April 20, 1926. 1,581,215

H. V. KOBIN

TESTING MACHINE

Filed Sept. 29, 1923 3 Sheets-Sheet 1

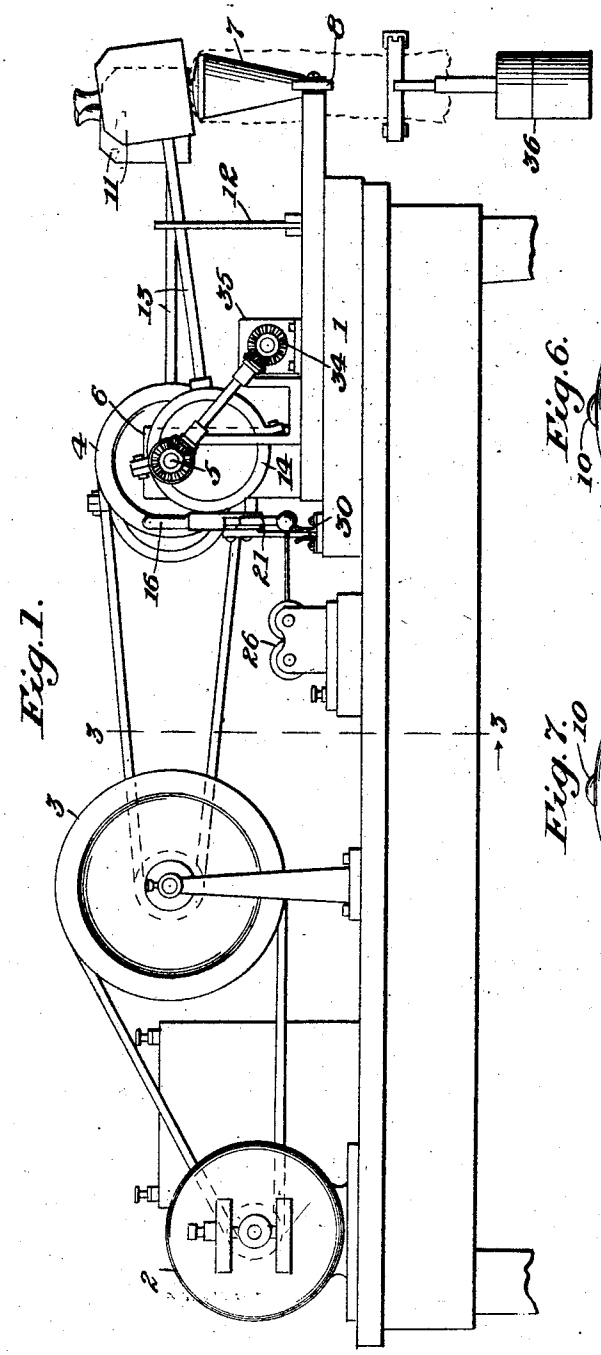


Fig. 1.

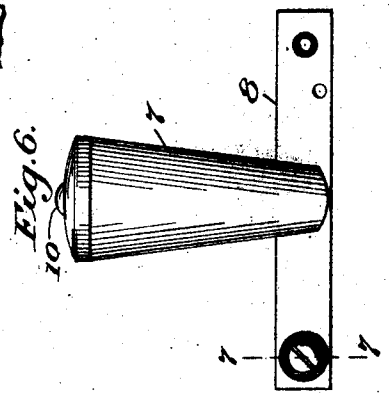


Fig. 6.

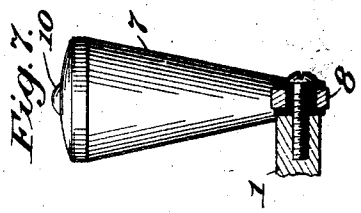


Fig. 7.

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Fig. 2.

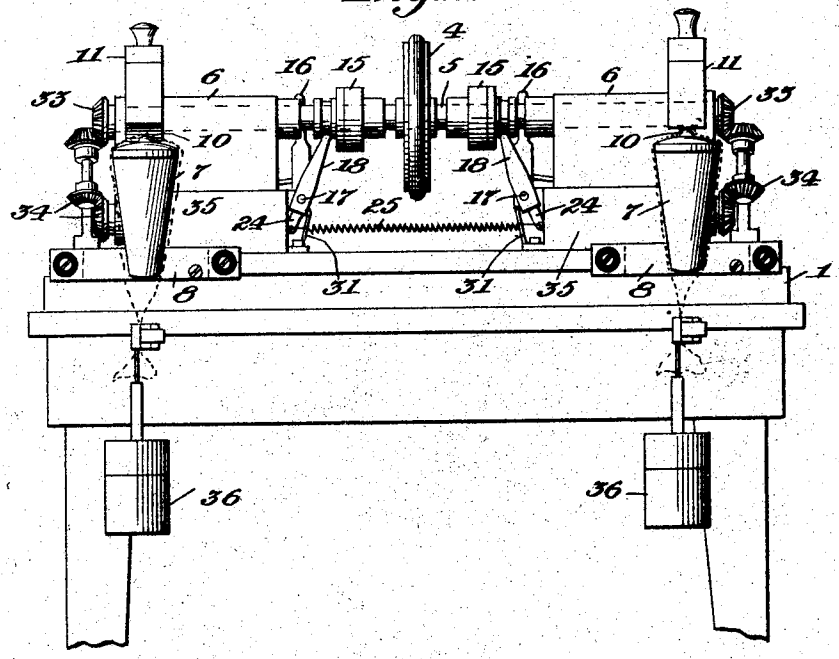


Fig. 3.

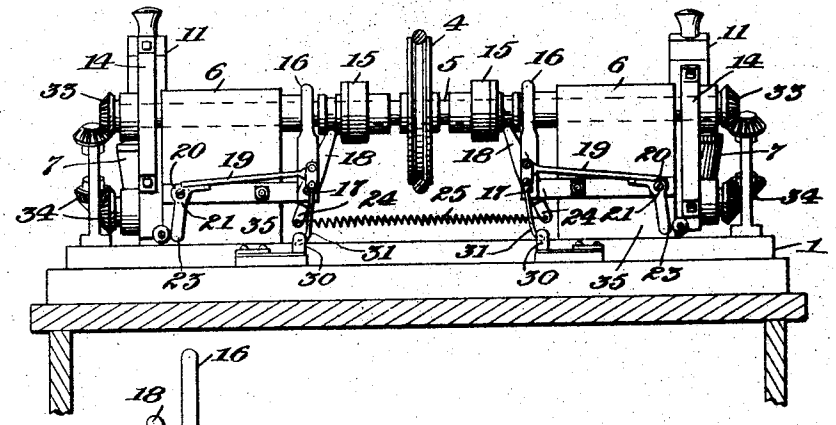
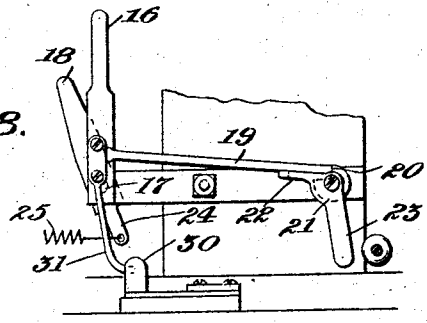


Fig. 8.



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Fig. 4.

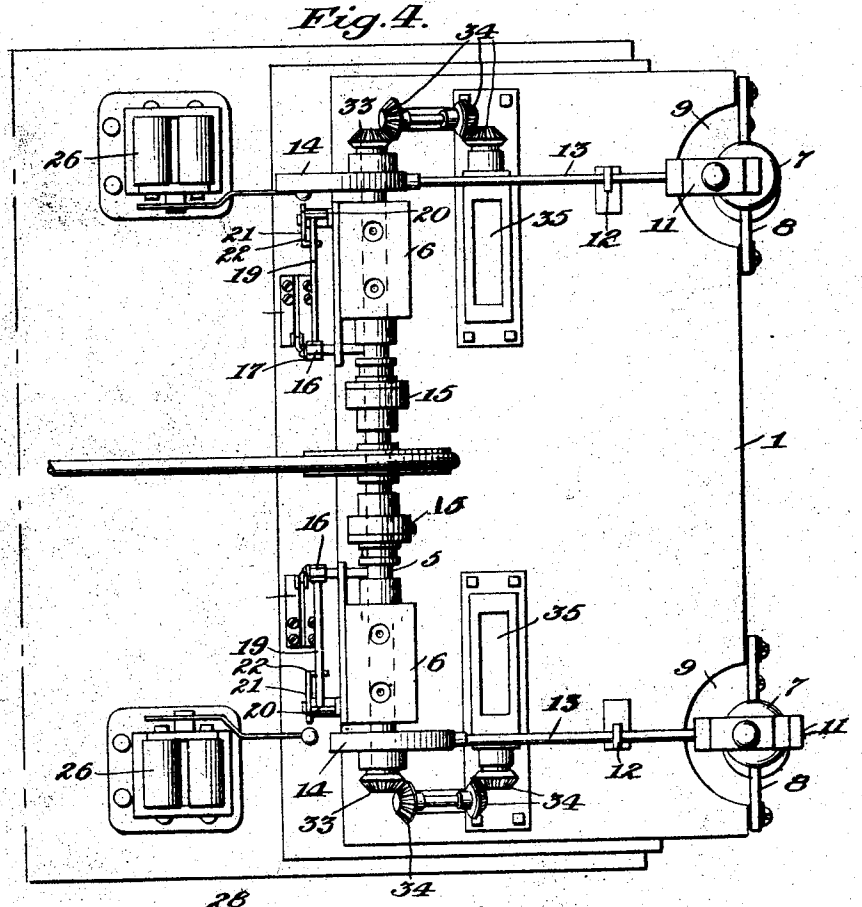


Fig. 5.

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Patented Apr. 20, 1926. 1,581,215

UNITED STATES PATENT OFFICE.

HENRY V. KOBIN, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO REAL SILK HOSIERY MILLS, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

TESTING MACHINE.

Application filed September 29, 1923. Serial No. 665,574.

To all whom it may concern:

Be it known that I, HENRY V. KOBIN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Testing Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention comprises a testing machine. While it is unrestricted in its application, it has been found especially useful in testing the wearing qualities of fabrics, particularly hosiery fabrics.

It is contemplated among the objects of the invention to produce a machine which will be simple, compact, and have parts which operate in duplicate from a common drive, so that a pair of hosiery, for example, may be tested at one time and each individual part be operated in unison or independently of the other.

Another object contemplated by the invention is to provide a friction-producing instrumentality operable to wear the fabric to a predetermined degree and, when so worn, a circuit will be closed to actuate mechanism for cutting out the friction-producing instrumentality and rendering it further inoperative until new fabric is placed in the machine.

A still further object of the invention is to provide recording mechanism in connection with the other parts of the machine which will record the number of movements of the friction-producing mechanism which were necessary to produce wear through the fabric.

Another object of the invention is the production of a machine, the operation of which is wholly automatic after the parts are once put into operation, and further objects and advantages will in part be apparent and in part be brought out more fully in the description which follows.

An embodiment of the invention is illustrated in the accompanying drawings, the following views being shown:

Figure 1 is a view in side elevation illustrating an arrangement of parts constituting a machine embodying one form of my invention;

Fig. 2 is a view of the same in front elevation and looking at the machine from the right side of Fig. 1;

Fig. 3 is a view in vertical section, on line 3—3 of Fig. 1, and looking in the direction of the arrows;

Fig. 4 is a fragmentary view in top plan, showing the right-hand portion of the machine illustrated in Fig. 1;

Fig. 5 is a diagrammatic view of a circuit used in connection with the machine;

Fig. 6 is a detail view in front elevation of a portion of the machine and its mounting;

Fig. 7 is a view in side elevation of the same, a portion being in section on line 7—7 of Fig. 6; and

Fig. 8 is a detail view in front elevation of one of the clutch-operating instrumentalities.

In these views, the reference-character 1 designates a bed, support, or base, mounted on standards and with them constituting a frame for the machine. The machine itself comprises a motor 2, in driving connection with a pulley 3, suitably mounted on the base. This pulley is in driving connection with a second pulley 4, splined to a shaft 5, which is suitably journaled in supporting bearings 6 mounted on the base of the machine, and for clearness of description this shaft will be herein referred to as the main drive shaft of the machine. The drive from the motor is stepped up so as to give speed to the pulley 4, and this rotary motion of the shaft 5 is utilized to operate the other parts of the machine. As the machine illustrated is designed for the testing of hosiery, the pulley 4 is disposed centrally of the drive shaft, intermediate the supporting bearings 6, 6, and the associated parts are arranged in duplicate on either side of the pulley.

Means for producing friction on material to be tested are provided, and as here shown comprise a support or anvil 7, suitably mounted on a bar 8, which spans a cutout portion 9 of the base and is secured thereto but insulated therefrom by means of gaskets or insulating bushings and screws illustrated particularly in Fig. 7. On the upper portion of the anvil or support there is a knob or projection 10, adapted to present a limited surface of the material to a friction-element 11. This friction-element is in the form of a weight having a surface

adapted to cooperate with the knob 10, or the material placed thereon, and be reciprocated back and forth on the knob. To this end, the element 11 is connected with a rod 13, suitably guided in an upstanding support 12; and at its other end it is attached to an eccentric 14, mounted on the main drive shaft 5. In the embodiment herein illustrated, there are two of these instrumentalities, one on either side of the central pulley 4, and the parts described are duplicated in each device.

Means are provided for putting the friction-producing instrumentality into operation and for automatically cutting out the same when the material has been worn to a predetermined degree. As here shown, these means comprise a clutch 15 disposed between the central drive pulley 4 and the eccentric 14, and through which the eccentric is placed in driving connection with the main drive shaft 5. A clutch-operating lever 16 is pivotally fulcrumed, as at 17, on a support rising from the bed of the machine and is connected with the clutch by means of an arm 18, best seen in Fig. 8. Associated with the clutch-operating lever is mechanism for locking the clutch in operative position and holding it there until automatically released after the material has been worn to the desired point. As here shown, this mechanism comprises an arm 19, which is in the nature of a pawl, pivotally mounted at one end on the clutch-operating lever 16, and at its opposite end adapted to take into a notch or ratchet 20 on a bell-crank-lever 21. This lever is pivotally mounted on a support and has a short arm 22 extending outwardly under the free end of the ratchet 19 and a depending extended arm 23. The arrangement is such that when the clutch is operated in one direction to connect up the drive and driven parts, the end of the arm or pawl 19 will take into the ratchet or notch 20, the notch being placed slightly off center, and will, when in such position, hold the arm 23 at the limit of its movement to the right, as seen in Fig. 8 in full line. This mechanism constitutes a trigger or releasing mechanism for the clutch-operating lever and clutch, and means are provided which normally tend to move the clutch-operating lever into inoperative position. Such means, as here shown, comprise an arm 24 extending downwardly from the lever 16 and having secured to one end thereof a spring 25. As the parts just described are duplicated on the other side of the pulley 4 and work in the opposite direction, the other end of the spring 25 is shown secured to the lower end of the corresponding arm on the other clutch-lever. The action of the spring on the arm tending to throw the clutch into open position is resisted by the pawl or trigger mechanism, and means are provided for automatically releasing the trigger mechanism and permitting the spring to actuate the clutch.

As here shown, such means comprise a buzzer or hammer forming part of an ordinary induction device 26, the hammer of which is adapted to strike the end of the arm 23 when the device has been energized, thus releasing the pawl 19 from the ratchet 20, and permitting the spring 25 to throw the clutch-lever 16 into inoperative position. The arrangement is such that the buzzer or hammer is energized when the wear on the fabric has reached a predetermined limit, and to this end there is an electrical circuit provided (best seen in Fig. 5) which includes a source of supply 27 from which leads a line 28 grounded on a portion of the machine so as to be in electrical contact with the friction-element 11. Another line 28′ is secured to the bar 8 which carries the anvil or support 9, and is secured at its other end to one terminal 29 of the induction device 26. A line 29′ extends from the other terminal of this device to the source 27, thus completing the circuit.

Means are provided for controlling the starting and stopping of the motor, and to this end there is provided a switch having contact fingers 30, with which there is adapted to cooperate a knife or contact member 31, mounted on the clutch-lever 16 and movable into and out of contact with the fingers 30 as the clutch-operating lever 16 is moved into or out of operative position. Circuit lines 32 connect the contact fingers 30 with terminals of the motor, which is in turn connected with a source of power.

It will be seen that when the fabric is between the friction-element 11 and anvil 9, the circuit will be open, and when the friction-element and anvil come into contact, the circuit will be closed. Closing of the circuit energizes the induction device 26. This in turn produces release of the latch, allowing the spring 25 to throw the clutch-lever 16 into inoperative position and at the same time remove the contact member 31 from the contacts 30, cutting out the motor. This mechanism is duplicated on the other side of the machine, so that either device may be operated independently or both may be operated in unison.

Means are provided for recording the number of movements of friction-element 11 necessary to produce the desired amount of wear, and as here shown these means comprise a beveled pinion 33, mounted on the drive shaft. This beveled pinion is in driving connection, through suitable gearing 34, with a counting mechanism 35, by means of which there is set up or registered the number of movements of the friction-element 11.

Means are also provided for holding the fabric to be tested in place on the anvil, and

as here shown these means comprise weights 36 adapted to be secured to a portion of the fabric and hold it in place on the anvil.

The instrumentalities just described and their arrangement constitute a simple and efficient means of effecting the objects set forth, and while they have been described in connection with the present embodiment, it will be understood that I do not wish to be limited to the precise form of this disclosure, as many changes in the general structure and arrangement of the parts are within the scope of the invention as set forth in the claims.

What I claim is:

1. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; and mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material.

2. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; and means for moving said element in frictional contact with material placed on the support.

3. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional contact with material placed on the support, said means including a driving member; and an eccentric mechanism connecting the driving member and friction-element.

4. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional contact with material placed on the support, said means including a driving member; an eccentric mechanism connecting the driving member and friction-element; and clutch mechanism operatively associated with the driving member and operable to connect and disconnect the driving member and friction-element.

5. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional contact with material placed on the support, said means including a driving member; an eccentric mechanism connecting the driving member and friction-element; clutch mechanism operatively associated with the driving member and operable to connect and disconnect the driving member and friction-element; and an instrumentality for holding the clutch in one position.

6. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automaticaly rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional contact with material placed on the support, said means including a driving member; an eccentric mechanism connecting the driving member and friction-element; clutch mechanism operatively associated with the driving member and operable to connect and disconnect the driving member and friction-element; and an instrumentality for holding the clutch in one position; said instrumentality including a latch mechanism operatively associated with the clutch.

7. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional

contact with material placed on the support, said means including a driving member; an eccentric mechanism connecting the driving member and friction-element; clutch mechanism operatively associated with the driving member and operable to connect and disconnect the driving member and friction-element; an instrumentality for holding the clutch in one position; said instrumentality including a latch mechanism operatively associated with the clutch; and means exerting pressure against the latch mechanism tending to move the clutch when the latch is released.

8. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional contact with material placed on the support, said means including a driving member; an eccentric mechanism connecting the driving member and friction-element; clutch mechanism operatively associated with the driving member and operable to connect and disconnect the driving member and friction-element; an instrumentality for holding the clutch in one position; said instrumentality including a latch mechanism operatively associated with the clutch; means exerting pressure agains the latch mechanism tending to move the clutch when the latch is released; and means for releasing the latch mechanism.

9. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional contact with material placed on the support, said means including a driving member; an eccentric mechanism connecting the driving member and friction-element; clutch mechanism operatively associated with the driving member and operable to connect and disconnect the driving member and friction-element; an instrumentality for holding the clutch in one position; said instrumentality including a latch mechanism operatively associated with the clutch; means exerting pressure against the latch mechanism tending to move the clutch when the latch is released; means for releasing the latch mechanism, said means including an electrical circuit; and a magnet in said circuit adapted to operate the latch mechanism when the magnet is actuated.

10. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional contact with material placed on the support, said means including a driving member; an eccentric mechanism connecting the driving member and friction-element; clutch mechanism operatively associated with the driving member and operable to connect and disconnect the driving member and friction-element; an instrumentality for holding the clutch in one position; said instrumentality including a latch mechanism operatively associated with the clutch; means exerting pressure against the latch mechanism tending to move the clutch when the latch is released; means for releasing the latch mechanism, said means including an electrical circuit; a magnet in said circuit adapted to operate the latch mechanism when the magnet is actuated; and a connection between the magnet and friction-producing mechanism whereby the magnet will be operated when the friction has reached a predetermined limit.

11. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional contact with material placed on the support, said means including a driving member; an eccentric mechanism connecting the driving member and friction-element; clutch mechanism operatively associated with the driving member and operable to connect and disconnect the driving member and friction-element; an instrumentality for holding the clutch in one position; said instrumentality including a latch mechanism operatively associated with the clutch; means exerting pressure against the latch mechanism tending to move the clutch when the latch is released; means for releasing the latch mech-

anism, said means including an electrical circuit; a magnet in said circuit adapted to operate the latch mechanism when the magnet is actuated; and a motor for operating the driving member connected with said circuit.

12. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional contact with material placed on the support, said means including a driving member; an eccentric mechanism connecting the driving member and friction-element; clutch mechanism operatively associated with the driving member and operable to connect and disconnect the driving member and friction-element; an instrumentality for holding the clutch in one position; said instrumentality including a latch mechanism operatively associated with the clutch; means exerting pressure against the latch mechanism tending to move the clutch when the latch is released; means for releasing the latch mechanism, said means including an electrical circuit; a magnet in said circuit adapted to operate the latch mechanism when the magnet is actuated; a motor for operating the driving member connected with said circuit; and mechanism for controlling the motor connected with the latch mechanism and operable upon actuation of the latch mechanism.

13. A testing machine comprising a support for material to be tested; a friction-producing instrumentality operatively associated with said support; means for actuating the friction-producing instrumentality; mechanism automatically rendering inoperative the friction-producing instrumentality when this instrumentality has produced a predetermined amount of wear on the material, said friction-producing instrumentality including a friction-element; means for moving said element in frictional contact with material placed on the support, said means including a driving member; an eccentric mechanism connecting the driving member and friction-element; clutch mechanism operatively associated with the driving member and operable to connect and disconnect the driving member and friction-element; an instrumentality for holding the clutch in one position; said instrumentality including a latch mechanism operatively associated with the clutch; means exerting pressure against the latch mechanism tending to move the clutch when the latch is released; means for releasing the latch mechanism, said means including an electrical circuit; a magnet in said circuit adapted to operate the latch mechanism when the magnet is actuated; a motor for operating the driving member connected with said circuit; mechanism for controlling the motor connected with the latch mechanism and operable upon actuation of the latch mechanism, said mechanism including a switch disposed in the circuit; and a switch-controlling element connected with the clutch and operable by movement of the clutch.

14. A testing machine comprising a stationary support for fabric to be tested; a motor; a drive shaft in driving connection with the motor; a friction element normally resting on the fabric on said support; means for moving the element relative to the support to produce friction; said means comprising an eccentric connected with the drive shaft; and mechanism operatively connecting the eccentric and element.

15. A testing machine comprising a stationary support for fabric to be tested; a motor; a drive shaft in driving connection with the motor; a friction element normally resting on the fabric on said support; means for moving the element relative to the support to produce friction; said means comprising an eccentric connected with the drive shaft; mechanism operatively connecting the eccentric and element; and a clutch mechanism operatively associated with the drive shaft and operable to connect and disconnect the element with the shaft.

16. A testing machine comprising a stationary support for fabric to be tested; a motor; a drive shaft in driving connection with the motor; a friction element normally resting on the fabric on said support; means for moving the element relative to the support to produce friction; said means comprising an eccentric connected with the drive shaft; mechanism operatively connecting the eccentric and element; a clutch mechanism operatively associated with the drive shaft and operable to connect and disconnect the element with the shaft; and means, including a spring element, connected with the clutch and tending to hold it in one position.

17. A testing machine comprising a support for material to be tested; a motor; a drive shaft in driving connection with the motor; a friction element operatively associated with the support; means for moving one of these members relatively to the other to produce friction, said means comprising an eccentric connected with the drive shaft; a rod directly connecting the eccentric and element to be moved; a clutch mechanism operatively associated with the drive shaft and operable to connect and disconnect the

element to be moved with the shaft; means, including a spring element, connected with the clutch and tending to hold it in one position; and latch mechanism operatively associated with the clutch and adapted to resist the movement of the clutch under the influence of the spring when the latch mechanism is set.

18. A testing machine comprising a support for material to be tested; a motor; a drive shaft in driving connection with the motor; a friction element operatively associated with the support; means for moving one of these members relatively to the other to produce friction, said means comprising an eccentric connected with the drive shaft; mechanism connecting the eccentric and element to be moved; a clutch mechanism operatively associated with the drive shaft and operable to connect and disconnect the element to be moved with the shaft; means, including a spring element, connected with the clutch and tending to hold it in one position; latch mechanism operatively associated with the clutch and adapted to resist the movement of the clutch under the influence of the spring when the latch mechanism is set, said latch mechanism comprising a lever provided with a ratchet; and a pawl connected with the clutch and ratchet.

19. A testing machine comprising a support for material to be tested; a motor; a drive shaft in driving connection with the motor; a friction element operatively associated with the support; means for moving one of these members relatively to the other to produce friction, said means comprising an eccentric connected with the drive shaft; mechanism connecting the eccentric and element to be moved; a clutch mechanism operatively associated with the drive shaft and operable to connect and disconnect the element to be moved with the shaft; means, including a spring element, connected with the clutch and tending to hold it in one position; latch mechanism operatively associated with the clutch and adapted to resist the movement of the clutch under the influence of the spring when the latch mechanism is set, said latch mechanism comprising a lever provided with a ratchet; a pawl connected with the clutch and ratchet; and mechanism for operating the lever to release the pawl from the ratchet.

20. A testing machine comprising a support for material to be tested; a motor; a drive shaft in driving connection with the motor; a friction element operatively associated with the support; means for moving one of these members relatively to the other to produce friction, said means comprising an eccentric connected with the drive shaft; mechanism connecting the eccentric and element to be moved; a clutch mechanism operatively associated with the drive shaft and operable to connect and disconnect the element to be moved with the shaft; means, including a spring element, connected with the clutch and tending to hold it in one position; latch mechanism operatively associated with the clutch and adapted to resist the movement of the clutch under the influence of the spring when the latch mechanism is set, said latch mechanism comprising a lever provided with a ratchet; a pawl connected with the clutch and ratchet; mechanism for operating the lever to release the pawl from the ratchet, said mechanism including an electrical circuit; and a magnet connected therewith and operatively associated with the lever on the latch mechanism whereby the lever will be operated to release the pawl when the magnet is operated.

21. A testing machine comprising a support for material to be tested; a motor; a drive shaft in driving connection with the motor; a friction element operatively associated with the support; means for moving one of these members relatively to the other to produce friction, said means comprising an eccentric connected with the drive shaft; mechanism connecting the eccentric and element to be moved; a clutch mechanism operatively associated with the drive shaft and operable to connect and disconnect the element to be moved with the shaft; means, including a spring element, connected with the clutch and tending to hold it in one position; latch mechanism operatively associated with the clutch and adapted to resist the movement of the clutch under the influence of the spring when the latch mechanism is set, said latch mechanism comprising a lever provided with a ratchet; a pawl connected with the clutch and ratchet; mechanism for operating the lever to release the pawl from the ratchet, said mechanism including an electrical circuit; a magnet connected therewith and operatively associated with the lever on the latch mechanism whereby the lever will be operated to release the pawl when the magnet is operated; and a connection between the circuit and friction-producing mechanism whereby the magnet will be operated when the friction has reached a predetermined limit.

22. A testing machine comprising a support for material to be tested; a motor; a drive shaft in driving connection with the motor; a friction element operatively associated with the support; means for moving one of these members relatively to the other to produce friction, said means comprising an eccentric connected with the drive shaft; mechanism connecting the eccentric and element to be moved; a clutch mechanism operatively associated with the drive shaft and operable to connect and disconnect the element to be moved with the shaft; means, including a spring element, connected with

the clutch and tending to hold it in one position; latch mechanism operatively associated with the clutch and adapted to resist the movement of the clutch under the influence of the spring when the latch mechanism is set, said latch mechanism comprising a lever provided with a ratchet; a pawl connected with the clutch and ratchet; mechanism for operating the lever to release the pawl from the ratchet, said mechanism including an electrical circuit; a magnet connected therewith and operatively associated with the lever on the latch mechanism whereby the lever will be operated to release the pawl when the magnet is operated; a connection between the circuit and friction-producing mechanism whereby the magnet will be operated when the friction has reached a predetermined limit; and a control switch for the motor included in the circuit and connected with the motor.

23. A testing machine comprising a support for material to be tested; a motor; a drive shaft in driving connection with the motor; a friction element operatively associated with the support; means for moving one of these members relatively to the other to produce friction, said means comprising an eccentric connected with the drive shaft; mechanism connecting the eccentric and element to be moved; a clutch mechanism operatively associated with the drive shaft and operable to connect and disconnect the element to be moved with the shaft; means, including a spring element, connected with the clutch and tending to hold it in one position; latch mechanism operatively associated with the clutch and adapted to resist the movement of the clutch under the influence of a spring when the latch mechanism is set, said latch mechanism comprising a lever provided with a ratchet; a pawl connected with the clutch and ratchet; mechanism for operating the lever to release the pawl from the ratchet; said mechanism including an electrical circuit; a magnet connected therewith and operatively associated with the lever on the latch mechanism whereby the lever will be operated to release the pawl when the magnet is operated; a connection between the circuit and friction-producing mechanism whereby the magnet will be operated when the friction has reached a predetermined limit; a control switch for the motor included in the circuit and connected with the motor; and mechanism connected with the clutch and motor switch whereby movement of the clutch will operate the switch.

24. A testing machine comprising a stationary support for fabric to be tested; a motor; a drive shaft in driving connection with the motor; a friction element normally resting on the fabric on said support; means for moving the element relative to the support to produce friction; said means comprising an eccentric connected with the drive shaft; mechanism operatively connecting the eccentric and element; and a registering mechanism operatively associated with the drive shaft and friction element for registering the amount of friction produced.

25. A testing machine including a material-sustaining instrumentality; a wear-producing instrumentality associated therewith; mechanism for producing relative movement between said instrumentalities to test the wearing capacity of material on the sustaining instrumentality; registering means associated with said movement-producing mechanism; and electrical means associated with said mechanism for automatically bringing the same to rest when a predetermined amount of wear has been produced on the material.

26. A testing machine including a stationary material-sustaining instrumentality, a wear-producing instrumentality associated therewith and including a rigid friction surface normally resting on the material on the sustaining instrumentality, and mechanism for producing relative movement between said instrumentalities to test the wearing capacity of the material on the sustaining instrumentality.

27. A testing machine including a stationary material-sustaining instrumentality, a wear-producing instrumentality associated therewith and including a weight having a friction surface normally resting on the material on the sustaining instrumentality, mechanism for producing reciprocatory movement of the wear-producing instrumentality with reference to said material-sustaining instrumentality to test the wearing capacity of material on the latter, and registering means associated with said movement-producing mechanism.

In testimony whereof I affix my signature.

HENRY V. KOBIN.