

Aug. 22, 1939.

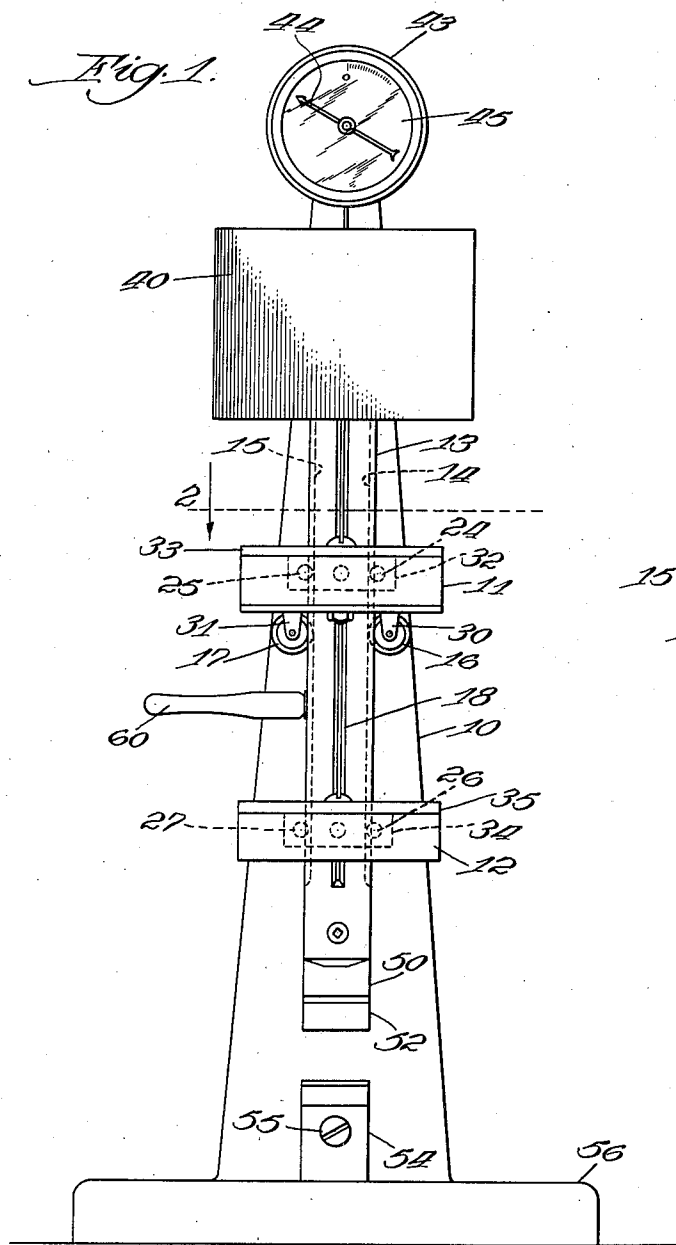
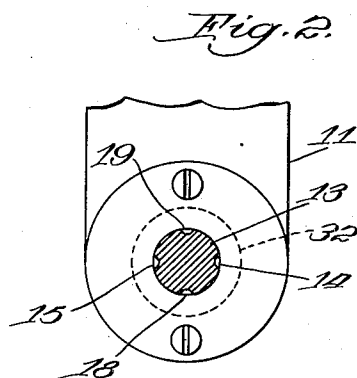
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2,170,747

APPARATUS FOR GAUGING WETTED MATERIAL

Filed Dec. 27, 1937

2 Sheets-Sheet 1



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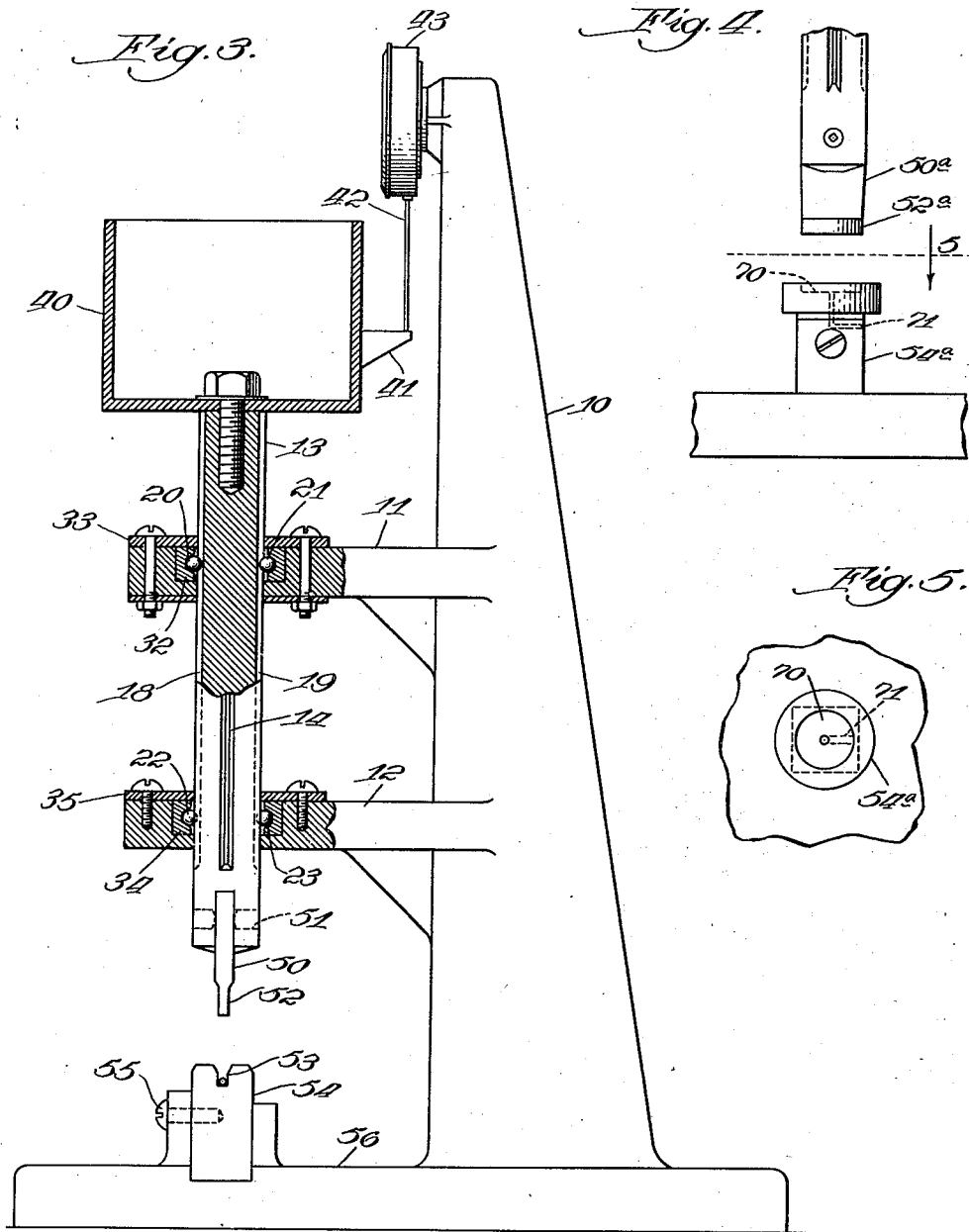
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APPARATUS FOR GAUGING WETTED MATERIAL

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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APPARATUS FOR GAUGING WETTED MATERIAL

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3 Claims. (Cl. 33—147)

This invention relates to a method and apparatus for gauging wetted material in order to determine its size when in a dry state.

The invention is primarily applicable to animal material such as wet gut to be used primarily for gut strings for tennis and other uses.

In the manufacture of tennis strings from gut, the gut is split in a plurality of strips and wound together to form a string. At this stage the gut is wet and slippery and it changes its characteristics decidedly upon drying out. It is nevertheless essential to know in advance the thickness which the string will have upon drying. At the present time the ultimate thickness of the string is estimated by the operator by the "feel" of the strings while wet; the operator guesses from the "feel" how thick the resulting string will be, but these guesses are at best somewhat indefinite, and the operation is a relatively slow one.

By means of the present invention, a rapid, inexpensive and accurate way of very closely approximating the gauge of dried gut from its characteristics while in a wetted condition is provided. The invention is illustrated in the drawings in which Figure 1 is a front elevation of a form of apparatus; Figure 2 is a sectional plan view partially broken away taken along the line 2 in Figure 1; Figure 3 is a side elevation of the apparatus; Figure 4 is a front elevation of the base of the apparatus showing a modified plunger arrangement; and Figure 5 is a broken sectional plan view taken along the line 5 in Figure 4.

The apparatus comprises a frame 10 provided with forwardly extending shelves 11 and 12 provided with aligned openings in which a shaft 13 is positioned. The shaft is provided with a pair of parallel vertically disposed lateral grooves 14 and 15, in which the guide wheels 16 and 17 ride. It is also provided with a pair of parallel vertically disposed grooves 18 and 19 at the front and back respectively of the shaft, within which are mounted the ball bearings 20 and 21, 22 and 23.

The lateral grooves are likewise provided with ball bearings 24 and 25, 26 and 27.

Guide wheels 16 and 17 are rotatably mounted in the brackets 30 and 31, which depend from the shelf 11.

Ball bearings 20 and 21, 24 and 25 are mounted in an annulus 32, set in a cavity in the shelf 11. A plate 33 suitably detachably secured to the shelf retains the bearings in the cavity. A similar bearing mounting 34 is provided in the shelf 12 and is held in place by the plate 35.

At the top of the shaft 13 is detachably mounted a weight box 40 at the rear of which is a lug 41 which is connected by a shaft 42 to the gauge 43, provided with an indicator 44 and a dial 45, which may be appropriately numbered.

In the base a plunger 50 is detachably held in the base of the shaft 13 by set screws 51. The base of the plunger narrows into a rectangular plate 52 of a size to fit snugly into the slot 53 in the pedestal 54. The pedestal is detachably held by screw 55 in the base 56 of the frame 10.

A handle 60 is firmly affixed to the shaft 13 in the middle portion thereof.

The slot 53 is of such width that a single string or strand of material will vary approximately to occupy the entire width thereof. For tennis strings it is approximately $\frac{1}{8}$ " in width, $\frac{1}{2}$ " high and $\frac{7}{8}$ " long, for example.

In operating the device the plunger 50 is allowed to fall until it reaches the bottom of the slot 53 and the indicator 44 is set at the zero point on the dial when the shaft is in this position. The weight box 40 is then filled with weights to the desired amount. The gauge 43 is so calibrated that the dial 45 will read directly the thickness of the dried article. Usually this is not the same as, but is directly proportional to the thickness of the wet article after pressing. For hog gut a satisfactory weight is one sufficient to produce a total pressure of about 100 lbs. per square inch on the base of the plunger 50. The shaft is then raised by means of the handle 60 and a string of wet gut material inserted in the slot 53 after being given a preliminary slight twist. The plunger is then allowed to press on the material for a predetermined time interval. This interval depends upon the nature of the gut or other object being twisted. For hog gut with a pressure of 100 lbs. per square inch a time of 30 seconds or thereabouts is satisfactory. At the end of this time the gauge will record the thickness which the article will have upon drying. If the time interval is increased, the plunger will continue to drop slowly, but the time is not critical and fairly wide variations in it will not disturb the readings markedly.

For lamb gut the action is much more rapid and a period of only 10 seconds is required for similar pressure.

Obviously if the pressure is decreased, the time required will increase.

The invention has proved remarkably effective in pregauging tennis strings. Under the previous practice when an order was received for a given quantity of strings of a particular size, it was

necessary to make approximately twice as many strings in order to get the required number of the proper gauge. With the present equipment, gauging may be carried out accurately at a stage in the process when it is possible to add or subtract plies to the string and as a result large orders may be prepared with substantially no variation in size or rejections on this account.

The operation does no harm to the string and it may even be repeated without damaging the string, if, for any reason, it is desirable.

Figures 4 and 5 show a modified pedestal arrangement which is used for flat articles. For these a circular disc is cut out of a size to fit snugly in the cavity 70 in the pedestal 54a. At the bottom of the cavity a conduit 71 is provided through which liquid may drain. The end 52a of the plunger 50a is made circular to conform to the cavity 70. This type of device may be used on other swollen animal membranous or epithelial materials.

The foregoing detailed description has been given for clearness of understanding only and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

I claim:

1. Apparatus for pregauging wet material com-

prising a base member provided with a narrow rectilinear cavity therein, a plunger having an end portion adapted to fit the cavity and movably mounted to enter the cavity, means for urging the plunger into the cavity by a predetermined pressure, and a measuring device directly connected to the plunger for measuring the penetration of the plunger into the cavity after a predetermined time interval.

2. Apparatus for pregauging the dried thickness of wet animal material comprising a base member having a cavity therein, a slidably mounted plunger member vertically positioned above the base member and having an end portion adapted to fit the cavity, a weight box carried upon the upper portion of the plunger and adapted to hold weights, and means connected to the weight box for measuring the position of the plunger.

3. Apparatus for pregauging the dried thickness of wet swollen animal material comprising a base member having a cavity in the upper face thereof, a relatively small drain conduit at the bottom of the cavity, a plunger movably mounted for insertion into the cavity, means for urging the plunger into the cavity, and means connected to the plunger for measuring its vertical position.

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