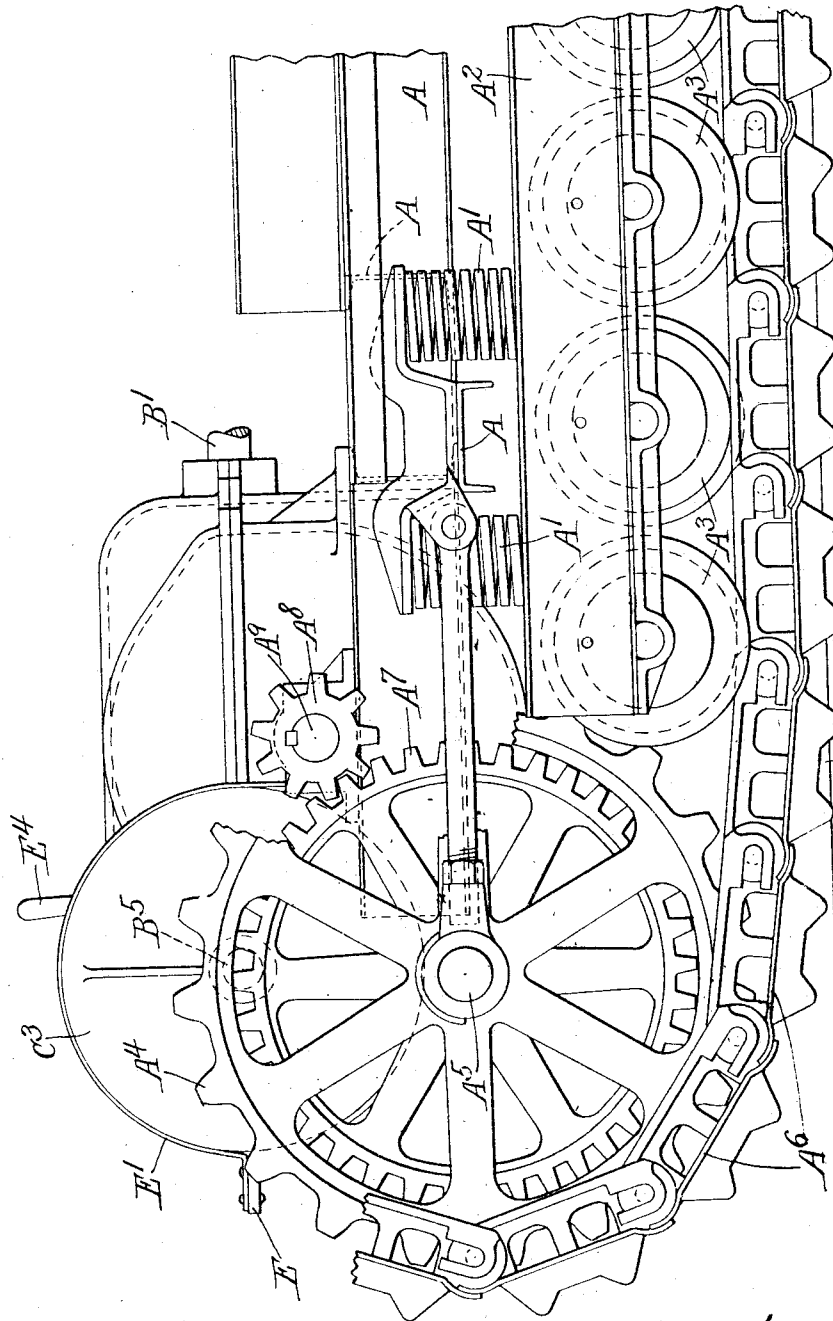


CLUTCH.

Patented May 23, 1916.

4 SHEETS—SHEET 1.

Fig. 1.



Inventor
Emil F. Norelius.

by *Parker & Carter*
Attorneys.

E. F. NORELIUS.

CLUTCH.

APPLICATION FILED FEB. 16, 1914.

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4 SHEETS—SHEET 2.

1,184,007.

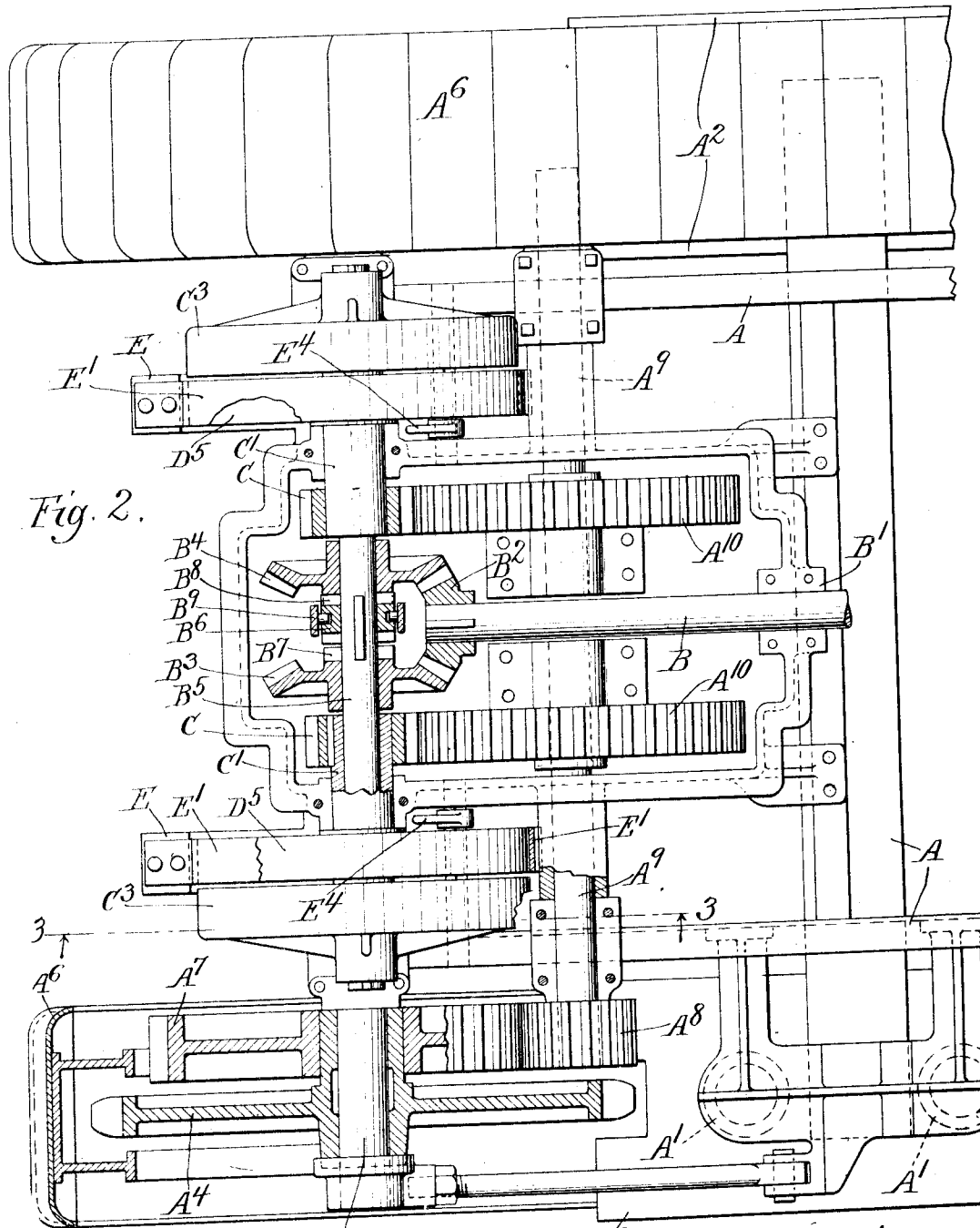


Fig. 2.

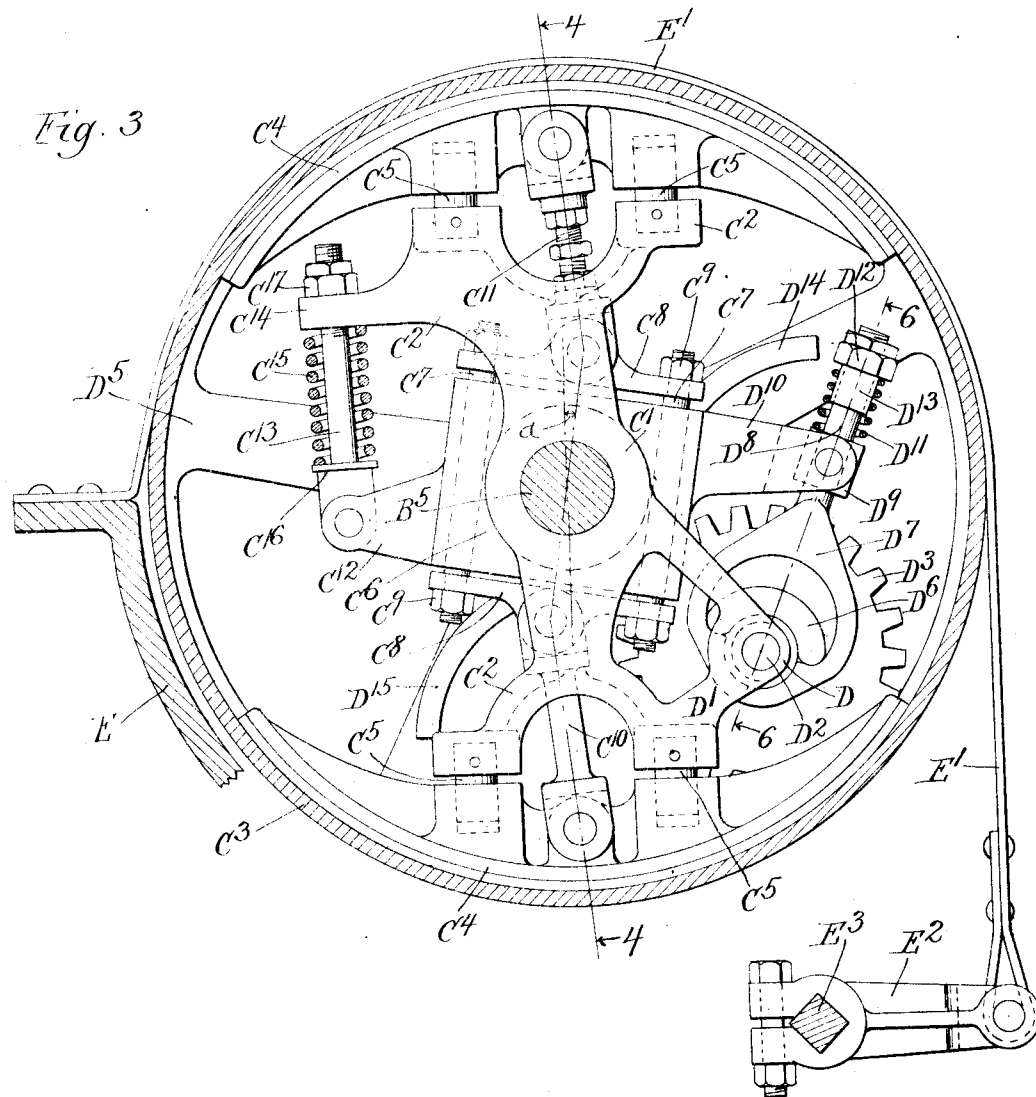
Witnesses.
Edward T. Wray.
Minnie M. Lindenau

Inventor.
Emil F. Norelius
by *Parsons & Carter*
Attorneys

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4 SHEETS—SHEET 3.



Witnesses.
Edward T. Wray.
Minnie M. Lindenau.

Inventor
Emil F. Norelius
by *Parkes & Co.*
Attorneys

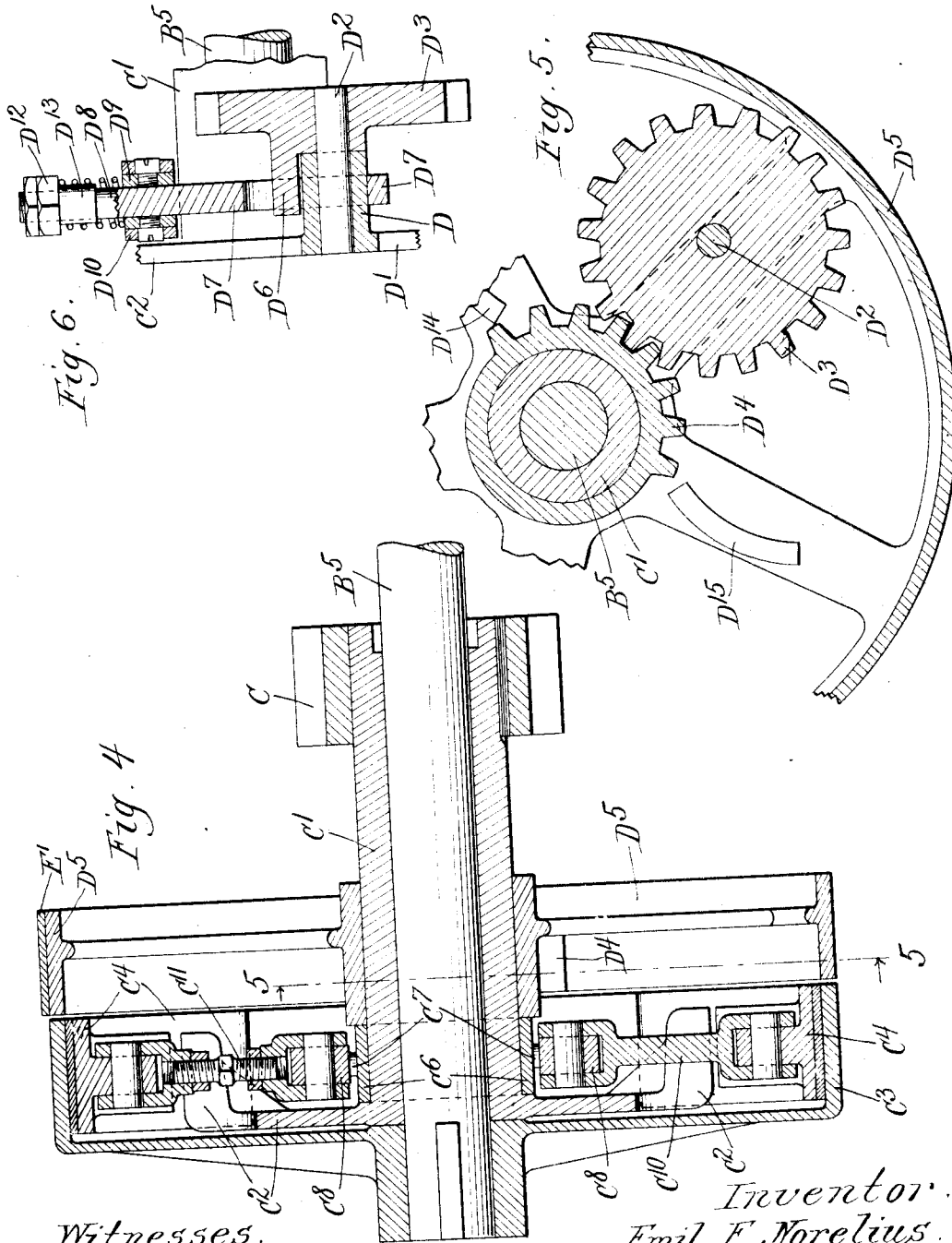
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4 SHEETS—SHEET 4.



Witnesses.
Edward T. Wray.
Minnie M. Lindeman

Inventor.
Emil F. Norelius.
by *Parker & Carter*
Attorneys.

UNITED STATES PATENT OFFICE.

EMIL F. NORELIUS, OF PEORIA, ILLINOIS, ASSIGNOR TO HOLT MANUFACTURING COMPANY, OF PEORIA, ILLINOIS, A CORPORATION OF CALIFORNIA.

CLUTCH.

1,184,007.

Specification of Letters Patent.

Patented May 23, 1916.

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To all whom it may concern:

Be it known that I, EMIL F. NORELIUS, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented a certain new and useful Improvement in Clutches, of which the following is a specification.

My invention relates to improvements in clutches suitable for a great number of purposes but particularly best adapted to use in connection with tractors of the caterpillar type. I have illustrated it for the sake of convenience as applied to a caterpillar tractor which I have shown in a more or less fragmentary diagrammatic form.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a detail side elevation of one end of a tractor with parts broken away; Fig. 2 is a detail plan view in section with parts broken away; Fig. 3 is a section along line 3—3 of Fig. 2 on an enlarged scale with parts omitted; Fig. 4 is a section along line 4—4 of Fig. 3; Fig. 5 is a section along line 5—5 of Fig. 4; and Fig. 6 is a section along line 6—6 of Fig. 3.

Like parts are indicated by like letters throughout the several figures.

A is the main frame supported by means of the springs A¹ from the roller frame A² which roller frame is supported with the supporting rollers A³ pivotally mounted thereon.

A⁴ is a driving sprocket mounted on an axle A⁵ on the frame A.

A⁶ is a caterpillar chain adapted to travel over the driving sprocket A⁴ and furnish a track along which the rollers A³ may travel.

A⁷ is a bull gear on the sprocket A⁴ in mesh with a bull pinion A⁸ on a shaft A⁹ rotatably mounted on the frame A. This shaft carries at its inward end a reduction gear A¹⁰.

It will be noted that the parts above described are in duplicate, one on either side of the machine. They are, however, identical in every respect, and a description of one will suffice for both.

B is a drive shaft driven by any suitable source of power such as an engine not here shown. This drive shaft is arranged in the bearing B¹ and along the line parallel with the central axis of the frame. It carries on

its end a miter pinion B² constantly in mesh with the miter gears B³ B⁴, which gears are 55 rotatably mounted but held against longitudinal movement along a shaft B⁵.

B⁶ is a sliding clutch member splined to the shaft B⁵ in opposition to clutch jaws B⁷ B⁸ on the gears B³ B⁴ respectively and adapted 60 to be actuated by a yoke B⁹ controlled in any suitable manner to reverse the direction of movement of the shaft B⁵ with respect to the shaft B to move the machine forward or reverse.

The shaft B⁵ has at either end a combined clutch and brake assembly. These assemblies are in each case identical, and a description of one will suffice for both.

C is a driving pinion in mesh with the 70 gear A¹⁰ mounted on the sleeve C¹, which sleeve is rotatable on the shaft B⁵ and carries a clutch spider C².

C³ is a clutch drum keyed to the shaft B⁵.

C⁴ C⁵ are brake shoes opposed to the drum 75 C³ and slidable along the guide pins C⁶ on the spider C².

C⁶ is a rocker block rockably or rotatably mounted about the sleeve C¹ inside the drum C³. This rocker block has slidably mounted 80 on either side of the shaft B⁵ the pins C⁷ shouldered to engage the yokes C⁸ which are held in position against the shoulders by the nuts C⁹.

C¹⁰ is a pivotal link interposed between 85 one of the yokes C⁸ and the clutch shoes C⁴. C¹¹ is an adjustable pivotal link interposed between the other yoke C⁸ and shoe C⁴. The yokes C⁸ are thus free to move slightly with respect to the block C⁶.

C¹² is a controlling arm projecting outwardly from one side of the rocker block C⁶ having pivotally mounted thereon a pin C¹³, which pin is in slidable engagement with an arm C¹⁴ on the spider C². The 95 spring C¹⁵, surrounding the pin pressing against the shoulder C¹⁶ at one end and the arm C¹⁴ at the other, tends to separate the arms C¹² C¹⁴ and thus yieldingly decrease the angle alpha and to wedge the blocks C⁴ 100 apart and clamp them against the surface of the brake drum C³. This movement is limited by the nuts C¹⁷.

D is a hub carried on the arm D¹ of the spider C². This hub carries a shaft D² on 105 which is rotatably mounted a pinion D³.

This pinion is in mesh with the fragmentary gear D⁴ on a brake wheel D⁵ which wheel is rotatably mounted on the sleeve C¹.

D⁶ is a cam carried by the pinion D³.

- 5 D⁷ is a cam yoke in the path of the cam D⁶. D⁸ is a control rod projecting from said cam yoke and in slidably engagement with the block D⁹ pivoted on the arm D¹⁰ on the rocker block C⁶.

- 10 D¹¹ is a yielding spring interposed between the block D⁹ and the adjustable nut D¹².

- D¹³ is a shoulder on the pin D⁸ to limit the movement of the pin with respect to the
15 block D⁹.

D¹⁴ D¹⁵ are stops on the clutch wheel D⁷ to limit the rotary progress of the pinion D³ with respect to the wheel.

- E is a brake and guard bracket on the
20 frame A partially surrounding the brake wheel D⁵.

E¹ is a brake band engaging the wheel D⁵ and anchored at one end on the bracket E.

- E² is a brake lever to which is pivotally
25 mounted the free end of the brake band E¹.

E³ is a brake shaft on which the lever is mounted and E⁴ is a hand lever whereby the brake band may be tightened.

- It will be evident that while I have
30 shown in my drawings an operative device, still many changes might be made in size, shape and arrangement of parts without departing materially from the spirit of my invention. I wish, therefore, that my draw-
35 ings be regarded as in a sense diagrammatic.

- The use and operation of my invention are as follows: In operating the tractor, the engine will, of course, be started in the usual manner and the clutch thrown in to move
40 the machine either forward or backward, depending on which of the two miter gears B³ B⁴ is in mesh with the pinion B². Since the springs C¹⁵ hold the two clutches in the operating position, the machine will move
45 forward in a straight line, since both caterpillars will be moved forward with equal force and velocity. When it is desired, however, to move the caterpillar to one side or the other to steer it about, this is to be done
50 by decreasing the forward movement of one of the driving or caterpillar wheels. This is done by manipulation of the brake band. The brake band is tightened up so as to arrest at first the movement of the brake
55 wheel. As this takes place the clutch spider continues to rotate, now, however, more rapidly than the brake wheel, and this results in a rotation of the pinion on the spider, owing to the change in relative velocities.
60 The result of this is to move the cam on the pinion around to draw in on the cam yoke and gradually rock the rocker block against the tension of the larger spring to increase the angle alpha and draw the two clutch
65 shoes out of contact with the clutch drum.

This continues until the pinion comes in contact with one or the other of the stops on the brake wheel. Then no further relative movement can be had and the braking effect of the brake band on the brake wheel is
70 transmitted through the gearing to the caterpillar itself. Thus a single movement of the brake lever operates to disconnect the clutch first so as to no longer drive the caterpillar and subsequently to exert a braking
75 effect so as to decrease its forward movement to turn the machine.

I claim:

1. In a clutch, the combination with a driving element and a driven element of a
80 connection interposed between said elements to transmit power from the driving element to the driven element, spring means for normally maintaining said operative relation between the connection and the two
85 elements, a motion arresting device with means for actuating the same, and means responsive to actuation of said motion arresting device for preliminarily overcoming the effect of said spring means and thereby dis-
90 connecting the driven element from the driving element and subsequently positively transmitting the motion arresting effect from said device through the said connection to the driven element to positively ar-
95 rest its movement.

2. In a clutch, the combination with a driving element and a driven element, of means for normally connecting both said
100 elements to transmit power from the driving element to the driven element, a motion arresting device with means for actuating the same, means responsive to actuation of said motion arresting device for preliminarily disconnecting the driven element
105 from the driving element and subsequently positively transmitting the motion arresting effect from said device to the driven element and positively arrest its movement, and means including a spring operated con-
110 nection interposed between the driving element and the driven element for automatically and positively restoring them to connected relation for the transmission of power when the motion arresting device is ren-
115 dered inoperative.

3. In a clutch, the combination with a driving shaft carrying a clutch drum, of a driven shaft, connections carried by the
120 driven shaft and means for causing said connections to frictionally engage the clutch drum whereby motion is transmitted from the driving shaft to the driven shaft, a brake drum mounted on the driven shaft, means
125 for arresting the movement of the brake drum, and a power disconnecting element interposed between the brake drum and said connections for positively disconnecting the driven shaft from the driving shaft respon-
130 sive to retarded movement of the brake

drum, and means carried by the brake drum for positively transmitting its motion arresting effect through the connections to the driven member, to yieldingly arrest its movement.

1. In a clutch, the combination with a driving shaft, and a clutch drum mounted thereon, a driven shaft, clutch shoes carried by the driven shaft and acting to transmit power from the driving shaft to the driven shaft, a brake drum mounted on the driven shaft, connections interposed between the brake drum and said shoes operative upon arrested movement of the drum to preliminarily positively disconnect the clutch shoes from the clutch drum, and subsequently transmit the motion arresting effect from the brake drum to the driven shaft to positively arrest its movement, and means for automatically restoring said clutch shoes to operative engagement with respect to the clutch drum when the brake drum becomes inoperative and its motion arresting effect is removed from the driven shaft.

5. In a clutch, the combination with a

driving shaft, and a clutch drum mounted thereon, a driven shaft, clutch shoes carried by the driven shaft and acting to transmit power from the driving shaft to the driven shaft, a brake drum mounted on the driven shaft, connections interposed between the brake drum and said shoes operative upon arrested movement of the drum to preliminarily positively disconnect the clutch shoes from the clutch drum, and subsequently transmit the motion arresting effect from the brake drum to the driven shaft to positively arrest its movement, and spring means for automatically restoring said clutch shoes to operative engagement with respect to the clutch drum when the brake drum becomes inoperative and its motion arresting effect is removed from the driven shaft.

In testimony whereof, I affix my signature in the presence of two witnesses this 9th day of February, 1911.

EMIL F. NORELIUS.

Witnesses:

H. B. BAKER,

F. T. MEEKER.