No. 754,748. PATENTED MAR. 15, 1904.

J. COCKER & C. DENN.

ELECTRIC STOP MOTION FOR WARPING MACHINES.

APPLICATION FILED JAN. 30, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

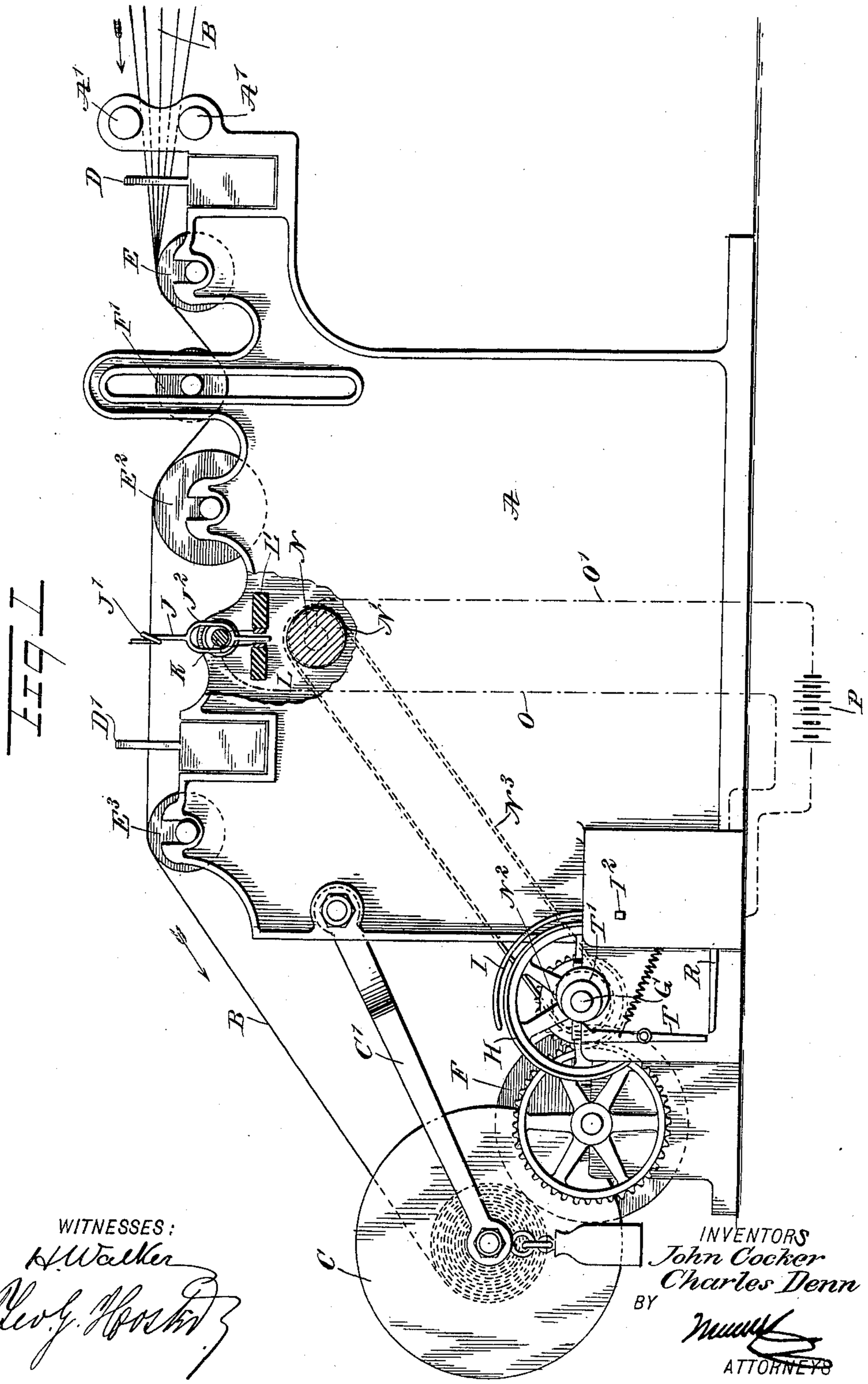


FIG. 1.

WITNESSES:
H. Walker
Rev. J. Howard

INVENTORS
John Cocker
Charles Denn
BY
ATTORNEYS

No. 754.748. PATENTED MAR. 15, 1904.

J. COCKER & C. DENN.

ELECTRIC STOP MOTION FOR WARPING MACHINES.

APPLICATION FILED JAN. 30, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig 2

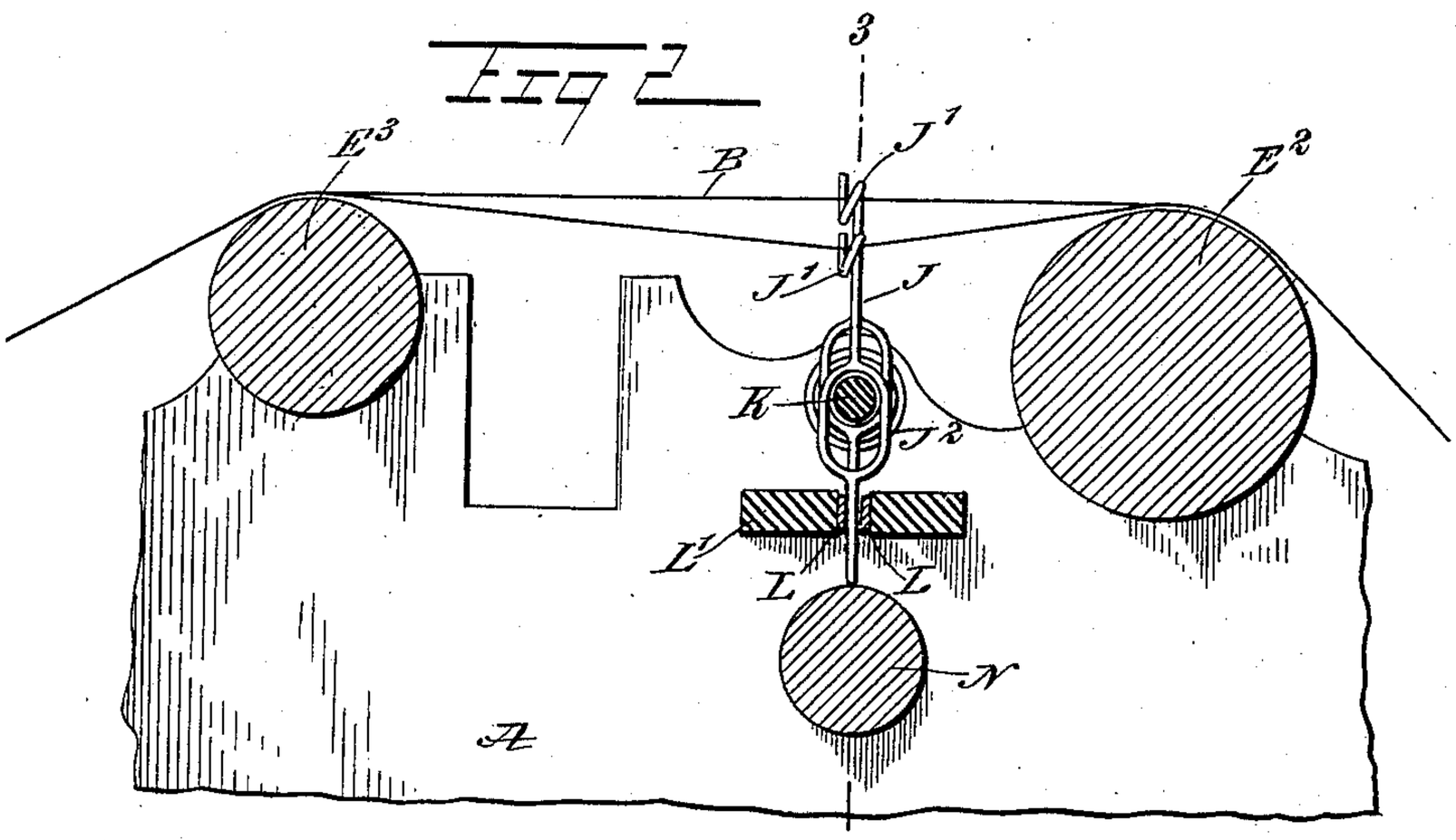


Fig 3

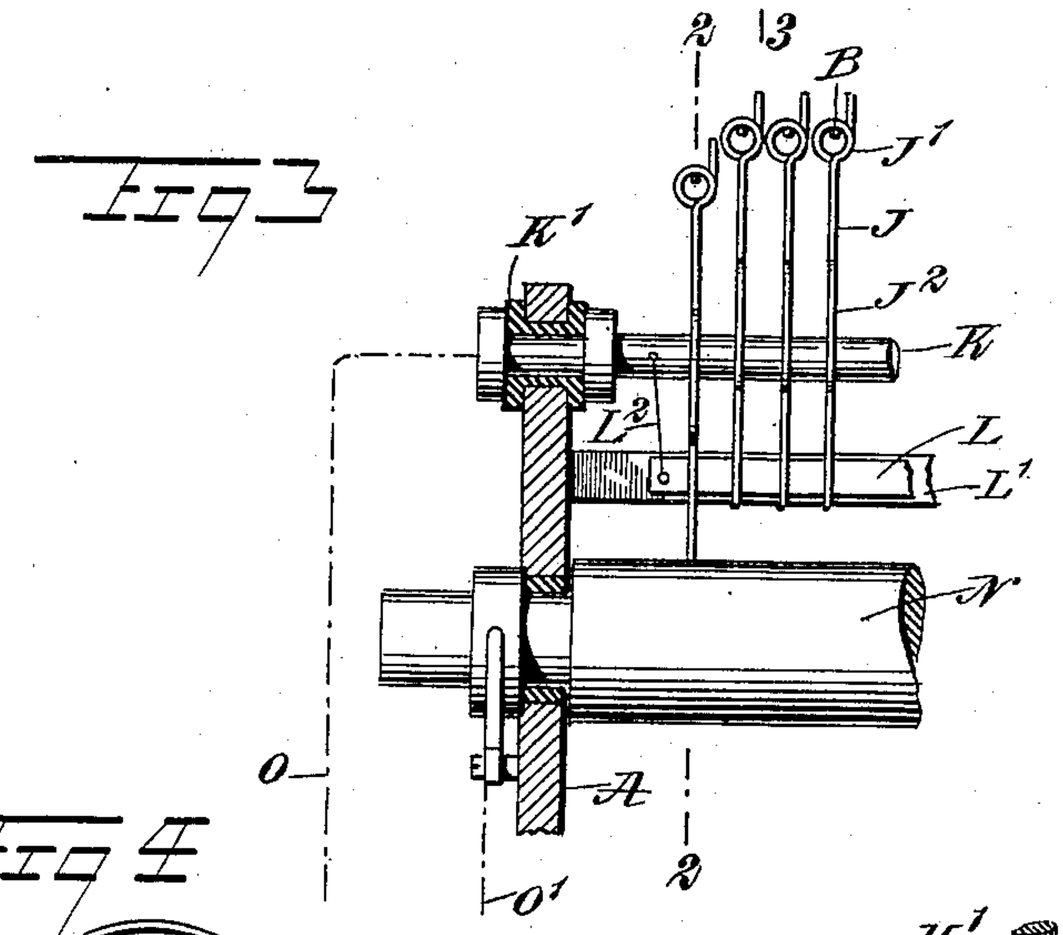


Fig 4

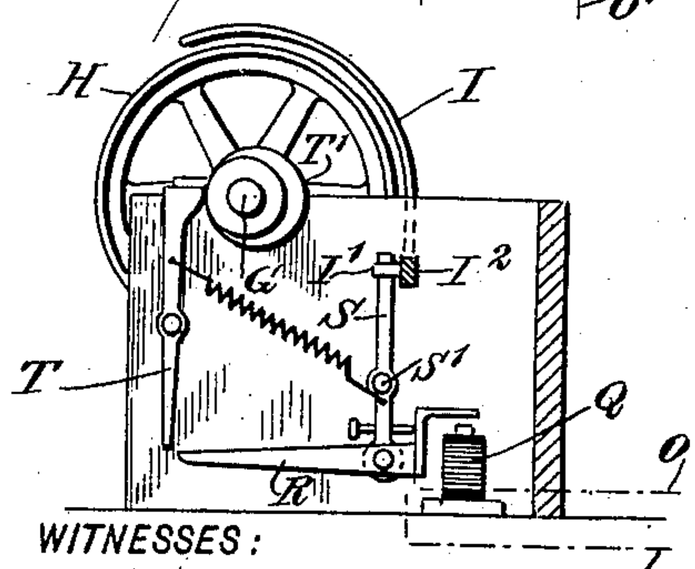
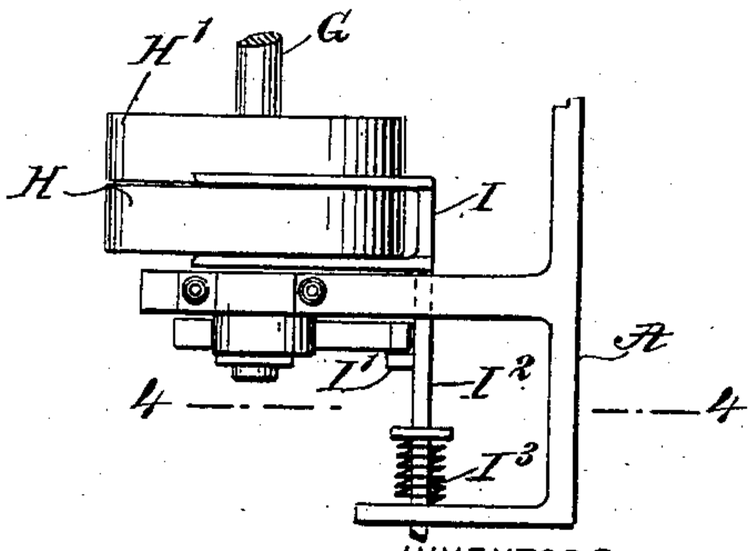


Fig 5



WITNESSES:

H. Walker

Rud. J. Hoster Jr.

INVENTORS

John Cocker

Charles Denn

BY Munn & Co

ATTORNEYS

No. 754,748. Patented March 15, 1904.

UNITED STATES PATENT OFFICE.

JOHN COCKER AND CHARLES DENN, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC STOP-MOTION FOR WARPING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 754,748, dated March 15, 1904.

Application filed January 30, 1902. Serial No. 91,876. (No model.)

To all whom it may concern:

Be it known that we, JOHN COCKER and CHARLES DENN, citizens of the United States, and residents of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Electric Stop-Motion for Warping-Machines, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved electric stop-motion for warping-machines arranged to form a permanent fixture of the warping-machine and adapted to stop the motion in case a yarn or thread breaks and prevent the manufacture of imperfect goods.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of a warping-machine provided with the improvement, parts being shown in section. Fig. 2 is an enlarged sectional side elevation of the circuit-closer and adjacent parts of the warping-machine, the section being on the line 2 2 of Fig. 3. Fig. 3 is a transverse section of the same on the line 3 3 of Fig. 2. Fig. 4 is a sectional side elevation of the electrically-actuated belt-shifting mechanism, the section being on the line 4 4 of Fig. 5; and Fig. 5 is a plan view of the same.

The electric stop-motion presently to be described in detail forms a permanent part of the warping-machine and is thus distinguished from the one shown in the Letters Patent of the United States, No. 512,013, granted January 2, 1894, to Clayton Denn, John Cocker, and Charles Denn. In this patent the circuit-closer is on the creel and controls the electrically-actuated belt-shifter for the belt on the fast and loose pulleys of the warping-machine.

The warping-machine (shown in Fig. 1) is mounted on a suitably-constructed frame A, and the yarns B from the creel (not shown) wind on the usual beam C, hung on arms C′, pivoted on the main frame A. The yarns B on reaching the warping-machine pass between the usual guide-rods A′ and then extend through the expansion-reed D, and next pass over the carrying-roller E, then under the drop-roller E′ and over the measuring-roller E^2, and then through the expansion-reed D′, to finally pass over the roller E^3 to the beam C. The latter is driven in the usual manner from the revolving drum F, geared with the driving-shaft G, carrying the fast and loose pulleys H and H′, connected by belt with other machinery to impart a rotary motion to the said shaft G, the belt being controlled by a belt-shifter I, electrically actuated, as hereinafter more fully described, whenever a yarn or a thread breaks so as to move the belt from the fast pulley to the loose pulley to stop the machine.

Each yarn or thread B in its passage from the measuring-roller E^2 to the roller E^3 passes through an eye J′ of a rod J, suspended on the yarn or thread as long as the latter is tightly stretched between the rollers E^2 and E^3. Each rod J forms a circuit-closer and is provided with a loop J^2, through which extends a metallic rod K, and the lower portion of each rod J passes between metallic strips L, held on a cross-board L′, of wood or other suitable non-conducting material, and attached to the sides of the main frame A.

Below the board L′ and its strips L is arranged a metallic roller N, journaled in suitable bearings in the main frame A and connected by pulleys N′ and N^2 and belt N^3 with the main shaft G, so that when the machine is in motion the said roller N is rotated. The rod K is held in insulating-blocks K′, attached to the main frame A, and the said rod K and the strips L are connected with each other by a wire L^2, and the said rod K and strips L form one terminal of an electric circuit, while the roller N forms the other terminal of the circuit. The rod K is connected with a wire O, and the roller N is connected by the frame or its bearings with the wire O′, the latter being connected with the source of electrical energy P, both wires being con-

nected with an electromagnet Q, controlling the armature-lever R, hung on the lower end of a vertically-disposed lever S, fulcrumed at S′ on the main frame A.

The armature-lever R normally stands out of engagement with the core of the electromagnet Q—that is, as long as the latter is deenergized; but when one of the rods J drops on the breaking of its yarn or thread then its lower end moves in contact with the revolving roller N, so that the circuit is closed and the electromagnet Q is energized to attract the armature-lever R.

The upper end of the lever S, carrying the armature-lever R, is engaged by a projection or lug I′ on a shipper-bar I^2 of the belt-shifter I to hold the latter in such position that the belt engages the fast pulley H. The shipper-bar is pressed on by a spring I^3, so that when the lever S swings out of engagement with the lug I′ then the shipper-bar I^2 is moved transversely by the action of the spring I^3 to cause the shifter to move the belt from the fast pulley H onto the loose pulley H′.

A vibrating lever T, fulcrumed on the main frame A, receives its vibratory motion from a cam T′ on the main shaft G, and the lower end of this vibrating lever T normally vibrates freely over one end of the armature-lever R. Now when the latter is attracted by the electromagnet Q becoming energized, as before explained, then the lever R swings into the path of the lower end of the vibrating lever T, so that the latter pushes the lever R to one side, and this imparts a swinging motion to the lever S to move the latter out of engagement with the lug I′, and the belt is now shifted by the shifter I from the fast pulley to the loose pulley.

When the machine is in operation, then the several rods J are suspended on their yarns or threads B, so that the lower ends of the rods are above and out of contact with the peripheral surface of the roller N. Now when the yarn breaks then its rod J immediately drops downward (see Figs. 2 and 3) to make contact with the peripheral surface of the roller N to close the circuit and to cause the belt-shifter to be actuated for driving the belt from the fast pulley H onto the loose pulley H′ to stop the warping-machine. Now by having the roller N continuously rotating as long as the machine is running it is evident that the dropping-rod J positively makes contact with the roller to insure closing of the circuit. By having the roller N rotate it is evident that the rods J in dropping down do not always strike the same place on the peripheral face of the roller, and consequently the roller is not liable to oxidize to such an extent that the circuit-closers fail to work and the whole stop mechanism become inoperative.

The stopping mechanism controlled by the electromagnet Q forms no part of this invention.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In an electric stop-motion for warping-machines, an electric circuit provided with a fixed terminal formed of a metallic rod, and spaced metallic strips below the rod and connected therewith, a second terminal in the form of a revoluble metallic roller arranged below the strips, means for continuously revolving said roller, and circuit-closers in the form of rods provided at their upper ends with eyes by means of which they are suspended from the yarns, and intermediate of their ends with loops to receive the said rod, the lower ends of the circuit-closers extending between the said strips and adapted to engage the rotating roller when a yarn breaks, as set forth.

2. In an electric stop-motion for warping-machines, an electric circuit, a fixed terminal comprising a metallic rod, spaced metallic strips below the rod, and a wire connecting the rod and strips, a second terminal in the form of a revoluble metallic roller arranged below the said strips, means for imparting a continuous rotary movement to said roller, and circuit-closers in the form of rods having eyes at their upper ends by which they are suspended from the yarns and elongated loops between their ends to receive the said rod, the lower ends of the circuit-closers extending between the metallic strips and adapted to engage the roller when the yarn breaks, as set forth.

3. In an electric stop-motion for warping-machines, the combination with a driving-shaft provided with fast and loose pulleys, a belt-shifter, and electrically-controlled mechanism for operating the belt-shifter, of a fixed terminal arranged in the circuit and formed of a metallic rod and spaced metallic strips below the rod and connected therewith, a revoluble metallic roller below the said strips, means for continuously revolving the roller from the said driving-shaft, and circuit-closers in the form of rods provided with eyes at their upper ends to receive the yarns and intermediate of their ends with elongated loops through which the said rod loosely passes, the lower ends of the rods passing between the metallic strips and adapted to engage the continuously-revolving roller when a yarn breaks, as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN COCKER.
CHARLES DENN.

Witnesses:
GERTRUDE CRAP,
EDWIN STEARNE.