April 27, 1937. J. V. MAGASH 2,078,259

FABRIC TESTING MACHINE

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Fig. 1.

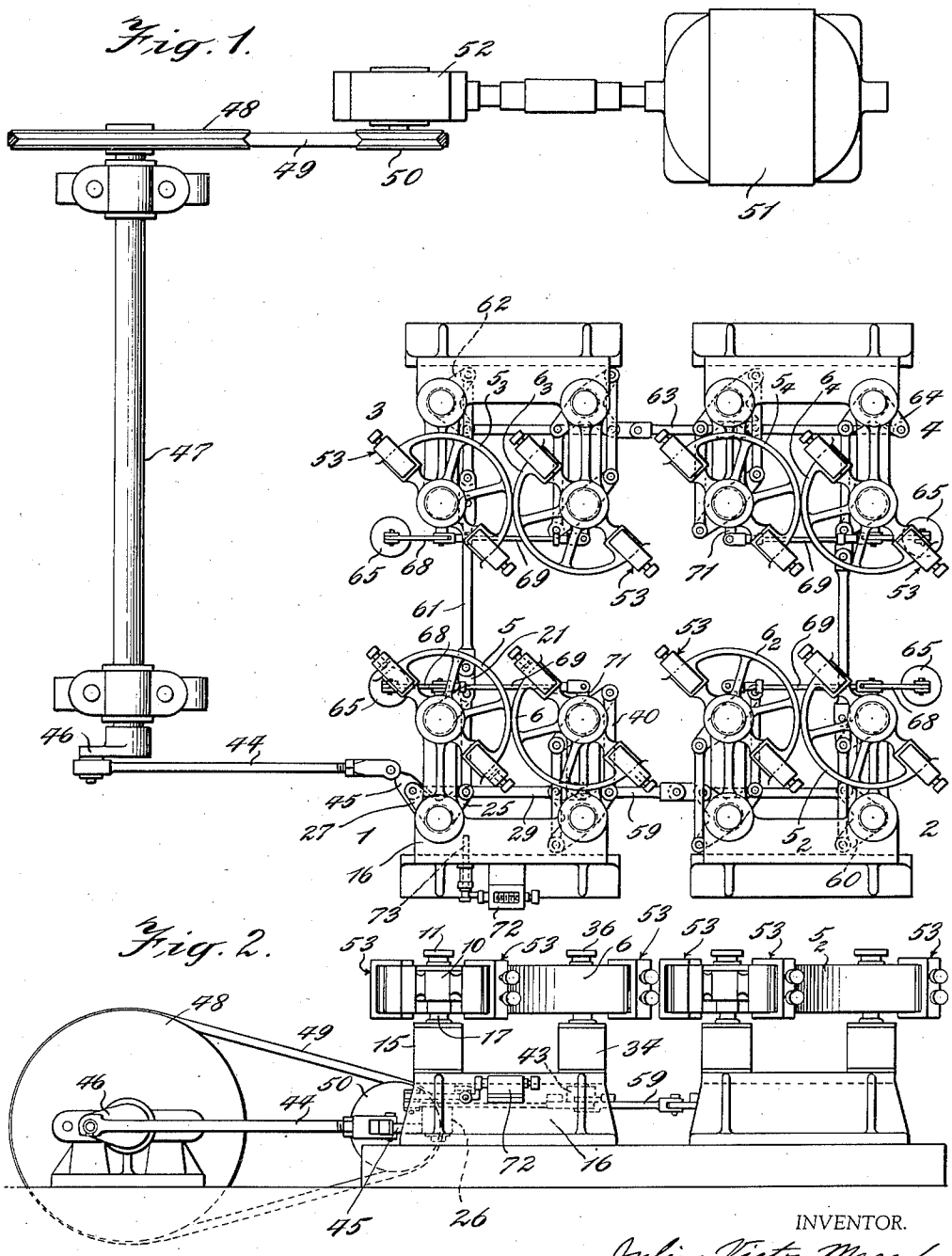


Fig. 2.

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Fig. 3.

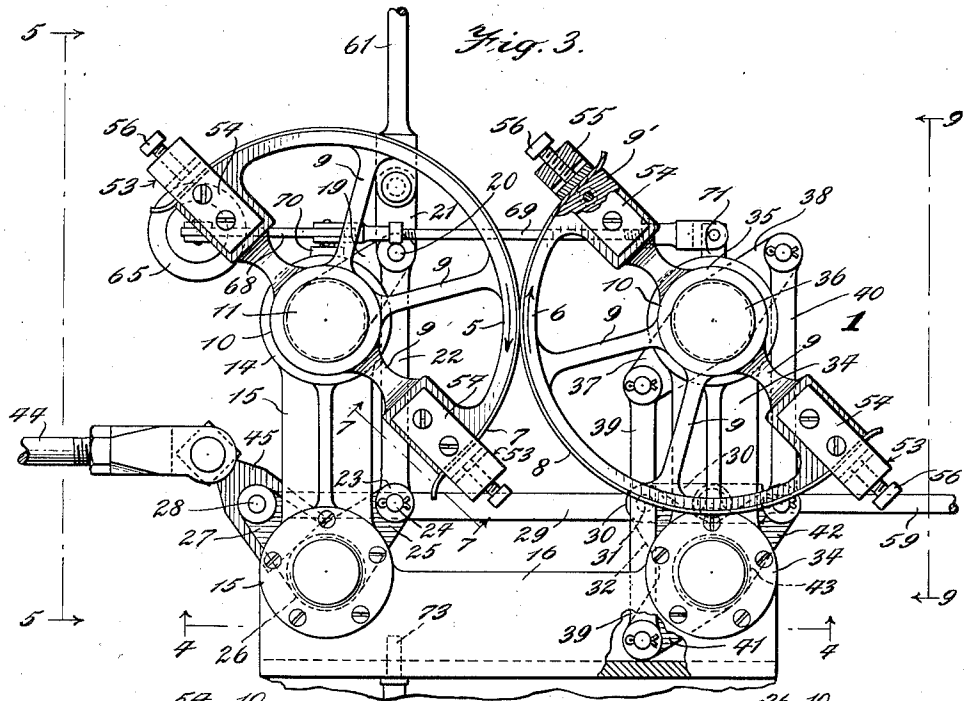
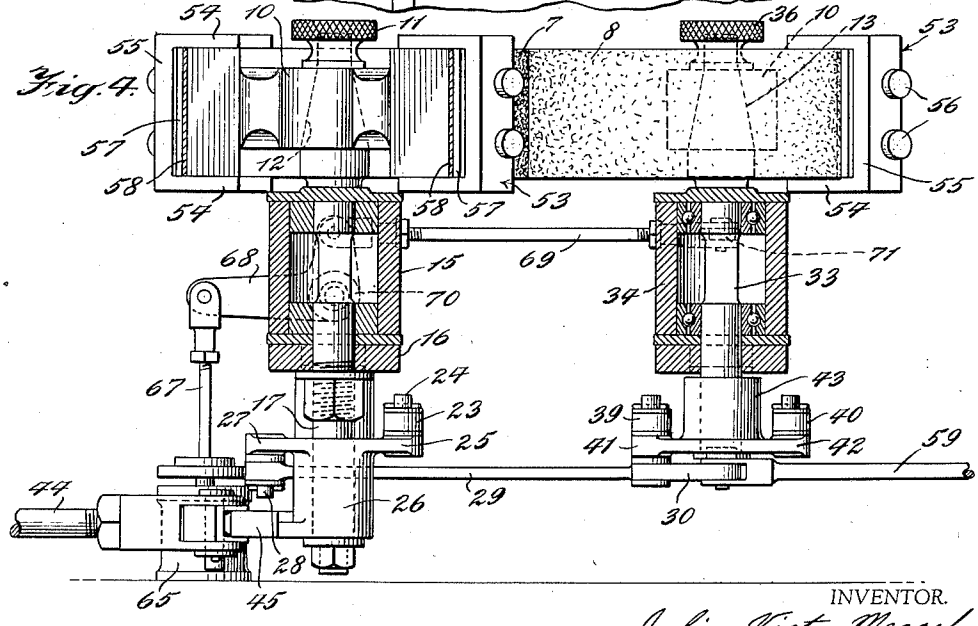


Fig. 4.



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Fig. 5.

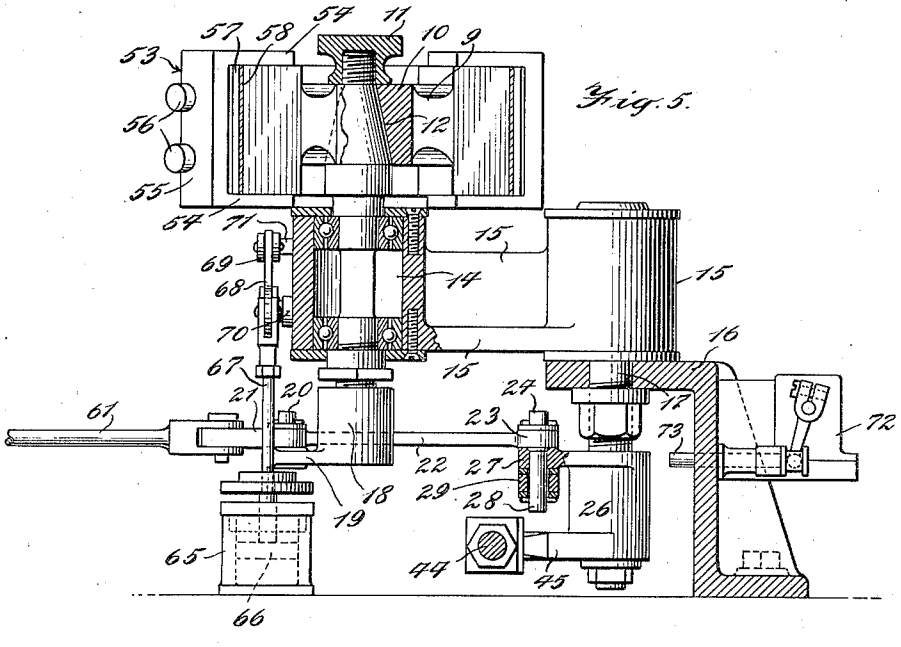


Fig. 6.

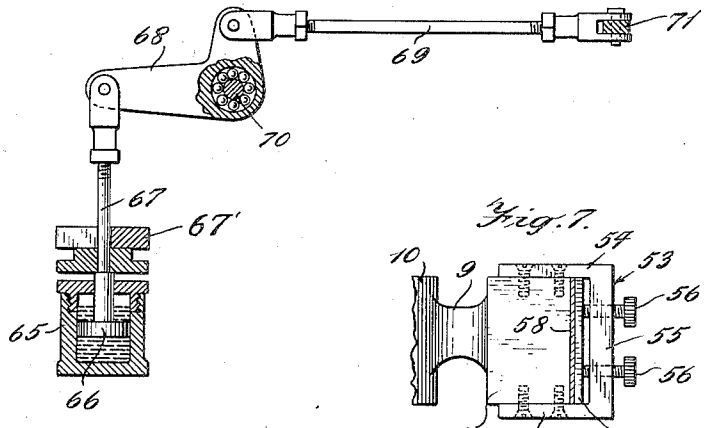


Fig. 7.

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Fig. 8.

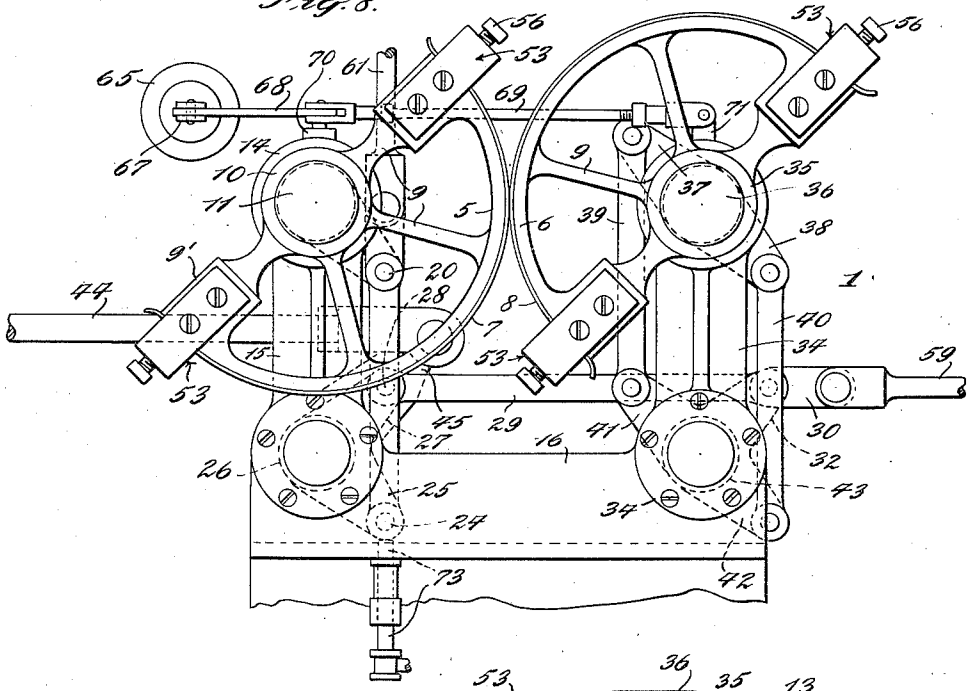
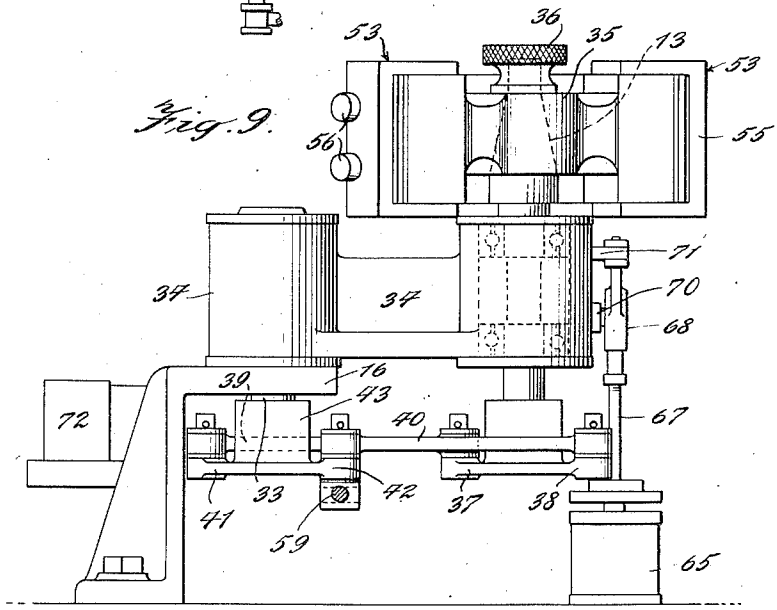


Fig. 9.



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Patented Apr. 27, 1937 2,078,259

UNITED STATES PATENT OFFICE

2,078,259

FABRIC TESTING MACHINE

Julius Victor Magash, Wallington, N. J.

Application January 9, 1935, Serial No. 938

11 Claims. (Cl. 73—51)

This invention relates to a novel and improved form of fabric testing machine, more particularly one for testing cloth. The novel features will be best understood from the following description and the annexed drawings, in which I have shown a selected embodiment of the invention and in which:

Fig. 1 is a plan view of the selected embodiment;

Fig. 2 is an elevation of the apparatus appearing in Fig. 1 as viewed from the bottom of that figure;

Fig. 3 is a view on an enlarged scale showing one of the units appearing in Fig. 1, this view being taken on the same plane as Fig. 1, but parts being broken away and other parts being shown in section;

Fig. 4 is a view approximately on the line 4—4 of Fig. 3, parts being shown in section;

Fig. 5 is a view approximately on the line 5—5 of Fig. 3;

Fig. 6 is a view partly in elevation and partly in section showing one of the dash-pots appearing in Figs. 1, 3, 4, and 5;

Fig. 7 is a detailed view taken approximately on the line 7—7 of Fig. 3;

Fig. 8 is a view corresponding to Fig. 3 but showing the parts in a different relation to each other;

Fig. 9 is a view approximately on the line 9—9 of Fig. 3.

The machine may comprise any number of units, each unit being adapted to test a piece of cloth or other material. In the selected embodiment, I have shown four such units designated generally by the numerals 1, 2, 3, and 4.

Referring particularly to Figs. 3, 4, and 5, it will be seen that the unit 1 comprises a pair of arc-shaped supports 5 and 6 having broad surfaces facing each other, upon which surfaces may be secured test pieces 7 and 8. The arcs are so arranged that they will contact with each other, as plainly indicated. The arcs form parts of supports having spokes 9 secured to hubs 10, which are shown as being clamped by nuts 11 onto cone-shaped spindles 12 and 13.

The spindle 12 is rotatably mounted in a bearing, designated generally at 14, in a bracket 15 secured in fixed position upon the frame 16 of the machine, as by a bolt 17. The bearing 14 may be of any suitable type, although preferably it is a ball or roller bearing, as plainly indicated in Fig. 5, so as to permit free rotation of the spindle on the bracket.

The arc 5 is rocked back and forth between the positions shown in Figs. 3 and 8, by rotation of the spindle 12, and this rocking may be caused by means which I shall now describe. The spindle 12 is shown as extending through the bearing 14, and beneath the bearing is provided with a hub 18 having an arm 19 extending outwardly therefrom, as best shown in Fig. 5. This arm carries a pivot pin 20 passing through a head 21 of a link 22 which at its other end has a head 23 through which passes a pivot pin 24, which likewise passes through an arm 25 on a hub 26 secured in fixed position on the lower end of the bolt 17.

The same hub has a second arm 27 thereon which, with the arm 25, forms a bell crank lever. This arm 27 has a pivot pin 28 which connects it to a link 29 which has its other end provided with a head 30 through which passes the pivot pin 31 connecting the head with the arm 32 of a bell crank lever mounted upon the spindle 33 upon which is pivotally mounted a bracket 34 by suitable bearings, here shown as ball bearings.

Upon the end of the bracket 34 is rotatably mounted the spindle 13, preferably in ball or roller bearings, and this spindle receives the hub 35 carrying the arc 6. The hub may be secured to the spindle by the nut 36 corresponding to the nut 11. In short, the arc 6 may be secured to its spindle in the same way as the arc 5 is secured to its spindle, and further detail description thereof would be a mere duplication. The spindle carrying the hub 35 has mounted on its lower end a hub having oppositely extending arms 37 and 38 pivotally connected by links 39 and 40 to oppositely extending arms 41 and 42 on the hub 43 upon which the arm 32 is also mounted.

The hub 26 is rocked by movement of a rod 44 pivotally connected to an arm 45 on the hub 26 and secured at its other end (Fig. 1) to a crank arm 46 on a shaft 47 which may be rotated by any suitable means, here exemplified as a pulley 48 operated by a belt 49 from a second pulley 50 which in turn is operated by a motor 51 through a reduction gearing of any suitable kind, indicated at 52.

Each arc is provided with means for clamping a piece of cloth or other material to be tested in contact with the outer surface. Such a means is best shown in Fig. 7 in the form of a yoke 53 having opposite legs 54 secured to an enlarged spoke 9' as by screws. The body portion 55 of the yoke extends across the arc and has threaded therein adjustment screws 56 which are adapted to force a plate 57 against a piece of cloth 58 and

thus force that cloth against the surface of the arc.

From the above description it will be seen that when it is desired to test cloth or other material, all that is necessary is to clamp two pieces of material on the arcs 5 and 6, respectively, and then turn on the motor 51. The result will be an actuation of the crank arm 46 to reciprocate the rod 44 and thus to rock the hub 26 and the arms connected thereto. The arc 5 will be rocked back and forth by means of the link 22, and the arc 6 will likewise be rocked back and forth by the link 29.

These arcs will always move in opposite directions, as will be apparent. For example, when the arc 5 is moving in the direction of the arrow shown thereon in Fig. 3, the arc 6 will be moving in the direction of the arrow shown thereon in that same figure, and the result will be a rubbing of the pieces of material on the two arcs throughout the extent of movement of those arcs. It will be seen that the two arcs are tangent to each other, and therefore the test pieces contact over a small area, practically on a line contact. As the two arcs move in opposite directions, the contacting areas are progressively changing, although there is an area of substantially constant size on one piece in contact with an equal area on the other piece.

The result will be that during each movement of the arcs, the entire contacting surfaces will be subjected to a uniform wearing action. Each part of each contacting surface will have the same amount of wearing action as every other part, and therefore a much better test will be provided than in prior art devices where certain areas of a test piece are subjected to greater wearing action than others.

The extent of the wearing surface may be varied as found desirable, both circumferentially of the arcs and transversely thereof, although for the purposes of illustration I have shown an arrangement where the wearing surfaces of the test pieces extend through an arc of considerably less than 180°. It is to be understood, however, that this arrangement is only illustrative of one form which the invention may take.

I have described above an arrangement for operating one unit, namely, that designated 1 in Fig. 1. Unit 2 may be operated by means of a rod 59 pivotally secured to the head 30 of the link 29 and also secured to a bell crank lever 60 on unit 2. This bell crank lever corresponds to that formed by the arms 25 and 27 of unit 1, and operates the arcs 5_2 and 6_2 in a manner similar to that in which the arcs 5 and 6 are operated.

The unit 3 may be operated by the rod 61 pivotally connected to the head 21 of the link 22 and pivotally connected at its other end to a bell crank lever 62 on the unit 3. This bell crank lever is in turn connected by a rod 63 to a bell crank lever 64 upon unit 4. By these connections, the arcs 5_3 and 6_3 and the arcs 5_4 and 6_4 are operated in the same manner as the arcs 5 and 6.

While I have shown the invention as applied to four different units, it is of course to be understood that suitable and similar connections can be made to any number of units which it is desired to operate at one time.

Referring again to Figs. 3, 4, and 5, and also to Fig. 6, it will be seen that the bracket 15 is rigidly fixed on the frame 16, whereas the bracket 34 is mounted to rotate thereon. This arrangement is found desirable so that the arc 16 may be moved away from the arc 5 to permit insertion of the test pieces of material. Another advantage of this arrangement is that test pieces of various thicknesses can be used upon the one piece of apparatus by simply swinging the bracket 34.

In order to resiliently hold the bracket 34 in place so that the pieces of test material will be held in contact with each other and so as to prevent chattering of the apparatus from any cause, I have provided a dash-pot 65 with each unit. This dash-pot comprises the usual cylinder having therein the piston 66 connected to a piston rod 67 pivotally connected at its upper end to a two-armed bell crank lever 68 having its other arm pivotally connected to a rod 69. The hub 70 of the bell crank lever 68, as best shown in Fig. 3, is fast upon the bracket 15, more particularly upon the bearing 14 of that bracket. The rod 69 is pivotally connected to an ear 71 upon the bracket 34 and more particularly upon the bearing for the spindle supporting the arc 6. Weights 67′ may be added or taken off, according to the material being tested.

A suitable liquid, such as oil, is placed in the dash-pot 65 and thus any inequalities in the materials on the arcs 5 and 6 may be compensated for by movement of the bracket 34 on the spindle 33, and that movement will be damped by the action of the dash-pot so that any violent movement is prevented.

The apparatus may include a suitable counting mechanism which will record the number of reciprocations of the various supports. Since all of the different units are operated from one source in the selected embodiment, one counting mechanism may be used, which is indicated at 72 (Figs. 1, 2, and 5) and which may be operated by a plunger 73, likewise appearing in Figs. 3 and 8 and which, as best shown in Fig. 8, is hit by the arm 25 at one end of the reciprocation of that arm. Since the details of the counting mechanism are not important, they will not be discussed further.

While I have shown the invention as embodied in a specific form, it is to be understood that various changes in details may be made without departing from the scope of the invention, as defined by the appended claims.

I claim:

1. A testing machine comprising two supports, one rotatably mounted on a pivot and having a face disposed on an arc concentric with said pivot, the second support being movably mounted and having a face adjacent the face on the first support, means for securing test pieces of cloth to said faces, said pieces normally being in contact with each other when thus secured and the area of contact being small, and means for reciprocating said supports in opposite directions to cause said test pieces to rub against each other in said opposite directions over continually changing small areas, and means to maintain uniform pressure between said contacting areas during said reciprocating movements.

2. A testing machine comprising two supports, one rotatably mounted on a pivot and having a face disposed on an arc cencentric with said pivot, the second support being movably mounted and having a face adjacent the face on the first support, means for securing test pieces of cloth to said faces, said pieces normally being in contact with each other when thus secured and the area of contact being small, and means for re-

ciprocating said supports in opposite directions to cause said test pieces to rub against each other in said opposite directions over continually changing small areas, the reciprocations of the two supports being equal in extent, whereby equal total areas of the test pieces are rubbed, and means to maintain uniform pressure between said contacting areas during said reciprocating movements.

3. A testing machine comprising two supports rotatably mounted on parallel pivots and each having a face disposed on an arc concentric with its pivot, means for securing test pieces of cloth to said faces, said pieces normally being in contact with each other when thus secured, and means for reciprocating said supports on their pivots to cause said pieces to move in opposite directions and equal distances, said arcuate construction of said faces causing uniform pressure between the contacting pieces on said faces.

4. A testing machine comprising two supports rotatably mounted on parallel pivots and each having a face disposed on an arc concentric with its pivot, means for securing test pieces of cloth to said faces, said pieces normally being in contact with each other when thus secured, means for reciprocating said supports on their pivots to cause said pieces to move in opposite directions and equal distances, a bracket mounted upon a pivot and receiving the pivot of one of said supports, and means yieldingly holding said pieces in contact.

5. A testing machine comprising a frame, a support rotatably mounted on a bearing in said frame and having a face disposed on an arc concentric with said bearing, a bracket rotatably mounted on said frame, a second support rotatably mounted on a bearing in said bracket and having a face disposed on an arc concentric with its bearing, means for securing test pieces of cloth to said faces, said pieces normally being in contact with each other when thus secured, means to reciprocate said supports on their bearings to cause said pieces to move in opposite directions and equal distances, and means yieldingly acting on said bracket to hold the pieces in contact.

6. A testing machine comprising a frame, a support rotatably mounted on a bearing in said frame and having a face disposed on an arc concentric with said bearing, a bracket rotatably mounted on said frame, a second support rotatably mounted on a bearing in said bracket and having a face disposed on an arc concentric with its bearing, means for securing test pieces of cloth to said faces, said pieces normally being in contact with each other when thus secured, a crank shaft having a crank arm thereon, an arm secured to each of said brackets and extending outwardly from their bearings, connections from said last-named arms to said crank arm, whereby operation of the crank arm will reciprocate said supports on their bearings, and means yieldingly acting on said bracket to hold the pieces in contact.

7. A testing machine comprising a frame, a support rotatably mounted on a bearing in said frame and having a face disposed on an arc concentric with said bearing, a bracket rotatably mounted on said frame, a second support rotatably mounted on a bearing in said bracket and having a face disposed on an arc concentric with its bearing, means for securing test pieces of cloth to said faces, said pieces normally being in contact with each other when thus secured, a crank shaft having a crank arm thereon, an arm on said first-named support and extending outwardly from its bearing, two oppositely disposed arms on said second-named support and extending outwardly from its bearing, connections from said crank arm to said arms on said supports, whereby operation of the crank shaft will reciprocate said supports, and means yieldingly acting on said bracket to hold the pieces in contact.

8. A testing machine comprising two supports having faces adjacent each other, means for securing test pieces of cloth to said faces, said faces being so formed that said pieces contact with each other over small areas on each piece, means for moving said faces relatively to each other in opposite directions and for causing successive small portions of a predetermined area on one piece to contact with and rub against successive equal small portions of an equal predetermined area on the other piece, and means for maintaining a uniform pressure between said pieces during said movement.

9. A testing machine comprising two supports having faces adjacent each other, means for securing test pieces of cloth to said faces, said faces being so formed that said pieces contact with each other over small areas on each piece, means for moving said faces back and forth relatively to each other in opposite directions and for causing successive small portions of a predetermined area on one piece to contact with and rub back and forth against successive equal small portions of an equal predetermined area on the other piece, and means for maintaining a uniform pressure between said pieces during said movement.

10. A testing machine comprising two supports rotatably mounted on parallel pivots and each having a face disposed on an arc concentric with its pivot, means for securing test pieces of cloth to said faces, said pieces normally being in contact with each other when thus secured, means for reciprocating said supports on their pivots to cause said pieces to move in opposite directions and equal distances, said arcuate construction of said faces causing uniform pressure between the contacting pieces on said faces, and means yieldingly urging said supports towards each other to yieldingly hold said pieces in contact.

11. A testing machine comprising two supports having faces adjacent each other, means for securing test pieces of cloth to said faces, said faces being so formed that said pieces contact with each other over small areas on each piece, means for moving said faces back and forth relatively to each other in opposite directions and for causing successive small portions of a predetermined area on one piece to contact with and rub back and forth against successive equal small portions of an equal predetermined area on the other piece, means for maintaining a uniform pressure between said pieces during said movement, and means yieldingly urging said supports towards each other to yieldingly hold said pieces in contact.

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