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W. C. DURFEE

2,114,831

SAMPLE RUBBING MACHINE

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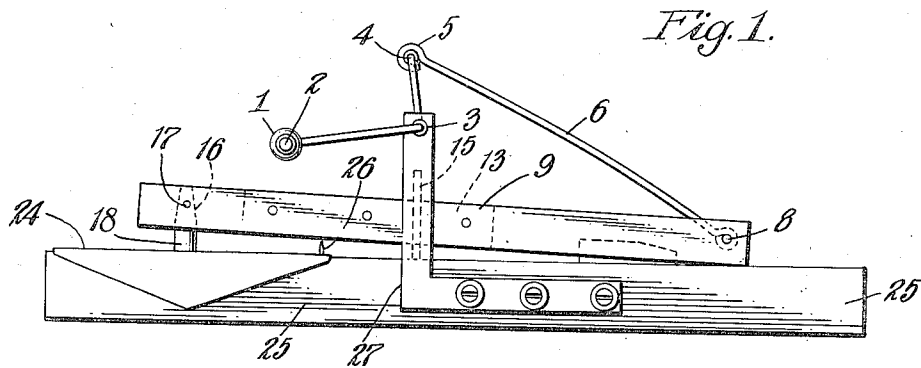


Fig. 1.

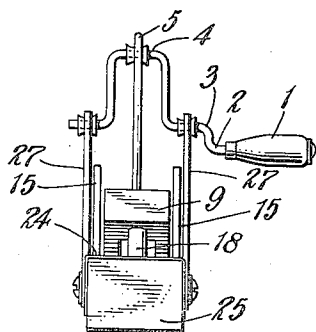


Fig. 2.

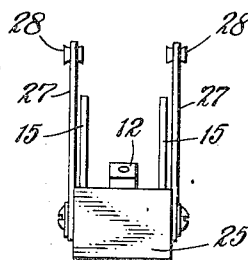


Fig. 3.

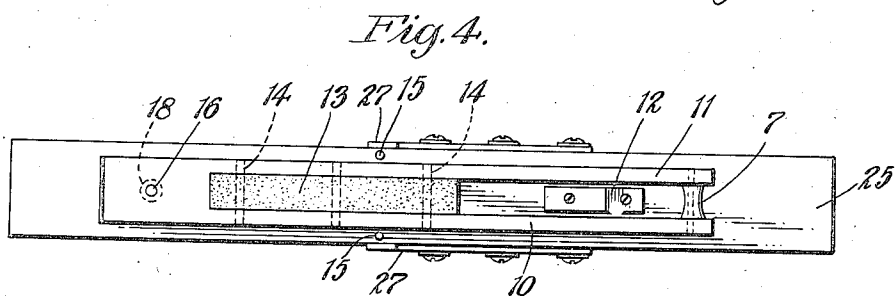


Fig. 4.

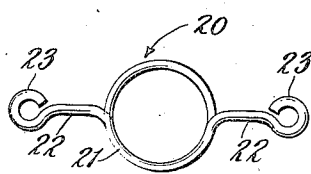


Fig. 5.

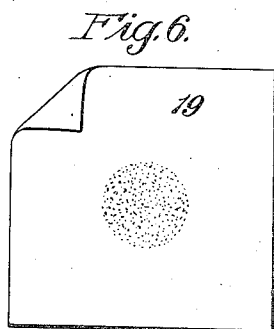


Fig. 6.



Fig. 7.

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UNITED STATES PATENT OFFICE

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SAMPLE RUBBING MACHINE

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4 Claims. (Cl. 75—51)

This invention relates to improvements in testing machines which produce a definite and reproducible rubbing action, such as could be used to test cloth and other materials for crock which usually means the rubbing onto a second material of some colored matter, visible dirt, stain, finish and fluff or flue from the first material, insofar as these permanently soil the second.

Other machines provide rubbing parts flexibly indefinite in form and unprecise in attitude, and give concealed fluctuations of pressure mechanically, and often have moving carriages unfitted for portions of large samples.

The objects of the improvements are, first, to provide means to secure and maintain an alignment of the rubbing surfaces; second, to provide means to keep a definite readily determined pressure on the rubbing surfaces; third, to provide means to give assurance of the reasonably constant and even distribution of this pressure over the surface of the rubbing contacts; fourth, to provide such needed safeguards and conveniences for the operator as will make the operation practical.

One form of the invention is shown in the drawing given herewith.

Figure 1 is a view of the near or front side of the machine, entire excepting certain parts belonging to the left end of the slide and to the slide finger, namely a finger-covering and a finger-cover fastening with a leash for the last named. Figure 2 is the left end-view omitting part of the underneath outline of the slide and the right end guide of the same. Figure 3 is the right end-view stripped of the crankshaft assembly but particularly showing the stanchions and guides on the base block. Figure 4 is a plan view from above of the slide and base block showing clearly the location of a weight held within the slide. Figure 5 is the finger-cover-fastening seen from above before mentioned as omitted from Figure 1. Similarly Figure 6 is the finger covering or crock record. Figure 7 is a view from the side of the fastening of Figure 5.

The details of this rubbing mechanism or invention for testing and recording the crocking of textiles and the like cooperate so that they must all, in this present paragraph, be indicated in suitable sequence to enable the manner of the cooperation of the several members and their parts and the safeguarding and facilitation of some of them by others to be described in following paragraphs. Beginning: Number one (1) is a handle for the driven-crank-shaft-journal (2) loosely riding on it in an ordinary manner

but situated in the circle of its rotation around the axis of the crankshaft (3) differently from the driving-crank-journal (4) which through the loose bearing (5) drives the connecting rod (6) that is as long as convenient and necessary and having a loose bearing around the strutlike sleeve or bearing numbered (7). The latter or the pin (8) on which it rides may be given some looseness or otherwise limbered, from the directing constraint of the connecting rod (6). The pin (8) just mentioned is located in the slide (9) as a cross-head to move the right end of the slide (9) which rests and slides, or rolls if given rollers, at a point of the slide near to the pin (8). The slide (9) has the cut out portion to accommodate (6) and (8) and to form portions (10) and (11). These near and far portions respectively numbered (10) and (11) embrace a guide (12) loosely and embrace and hold also a suitable weight (13) to produce a low center of gravity disposed to give satisfactory weight as measured by weighing scales supporting both ends of the slide (9) left and right during the making of the slide to secure proper weight distribution. In addition to embracing this weight the sides (10 and 11) carry the several bracings and weight supports numbered (14) over which the weight (13) is cast molten so as to fit firmly the sides (10 and 11) and the supports (14) which are part of the casting mold. Near this weight are two outside guides (15, 15) for the slide. These guides (15) are conveniently vertical posts embracing the slide on both sides, which slide (9) in this neighborhood is made smooth and its cross bracing weight-supports (14) are here slightly below the slide surfaces to prevent the guides wearing through to them (15 against 14). The slide adjacent its left end, holds firmly by the grip (16) which here is a tapered hole and the through fastening screw (17) the root of a toothlike member (18) called a rubbing or crocking finger extending downward from the slide as a short finger. In use the finger (18) is the leftward support of the slide, and it is covered or clothed with the crocking cloth or record material (19), Figure 6, secured by the finger-cover-fastening (20) composed of a spring coil (21) with handles (22) and handle rings (23) and bends in the rings or elsewhere so disposed as to enable the operator to place it easily over the finger. When clothed the finger (18) rests and moves over the samples being tested placed at the surface numbered (24) directly, or on some suitable holder. The surface numbered (24) is one of the upper surfaces of the base block (25). 55

It may very conveniently be a roughened surface, as emery cloth, to hold the tested samples against slipping when tested; but it is usually very convenient for the operator to steady himself during the operation of the crank handle (1) by grasping his left hand on the base block (25) so that he may partly with this hand care for the sample. On the base block in the present drawing is shown at 26 a few sharp small teeth upwardly extending and located to catch the sample under test shortly beyond the path of travel of the crocking finger (18) to the right of this path of travel. These enable the operator to hold samples well, though other means are convenient. The base block (25) holds the stanchions (27, 27) which although they are crankshaft bearing (28) stanchions are utilized when possible as protective guards for the side guides (15, 15). The base block also holds the right guide (12) and supports the rightward end of the slide (9). The especially important feature of the base block (25) is its slide supporting surfaces and its uniform shape, substance, and finish together with its general rigidity. These contribute to the permanence of its slide supporting surfaces, which lie in parallel levels that are preferably substantially coincident as shown, but yet operative if bent, warped or twisted when the deformities are nearly uniform. In deciding what level for right end of slide and its pin 8 is best, the anticipated thickness of samples to be rubbed and the actual selection of detail design around 8 is considered, with a view to levelling the forces required to move the finger 18 over the samples, and so it can be foreseen that, because of this and because of eventual wear, persons are likely to wish to improvise some slight change at the right end of the upper surface of the block, from need or fancy, so that by preference and foresight it is left unobstructed.

The alignment of the useful rubbing surface of finger (18) with the machine is partly already self-evident in the nature of the surface of the base block (25) and the manner of support of the slide (9) but this alignment is endangered by the occasional lifting action of the rod (6), when it comes into a condition of severe tension from the force developed and needed to impart to the slide (9) much momentum toward the left in a brief time at the beginning of the leftward motion. This tension may lift the slide even though the cranking is done in a naturally clockwise direction as viewed in Fig. 1 and though the upward inclination of the rod (6) by its length and temporary position is minimized. The slide is lifted at a calculated speed somewhat over one hundred revolutions of the crank per minute if the speed is uniform. So there are provided three cooperative means at least in this invention to permit speed while yet the slide stays down at the right end of it. First the proportion of the slide's weight at the end in question near (8) is a considerable proportion of the total weight of it as one third or thereabouts and upwards. This permits a realizing of a good percentage of the limited speed permitted by the slope horizontal-to-vertical ratio in the rod (6). This ratio arising from the length of the rod and location of the crankshaft axis (3) is the second provided means of the three above mentioned. The third is the form of crankshaft employed that times the start of the leftward slide motion with one of the naturally slow periods of motion of the operator in his hand cranking.

The original proper alignment of the rubbing surfaces above safeguarded is provided by having the finger of suitable length and material to be ground to shape while it is actually in action as if testing cloth for crocking but running instead on abrasive cloth or the like, cushioned underneath or not, to resemble and duplicate in the abrasive cloth or its like the form of the cloth to be tested as it is when being tested. A finger suited to be ground in place then is found perfect.

The tilting up of the slope of the slide and its finger rubbing-surface due to more or less thickness of tested samples is divided by the span of the slide so that the angle of tilt is made immaterial by the length of the slide span, and provision for those who choose to amend even this is left available; as a compensating distance plate or sheet may be applied at the right end of the base block upper surface.

Pressure in rubbing is made definite in this invention not simply by the amount of lead or metal poured into it while the casting of the weight is being done over properly placed weighing scales. In addition every noticeable effect on the finger that might come from the somewhat upward and downward tendency in the pushing and pulling of the driving rod or any direct handle substituted for it in other forms of the invention is stopped as an effect on the finger by the location in the slide of the pin (8), namely, very near over the second line of support of the slide so that no effect reaches the first or finger support, practically speaking. Still more in addition the finger pressure that would be subject to extreme additions and subtractions due to force needed to stop pitching (variations) if the weight were carried high and reciprocated in rapid motion cannot in this invention be affected by more than a few per cent plus and minus at moderate speed suited to counting; and this error can be minimized or reduced as much as may be wished by a more accurate alignment of the rubbing surface with the line of action of the pin (8) and the center of gravity of the slide system or rather aligning principally the last named. However it is best to refrain from racing the machine, confining it to the speed of audible counting of a comfortable sort which so effects a sort of standardizing of speed likely to prove abundantly reliable, using in wet crocking great care however.

Distribution of pressure over the operative rubbing surfaces in view of what has already been said of alignments and in view of the softness of the samples under test and the form of the ground finger surface as already mentioned is a distribution likely to be menaced by tilting the machine toward or away from the crank side. So in addition to surfacing of the finger and to aligning the slide lengthwise on a wide span, the span of the sides (10) and (11) is made so great as to require severe tilting before the slide will start to tumble. Hence it can be tilted a little without expectation of any results from maldistribution of strain in the right ends of (10) and (11). In addition the guides have surfaces particularly in the outside guides (15, 15) which can effectively cooperate, to the purpose in question. The safeguards formerly mentioned among objects are first the retaining horns which in the illustration are represented by the guides (15) and by the stanchions serving as guide shields (27) because the machine in all forms requires that the slide should not be damaged by falling. I do not deny

the advantage of a hook end or ends to the rod (6). Their convenience is usually outweighed by their risks. The closed ends of (6) shown are to hold the slide secure from falling out. Finally two safeguards to make the operation practical need mention. The useful safeguards just named are made acceptable by the fastening (20) Figures 5 and 7 as some other forms of ring are difficult to handle in the situation and further tend to a harmful or careless dropping of the heavy finger. The last safeguard is a suitable degree of moisture-proofing, of finger 18 and adjacent portions, so that if wanted dry testing can be done after wet, using any method not likely to transfer an effect to the finger-cover.

In the present drawing the character of the invention is not to be read from the breadth of base, the style of guides and stops, kind of slide rest and footing, or manner of placing a mechanism on a platform.

I do not wish to limit myself to the specific construction shown, the invention being delineated by the evident scope and spirit of my claims.

I claim:—

1. In a textile crock testing machine; a rigid elongated horizontal base having a portion adjacent one end adapted to support a piece of cloth to be tested; an elongated rigid slide on said base; a depending holder member carried by the slide at the end thereof adjacent said portion and adapted to have secured thereover a test cloth adapted to rest on and slide over the cloth on the said portion when the slide is reciprocated on the base; the other end of the slide resting on a remote portion of said base, and a guide on said base for guiding said slide for longitudinal reciprocating movement on the base; the entire weight of the slide being supported by the holder member and the said other end, and the length of the holder member being small whereby the slide will be but slightly inclined from the horizontal; weighting means carried by the slide; and means having pivotal connection with the said other end of the slide for reciprocating it on the base.

2. In a textile crock testing machine, an elongated horizontal base having a portion adjacent one end adapted to support a piece of cloth to be tested; an elongated slide on said base; a holder member for another piece of cloth on the under side of said slide at the end thereof adjacent the other piece of cloth whereby said slide rests freely on said base with its weight supported entirely by the holder member and the other end of the slide to occupy a position inclined with respect to the horizontal with the two pieces of cloth in rubbing contact when the slide is reciprocated on the base; means for reciprocating said slide comprising two upright members carried by the base and extending upwardly on either side of the slide at a location intermediate its length and to a point thereabove, a crank shaft having an operating handle journaled in the upper ends of said upright members, and a connecting rod connecting the crank of the crank

shaft with the said other end of the slide, the handle, crank and connecting rod being so arranged and proportioned that when the handle is turning downwardly on the side of the uprights adjacent said other end of the slide the crank is in a lower position and moving toward the other end of the base whereby the pull of the connecting rod is substantially parallel to the inclined length of the slide, and whereby the initiating of the movement of the slide toward said other end of the base occurs at a naturally slow period of motion in the manual actuation of the handle, said arrangement minimizing tendency to lift the said other end of the slide and to insure uniform rubbing pressure between said pieces of cloth.

3. In a textile crock testing machine; a rigid elongated horizontal base having a portion adjacent one end adapted to support a piece of cloth to be tested; an elongated rigid slide on said base; a depending holder member carried by the slide at the end thereof adjacent said portion and adapted to have secured thereover a test cloth adapted to rest on and slide over the cloth on the said portion when the slide is reciprocated on the base; the other end of said slide being forked, and a guide on said base which is straddled by the arms of the fork; the entire weight of the slide being supported by the holder member and the fork ends, and the length of the holder member being small whereby the slide will be but slightly inclined from the horizontal; weighting means carried by the slide intermediate its ends; and means having pivotal connection with the forked end of the slide for reciprocating it on the base.

4. In a sample-rubbing machine; a bridge member rigid throughout, of prolonged single span, having its span portion low compared to its length, and at the ends of its span having foot portions so that one part of the weight of the bridge will be on one foot portion and the remainder of the weight on the other foot portion; a base member supporting said portions, rigid throughout; having a level upper portion adapted for the one foot portion of the bridge member to rest upon, and to slide upon; and a further level upper portion adapted for the other foot portion of the bridge to trail upon, so that when one portion of the bridge is moved over one portion of the base the other will move in like degree over the other portion of the base, and the aforesaid weight on each foot of the bridge will bear on each said portion of the base, and when a test object is inserted beneath a foot, the foot will bear on it and the posture of this foot will be governed by the other foot, and the posture will not be unsteadied by the softness of the said test object, and said other foot may be moved and pushed, and this push will not bear upon the test object, but the foot that is on the test object will move and will bear on said test object according to the weighting of the bridge only.