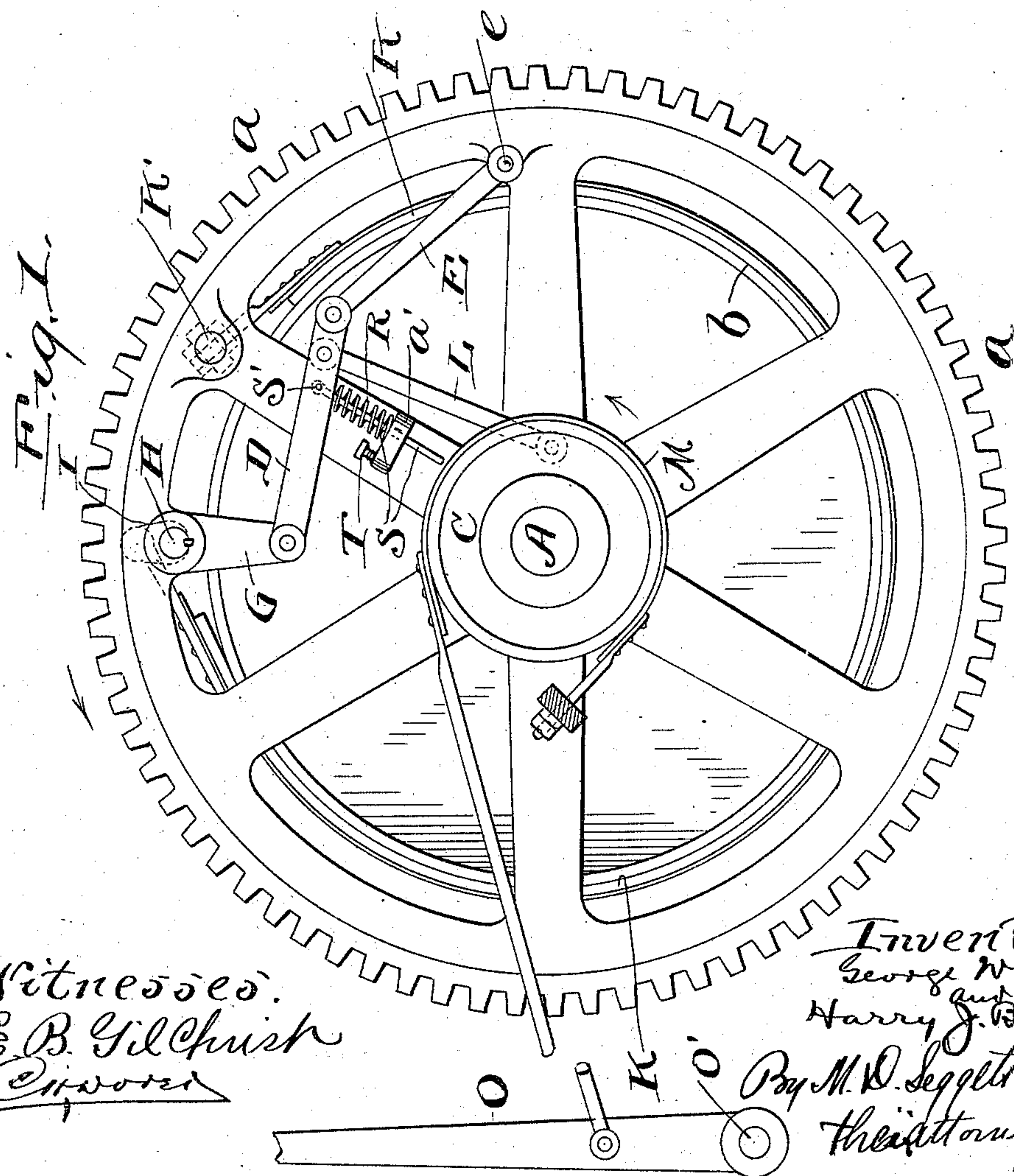
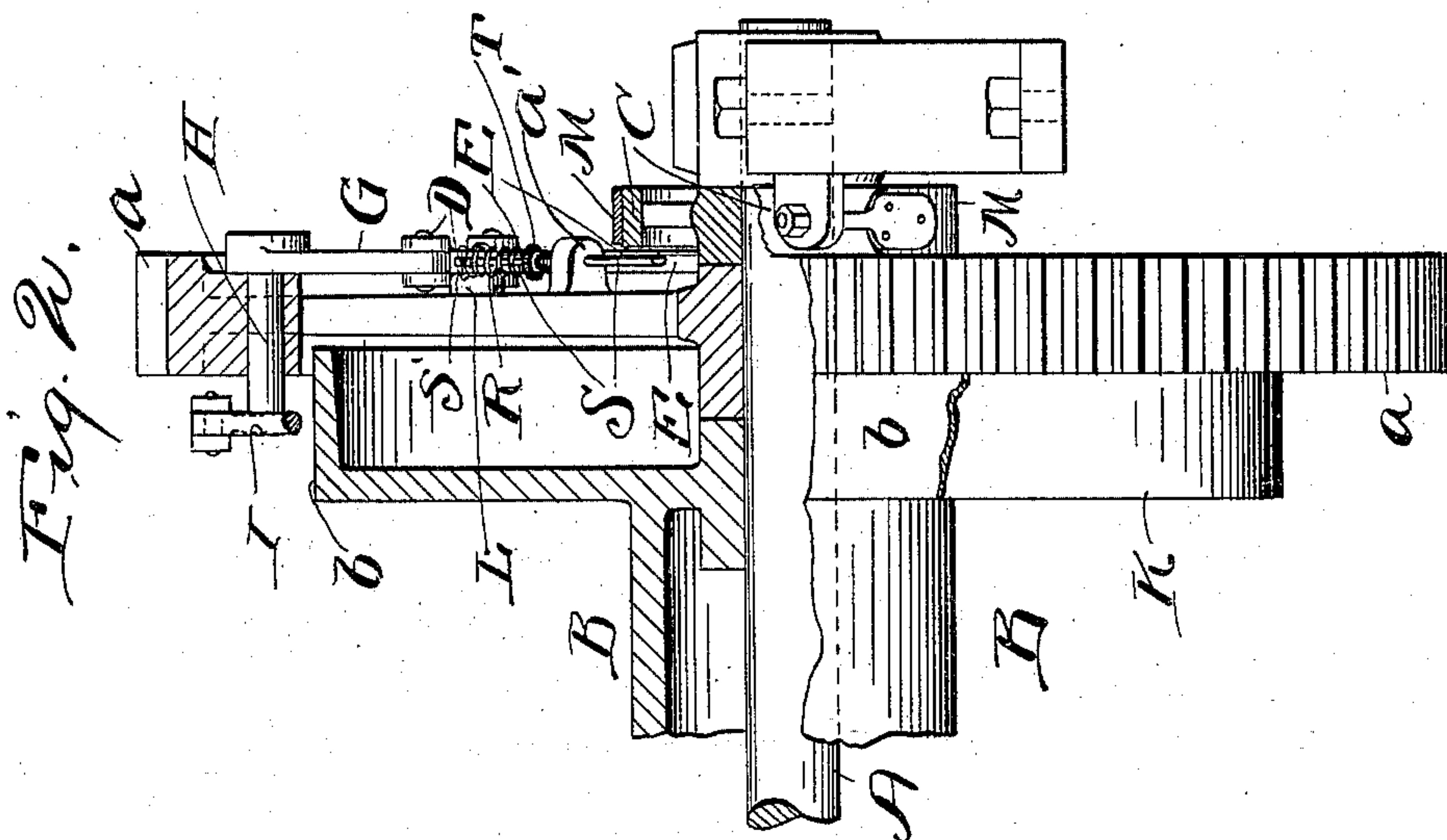


(No Model.)

G. W. KING & H. J. BARNHART.
FRICTION CLUTCH.

No. 558,691.

Patented Apr. 21, 1896.



Witnessed:
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UNITED STATES PATENT OFFICE.

GEORGE W. KING AND HARRY J. BARNHART, OF MARION, OHIO, ASSIGNORS
TO THE MARION STEAM SHOVEL COMPANY, OF SAME PLACE.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 558,691, dated April 21, 1896.

Application filed May 7, 1895. Serial No. 548,382. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. KING and HARRY J. BARNHART, of Marion, in the county of Marion and State of Ohio, have invented certain new and useful Improvements in Friction-Clutches; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

Our invention relates to improvements in friction-clutches designed for establishing operative connection between a rotating shaft and a drum, wheel, or rotatable body loosely mounted on the shaft.

Of all the friction-clutches heretofore devised the strap or brake-band type presents the simplest form; but the great difficulty heretofore encountered in applying power to tighten the strap or band has prevented general use of this type of friction-clutches.

We have devised an improved friction-clutch of the type referred to, wherein we utilize the power that drives the machinery to tighten the strap or brake-band by means of a simple system of connecting rods and levers and a small brake-wheel manipulated by a brake-band and hand-lever; and our invention consists in certain features of construction and in combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings we have shown a preferable construction of friction-clutch embodying our invention.

Figures 1 and 2 are elevations taken at right angles to each other, portions being broken away, and in section in Fig. 2 to more clearly show the construction.

Referring to the drawings, A designates a rotating shaft and *a* the driving gear or wheel operatively mounted upon said shaft, and which, we will suppose, is driven in the direction indicated by the arrow.

B represents a drum, pulley, or rotatable body loosely mounted upon the shaft at one end of the hub of gear *a*, and between which rotatable body and the shaft it is desired to establish and interrupt operative connection, as occasion may require.

A brake-wheel C is loosely mounted upon the shaft A at the other end of the hub of gear

a; but said brake-wheel rotates with the shaft, as will hereinafter appear.

D and E designate a pair of toggle-arms that are preferably arranged about midway between the peripheries of brake-wheel C and driving-wheel *a*. The outer end of toggle-arm E is pivoted, as at *e*, to wheel *a*, and the outer end of the other toggle-arm D is operatively connected with the outer end of an arm or lever G, operatively mounted upon a rock-shaft H, that is shown journaled in the rim of wheel *a*. Rock-shaft H is provided with another arm or lever I, to the outer end of which is suitably attached brake strap or band K, that is adapted to frictionally engage the annular rim or friction-surface *b*, with which drum or rotatable body B is provided. The other end of brake-strap K is shown attached to gear or wheel *a* at K', Fig. 1. Toggle-arms D and E, preferably near their joint or connection with each other, are operatively connected by means of a link L with brake-wheel C, and the peripheral surface of the latter is engaged by a brake-band M, that at one end is shown attached to any relatively stationary object, and at its other end is operatively connected with a hand-lever O, that is fulcrumed, as at O', to any suitable support.

R represents a spring that acts in the direction to move the toggle-arms outwardly from a straightened position, said spring being preferably a coil-spring confined upon a rod S, that at one end is pivoted to one of the toggle-arms, as at S', and extends easily through a hole in a lug *a'*, located on one of the arms of gear *a*, between the toggle-arms and hub of said gear, and a stop T to prevent the toggle-arms from moving inwardly beyond a straightened position is provided, said stop being preferably adjustable toward and from the toggle-arms and consisting preferably of a bolt or screw engaging a correspondingly-threaded hole in the aforesaid lug *a'*.

By the construction hereinbefore described it will be observed that as brake-wheel A rotates with the shaft, spring R and centrifugal force cause toggle-arms D and E to move outwardly in the direction of the periphery of wheel *a*, and thereby, through the intervention of rock-shaft H and arms or levers G and

I, loosen brake-strap K, and it will further be observed that the elasticity of brake-strap K will assist in said loosening operation. Spring R might be dispensed with, as the centrifugal force together with the assistance of the elasticity of the brake-strap would be sufficient; but the spring is a valuable addition because it maintains the parts in a desirable position when the machinery is not in motion, and it also assists in lifting or moving outwardly toggle-arms D and E when said arms are approximately in a straight line. It will be observed that toggle-arms D and E exert their greatest force on brake-strap K when they are in line or approximately in line; but when hand-lever O is actuated in the direction of the operator, brake-band M will be tightened upon brake-wheel C, causing said wheel to stop or slacken its speed while the other parts rotate or revolve with the shaft, whereby through the intervention of connecting-rod L toggle-arms D and E are actuated inwardly toward the shaft, causing arm or lever G, together with rock-shaft H and arm or lever I, to move in the direction required to tighten strap or band K. Stop T, as already indicated, prevents toggle-arms D and E from being actuated inwardly beyond a straight line or slightly beyond a straight line when they are desired to assist in locking the clutch. Said toggle-arms may, however, be moved as nearly into a straightened position as will produce the best results.

It is obvious that by the construction hereinbefore described a very small amount of power applied to lever O will apply the clutch, because the power of the driving machinery is utilized in the application of the clutch.

What we claim is—

1. The combination of a rotating shaft, drum or rotating body loosely mounted upon said shaft and provided with a friction-surface, driving-wheel operatively mounted upon the shaft, band or strap K adapted to frictionally engage the aforesaid friction-surface, one end of said strap being suitably attached to the driving-wheel, toggle-arms D and E, rock-shaft H with its arms or levers G and I, said arms, rock-shaft and levers being borne by the driving-wheel and lever I being operatively connected with the other end of the aforesaid strap or band, brake-wheel C loose upon the shaft, said brake-wheel being operatively connected with the toggle-arms, band M adapted to frictionally engage the brake-wheel and means for applying said band, all arranged and operating substantially as shown, for the purpose specified.

2. The combination of a rotating shaft, drum or rotating body loosely mounted upon

said shaft and provided with a friction-surface, driving-wheel operatively mounted upon the shaft, band or strap adapted to frictionally engage the aforesaid friction-surface, one end of said strap being suitably attached to the driving-wheel, toggle-arms D and E arranged and supported substantially as indicated, mechanism operatively connecting the other end of the aforesaid strap or band with the toggle-arms, brake-wheel C loose upon the shaft and operatively connected with the toggle-arms, band M adapted to frictionally engage the brake-wheel and means for applying said band, and a suitably-supported spring acting to move the toggle-arms outwardly, all arranged and operating substantially as shown, for the purpose specified.

3. The combination of a rotating shaft, drum or rotating body loosely mounted upon said shaft and provided with a friction-surface, driving-wheel operatively mounted upon the shaft, band or strap adapted to frictionally engage the aforesaid friction-surface, one end of said strap being suitably attached to the driving-wheel, toggle-arms D and E arranged and supported substantially as indicated, mechanism operatively connecting the other end of the aforesaid strap or band with the toggle-arms, brake-wheel C loose upon the shaft and operatively connected with the toggle-arms, band M adapted to frictionally engage the brake-wheel and means for applying said band, and a stop for limiting the inward movement of the toggle-arms, substantially as shown, for the purpose specified.

4. The combination of a rotating shaft, drum or rotating body loosely mounted upon said shaft and provided with a friction-surface, driving-wheel operatively mounted upon the shaft, band or strap adapted to frictionally engage the aforesaid friction-surface, one end of said strap being suitably attached to the driving-wheel, toggle-arms D and E arranged and supported substantially as indicated, mechanism operatively connecting the other end of the aforesaid strap or band with the toggle-arms, brake-wheel C loose upon the shaft and operatively connected with the toggle-arms, band M adapted to frictionally engage the brake-wheel and means for applying said band, and a stop for limiting the inward movement of the toggle-arms, substantially as shown and described.

In testimony whereof we sign this specification in the presence of two witnesses.

GEORGE W. KING.

HARRY J. BARNHART.

Witnesses:

EDW. E. WEBBER,

H. C. WINSLOW.