAGNETS.

(Application filed Sept. 10, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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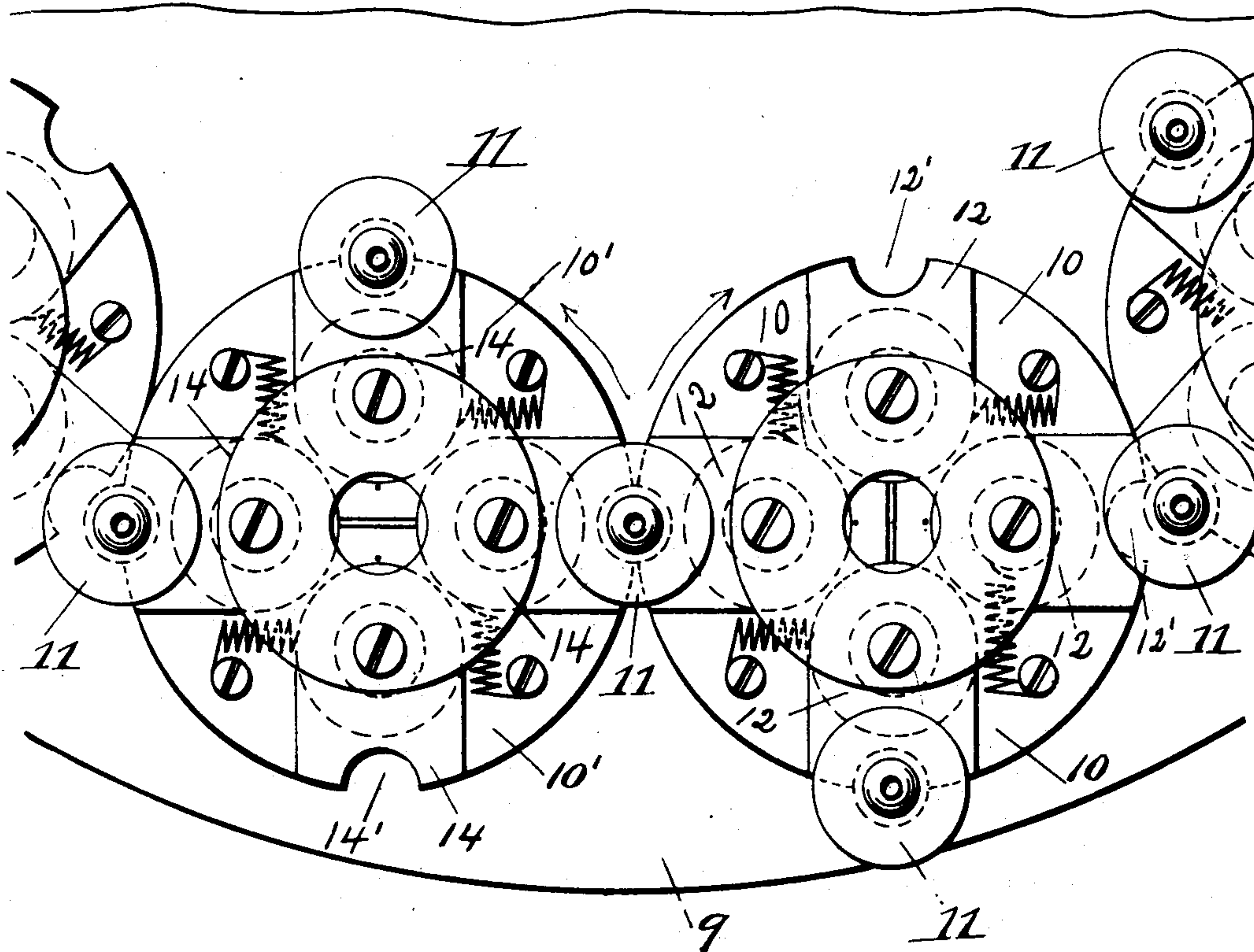


FIG. 2.

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Fig. 3

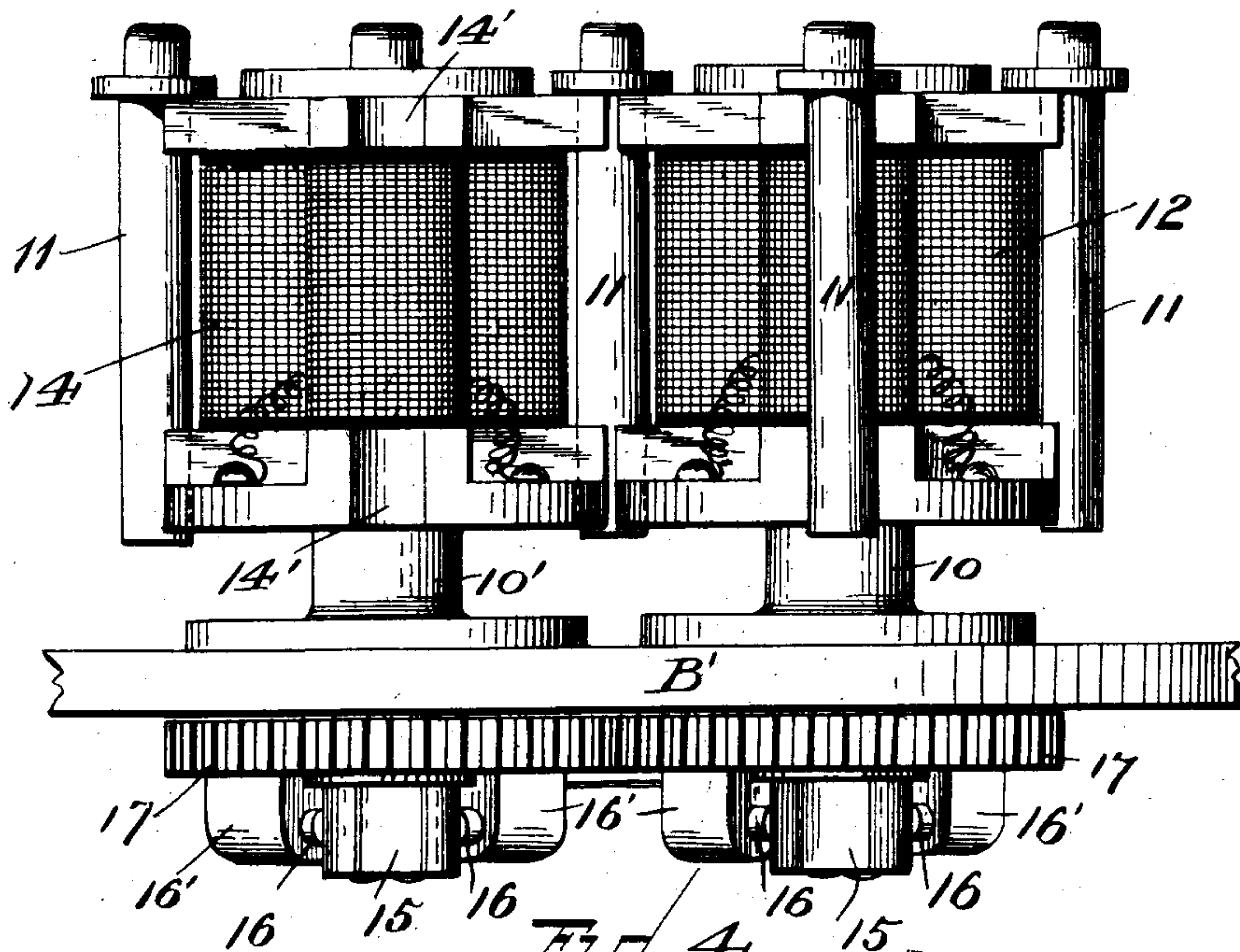
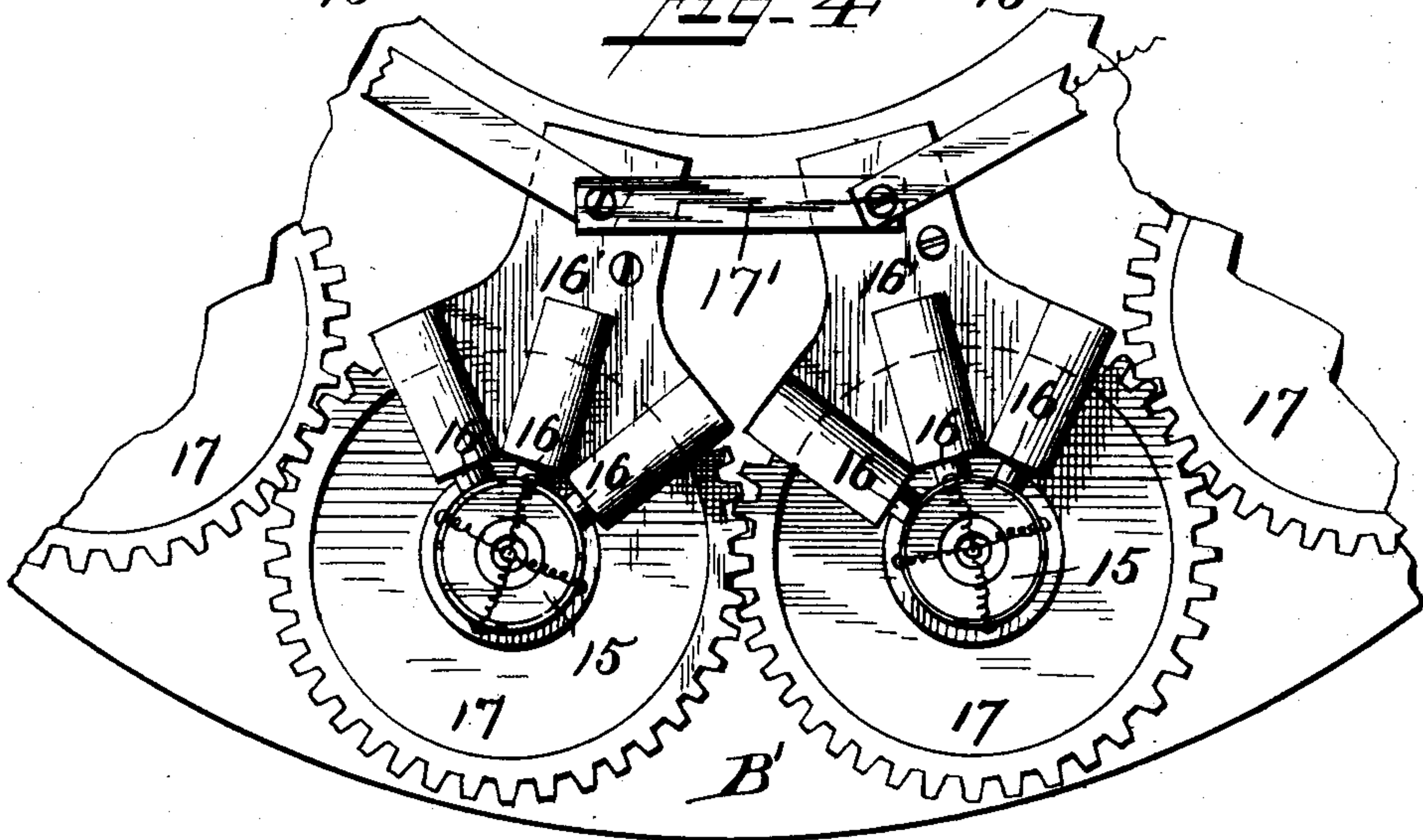


Fig. 4



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UNITED STATES PATENT OFFICE.

JOHN P. SWIFT, OF PAWTUCKET, RHODE ISLAND.

ART OF TRANSMITTING BODIES BY MEANS OF ELECTROMAGNETS.

SPECIFICATION forming part of Letters Patent No. 681,999, dated September 3, 1901.

Application filed September 10, 1900. Serial No. 29,512. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. SWIFT, a citizen of the United States of America, and a resident of Pawtucket, Rhode Island, have invented certain new and useful Improvements in the Art of Transmitting Bodies by Means of Electromagnets, of which the following is a specification.

My invention relates to the art of transmitting bodies from one point to another in a predetermined course by means of electromagnets, all of which may be movable or some movable and some fixed; and the purpose of my invention is to provide a means of transmitting from one point to another in a predetermined course of any desired direction an armature, together with any object or matter that may be attached thereto or fixed thereon, such transmission being accomplished by means of the magnetization and demagnetization of one or more movable electromagnets working in conjunction with each other or in conjunction with one or more fixed electromagnets, such armature being in actual engagement with the poles of said magnets.

My invention consists, substantially, in the arrangement along the course in which it is desired to transmit the body or bodies of a series of electromagnets or a series of groups of electromagnets having their pole-pieces milled out in such a form as to fit the body desired to be transmitted or to fit an armature, to which such body may be attached. These electromagnets may be all movable by revolving about a central shaft or may be movable reciprocally or may be movable in an oscillatory manner—that is, may revolve through a portion of an arc of a circle and back again.

Other forms of arrangement or kinds of movement embodying my invention may be used, the essential element of which is the arrangement of magnets having pole-pieces adapted to receive, hold, and transmit by actual engagement the body to be transmitted or an armature to which said body may be attached, and to release by demagnetization said body either into a suitable receptacle or to the pole-piece or pole-pieces of an adjacent magnet at predetermined intervals.

Figure 1 is a plan of mechanism by which

my improved method may be carried out. Fig. 2 is a detail plan of a modified arrangement. Fig. 3 is a side elevation of the mechanism of Fig. 2, and Fig. 4 is an inverted plan.

The same characters refer to the same parts throughout the various views.

Fig. 1 represents a device in which two or more magnets oscillate through approximately a half-circle and operate in conjunction with fixed magnets situated midway between such oscillating magnets.

In said Fig. 1, 1 and 2 represent end views of two electromagnets attached to arms A B, which are pivoted at 7 and 8, respectively, and have their pole-pieces 5 5 and 5' 5', respectively, adapted to fit the object to be transmitted, which is represented by 4. This object 4 may be a magnetic body itself, or may be an armature to which the body to be transmitted may be attached. 3 is a fixed electromagnet having its pole-pieces 6 6 of the same shape as the electromagnets 1 and 2. The magnet 1 is made to oscillate about its center 7 and is so magnetized by means of suitable commutators that the body 4 is held in engagement during the entire movement of 1 through its arc until 4 enters the pole-pieces of the fixed magnet 3. When the travel of 1 is ended, it is demagnetized and the magnet 3 becomes charged at the same instant, and this retains the armature 4 in position until the magnet 2, revolving through its arc, reaches said armature and receives it into the pole-pieces 5' 5'. 2 is then magnetized and 3 demagnetized, and 2 then reverses its course, bearing the armature 4 along to either another fixed magnet or to such other point as it is desired to carry it in the arc of 2. This process may be repeated indefinitely by the mere multiplication of parts, the course of the body attached to the armature 4 being determined by the position of the shafts 7 8, &c., to which the magnets 1 and 2 are attached.

A simple mechanism for controlling the magnets in Fig. 1 comprises the three blocks a b c, over which the vibrating switch-lever S is moved by the cam C and connecting-bar S'. The cam C is provided with a groove C', into which projects a pin s, carried by the bar S', the said bar having one end bifurcated to straddle the axis of the cam. The groove

C is so shaped with relation to the speed at which the magnet-carrying arms A B are vibrated by their gears $a' b'$ as to cause the switch S to pass from block a to block b at the instant the armature 4 enters the pole-piece 6 of magnet 3, so that magnet 3 will be energized to hold the armature at the moment armature 1 is demagnetized and releases the armature, and, furthermore, the cam will next cause the switch to leave the block b for block c and demagnetize armature 3 at the instant the arm B has brought its pole-piece 5' into engagement with the armature 4, so as to magnetize armature 2, and soon. The mechanism for actuating-gears $a' b'$ is not shown.

Figs. 2, 3, and 4 represent my invention applied to an arrangement of revolving electromagnets. In these figures the electromagnets are arranged in groups of four, each group being mounted upon a central shaft and revolving continuously. The pole-pieces in this arrangement are milled out, so as to receive an armature of cylindrical form, as shown. In these figures 12 12 14 14, &c., are the electromagnets having their pole-pieces milled out, as shown, at 12' 12' 14' 14', &c. These groups of magnets are fixed on revolving heads 10 10', &c., and are so arranged with reference to each other that as they revolve about their respective axes in the direction of the arrows the depression in the pole-pieces of any magnet in one group comes exactly opposite the depression in the pole-pieces of a magnet of the adjacent group. 11 11, &c., are the armatures to be transmitted. The commutators 15 of the various magnets are so arranged that magnet 14 receives from the magnet of an adjacent group an armature, to which is attached the body to be transmitted. At the moment of receiving it the magnet 14 is magnetized and continues magnetized during its revolution until it reaches the magnet 12 of the next adjacent group. As soon as the pole-pieces of the two magnets 14 of one group and 12 of the other group come opposite each other the current is cut off from the magnet 14 and turned onto the magnet 12, which then seizes the armature and bears it around the half-circle or any desired arc until it is seized by a magnet of the next group, and thus borne on through any desired course. The commutators 15 are in segments and are connected to and rotate with the heads 10 10'

and receive the current for the magnets 12 14 from the brushes 16, which are supplied through their carrier-plates 16' from the conductors 17', which connect said plates. The rotary heads 10 10' are continuously rotated in plate B' by their connecting gear-wheels 17, one of which is driven from any suitable source of power. (Not shown.) The commutators being segmental and rotating past the three brushes will cause the necessary break to demagnetize the magnets at the proper time for them to release the armature when it is delivered to the pole-pieces of a magnet of the next series.

It will readily appear that my invention is applicable not only to the mechanism shown in the figures, but also to any case where a body of any size or shape is required to move through a given course.

The two forms of mechanism illustrated in Figs. 1, 3, and 4 for making and breaking the various circuits form no part of the present invention.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The process of transmitting a body or bodies from one point to another, which consists in placing a movable magnet in proper relation to a second magnet, then energizing the first magnet to cause it to attract and hold said body till brought to said second magnet, and then energizing the second magnet and demagnetizing the first-named magnet.

2. The process of transmitting a body or bodies through a predetermined course, which consists in arranging a series of rotary groups of magnets in the order or course desired, then magnetizing certain magnets of one series to attract and hold the body or bodies to be transmitted until said body or bodies is or are brought to a magnet of the next group, then demagnetizing the said magnet of the first group and energizing the magnet of the second group and maintaining such energizing till the body is brought to a magnet of the third group and so on indefinitely.

Signed at Pawtucket this 8th day of September, 1900.

JOHN P. SWIFT.

Witnesses:

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