

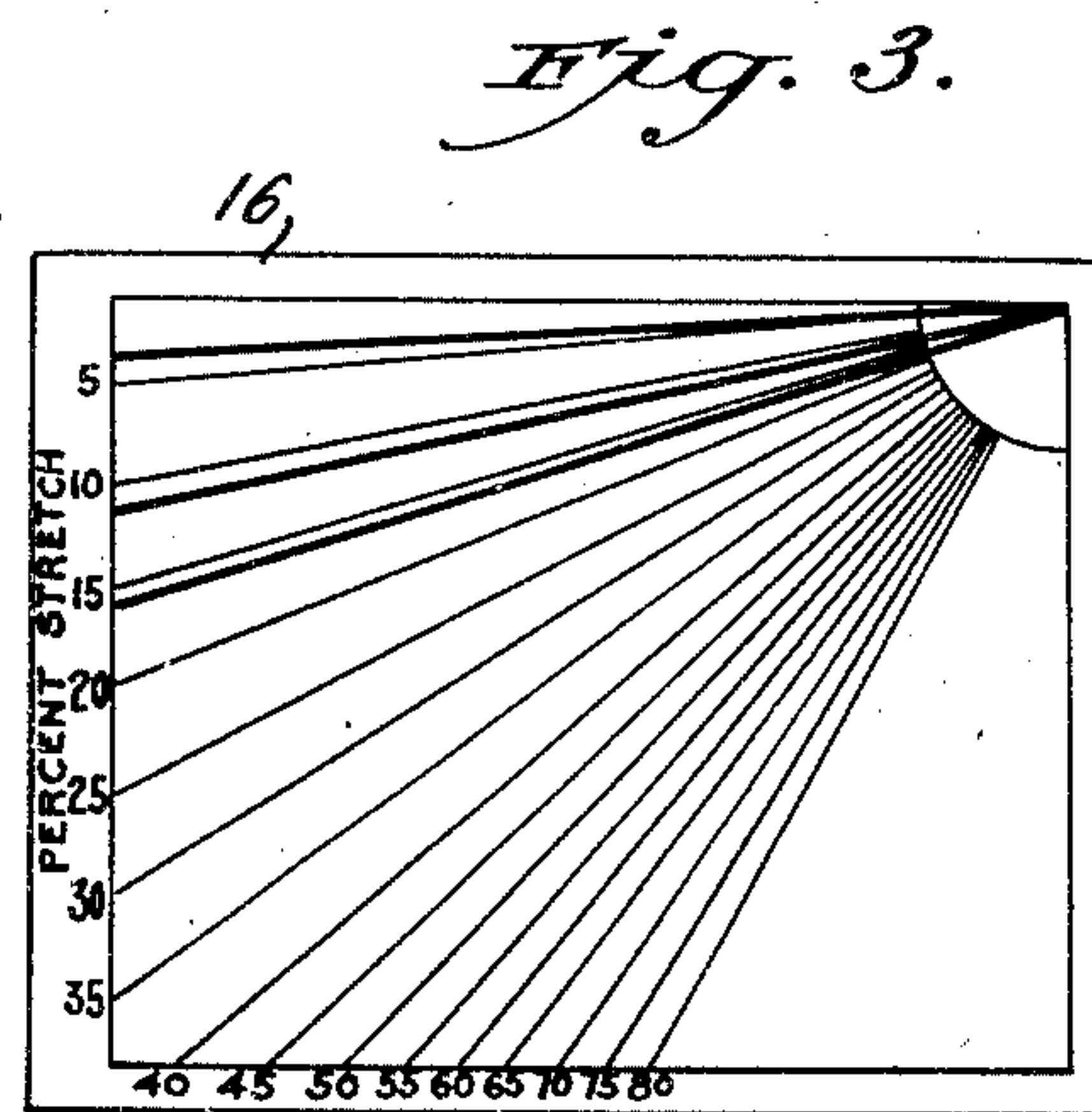
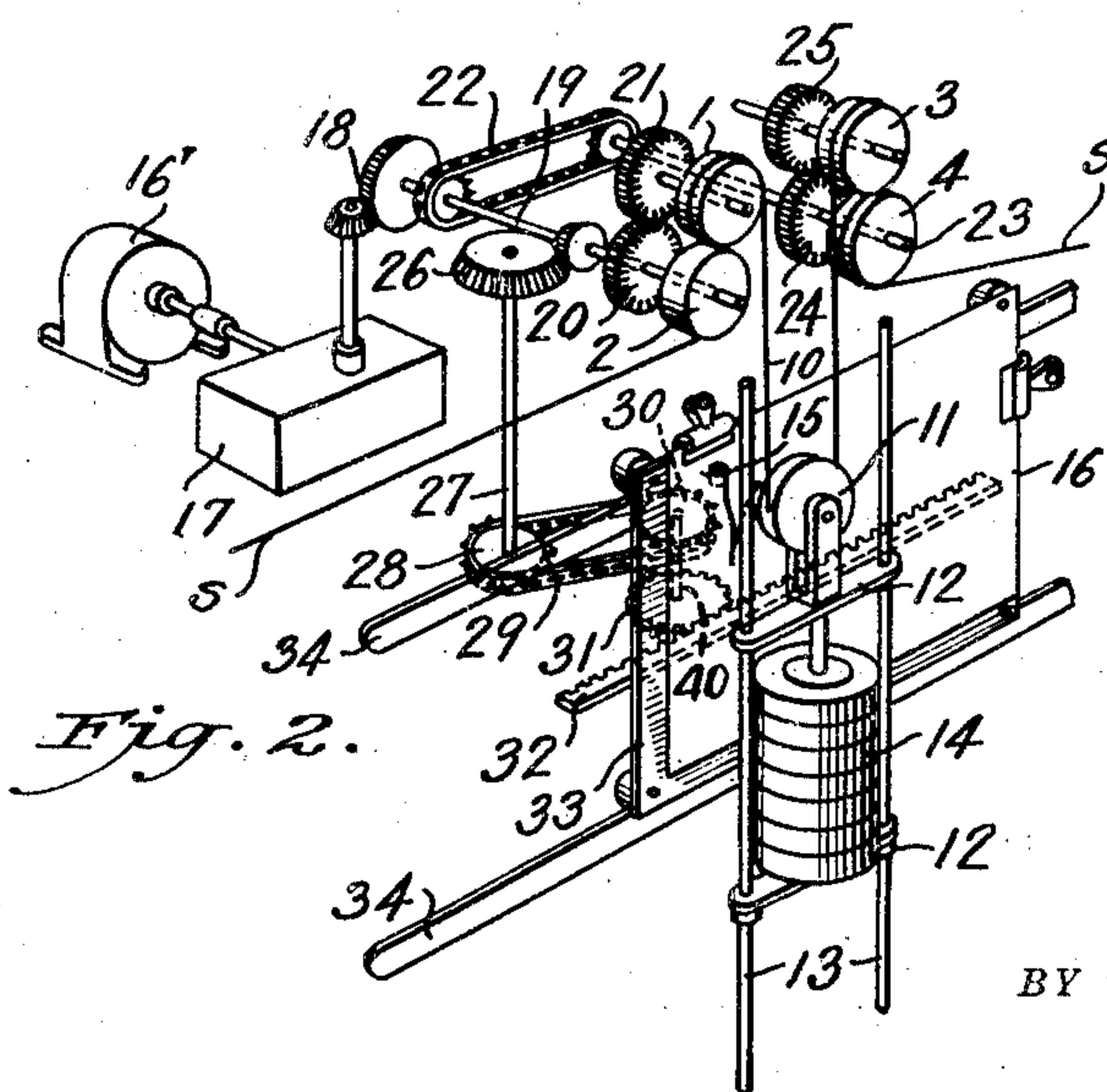
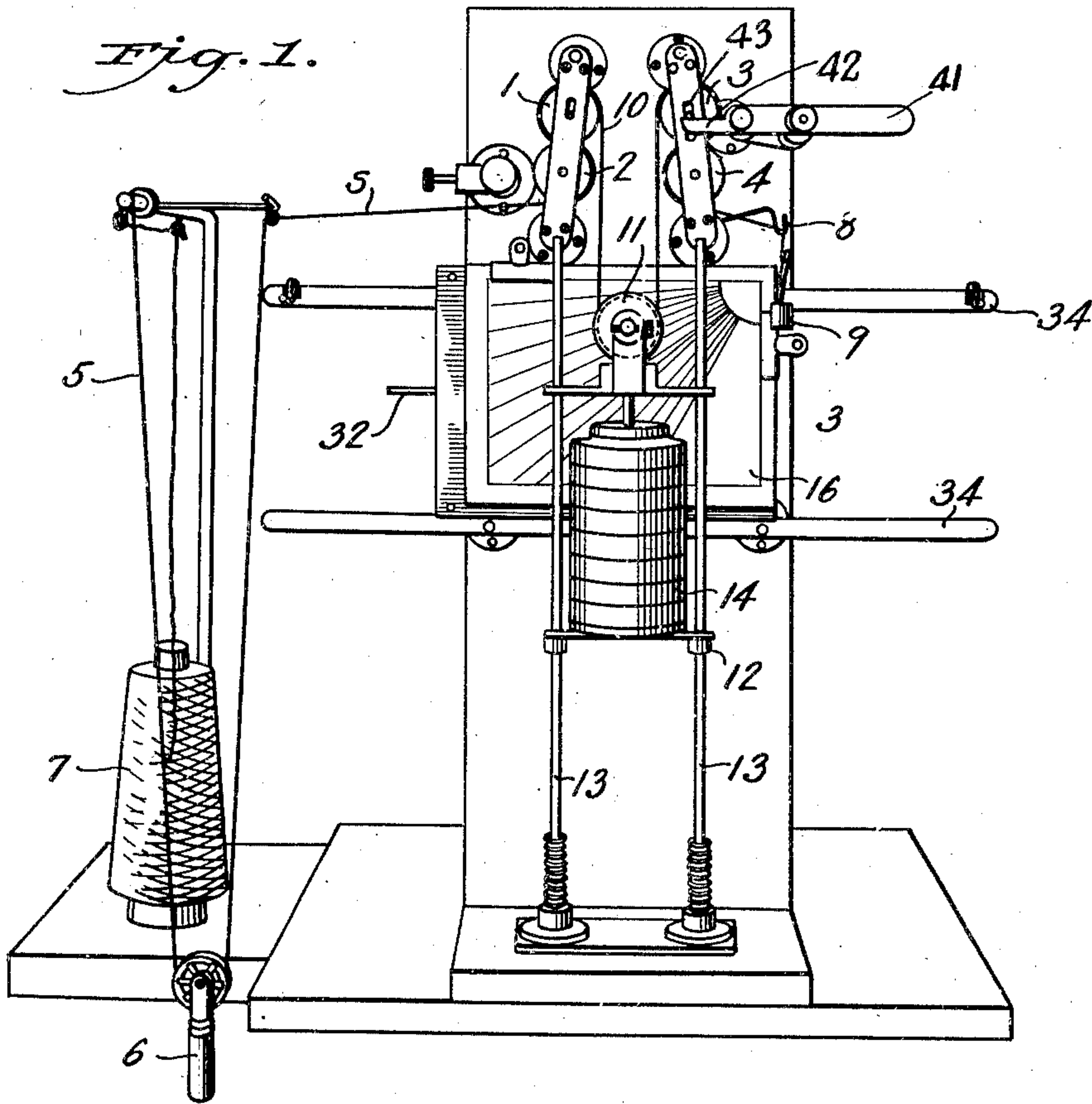
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THREAD TESTING MACHINE

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THREAD TESTING MACHINE

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1 Claim. (Cl. 265—2)

This invention relates to a machine or device for measuring and recording the stretch in strands.

Heretofore testing machine for measuring stretch have been constructed in which the whole length of the strand to be tested is stretched simultaneously and only a total stretch for the whole length determined. Such machines are liable to error because of the human element in mounting the specimen in the machine, in taking the measurements and in applying the stretching force. It is also of importance to have some knowledge of the variation in stretch in shorter lengths of the strand, which information cannot be obtained by the testing machine at present in use.

It is the object of this invention to provide a machine for measuring stretch in strands which is largely automatic, thereby eliminating the human element in making measurements. Another object of the invention is to provide a device for measuring the stretch in relatively short lengths of a strand and for integrating the stretch throughout the entire length of the strand. Another object of this invention is to provide a device for continuously measuring the stretch in a relatively small length of a continuously moving strand and for recording the stretch. Another object of this invention is to provide a machine for measuring the stretch in strands throughout any practical length of strand. Other objects and advantages of the invention will appear in the following detailed description taken in connection with the accompanying drawing in which:—

Fig. 1 is a front elevation, in perspective, of the machine of this invention.

Fig. 2 is a perspective view of the essential parts of the machine with various parts omitted for clearness.

Fig. 3 is a showing of the recording chart used in connection with this invention.

According to this invention a length of the strand less than a total length is placed under a stretching tension. The portion of the strand which forms the length under tension is continuously changed by so advancing the strand as to simultaneously bring new portions of the strand within the tensioned length and remove an equal or proportionate part of the strand from the length under tension. Suitable means are provided for so advancing the strands. Such means preferably takes the form of a pair of rollers 1, 2 for adding new increments to the length of strand under tension and a pair of rollers 3—4

for removing a like or proportionate increment of the length of the strand under tension. The strand S as it is drawn between the rollers 1—2 may come from any suitable source of supply, either continuous or discontinuous, such for instance as the loop 5 in which is hung the weight 6 for maintaining the strand taut as it is fed to the rollers 1 and 2. As shown in Fig. 1 an end of the loop 5 is fixed although it may be continuously supplied from the bobbin 7, if desired. As the strand S leaves the rollers 3, 4 it is taken up in any suitable manner as by a reel or simply by passing the strand through an eye 8 and maintaining it taut by weight 9 attached to the end thereof. While the means for advancing the strand preferably takes the form of the rollers 1, 2, 3, 4, other suitable means may be employed, such as a supply cylinder and take up cylinder of equal diameters which are driven in synchronism, or of diameters inversely proportionate to the speed of rotation of such take up and supply reels, the strand being unwrapped from the supply cylinder and wrapped onto the take up cylinder as it is advanced through the tensioned length of strand. Any other suitable form of supply and take-up mechanism for advancing the strand, without allowing slippage of the strand and permitting the formation of a loop or a portion therebetween which may be tensioned, may be employed.

As shown in Figs. 1 and 2, a loop 10 is formed in the strand between the pair of rollers 1 and 2 and the pair of rollers 3, 4, which loop is maintained under a constant tension by a suitable means which preferably consists of the pulley 11 over which the strand passes and from which is suspended the weight supporting frame 12, the pulley 11 being rotatably mounted in the frame. Rods 13 upon which the frame 12 may slide are provided to maintain the motion of the weight supporting frame 12 rectilinear. Suitable weights 14 of any desired size are supported upon the frame 12. Any other means for maintaining the strand under constant tension may be employed.

As the strand S is continuously advanced by the rollers 1, 2, 3, 4, the loop 10, which if it were unstretched would remain constant in length, is stretched. Inasmuch as the strand is removed from the loop at the same rate as is supplied thereto, the residual stretch formed in the loop will accumulate therein thereby allowing the tensioning system 11, 12, 14 to move in proportion to the stretch. In order to measure and to record the movement of the tensioning system 11, 12, 14,

a stylus 15 attached on the frame 12 in any suitable manner is provided.

The stylus 15 cooperates with a chart 16 which may be either stationary or movable. If stationary the total length of line marked upon the chart will form a measure of the total stretch of the strand throughout its whole length. However, if it is desired to mount the chart 16 so that it may be moved transversely with respect to the direction of movement of the tensioning system 11, 12, 14 the stylus will make a graph line commencing at the zero point at the upper right hand corner of the chart and will indicate the percent of stretch removed for every increment of length passing through the strand advancing means, which increments of length will pass through the device at a constant speed which is proportionate to the transverse speed of the chart as regulated by the driving gears. As the chart moves to the right at the desired speed the tensioning system will descend at a substantially uniform rate and the stylus will thus trace out the amount of stretch removed from successive increments of strand lengths and from the total length of the strand. Such an arrangement of the chart has the advantage such that not only is the measurement of the total stretch throughout the whole length of the strand made, but the stretch in any portion of the strand is measured and recorded. It is preferred to drive the chart at a rate of speed proportionate to the speed of the rollers 1, 2, 3, 4 in order that the record made may be interpreted in terms of the length of strand passed through the machine.

For driving the various parts of the device a suitable source of power such as the motor 16' is provided which, through reduction gear box 17 and bevel gears 18, drives shaft 19, on which is rigidly mounted the roller 2. Spur gear 20 is rigidly mounted on shaft 19 and drives spur gear 21 rigidly mounted upon a shaft which carries the roller 1. Chain 22 cooperates with suitable sprockets to drive the shaft 23 from shaft 19. The shaft 23 carries roller 4. A spur gear 24, mounted on shaft 23, drives spur gear 25 which is mounted on the shaft that rigidly carries roller 3. Thus rollers 1, 2, 3, 4 are driven in synchronism. Shaft 19, through the bevel gears 26, drives the shaft 27 which rigidly carries sprocket 28. Chain 29 drives sprocket 30 from sprocket 28. Sprocket 30 is rigidly mounted upon a shaft 40 which carries pinion 31 meshing with rack 32 mounted upon the support 33 for the chart 16. Tracks or ways 34 are provided to support the chart board 33 for rectilinear movement in a direction transverse of the movement of the tension system 11, 12, and 14. It is obvious that other suitable forms of mechanism for synchronously driving the rollers 1, 2, 3 and 4 or their equivalent and also for driving the chart board 33 at a rate of speed proportionate to the speed of the rollers 1, 2, 3, 4 may be provided.

In the operation of the machine the strand is introduced between the rollers 1, 2, a suitable length of loop formed, and the strand is then passed through rollers 3 and 4. The pulley 11 is hung in the loop or the strand threaded there-

through before it is passed through the rollers 3, 4. A chart 16 is mounted upon the support 33 which is positioned to the left as shown in Fig. 1. At this time the stylus 15 is in the upper right hand corner of the chart. The machine is set into operation by starting the motor 16'. As the machine operates the strand is continuously moved through the machine at a uniform rate of speed and the unstretched length of the loop 10 remains constant. Due to the constant tension upon the loop 10 applied through the pulley 11 the strand is stretched in small lengths which stretch is recorded upon the chart 16 as the stylus 15 moves downwardly and the chart moves to the right. The machine is continued until the desired length of strand is passed there-through, the functions of measuring the stretch being continuously performed automatically by the machine and a record of the stretch, over the entire length of strand passed through the machine and in every part thereof, such as shown in Fig. 3, is made. Thus it is seen that a stretch measuring device is provided which functions substantially independent of the human element, and which measures the stretch in relatively short lengths of a strand throughout the length of the strand.

The lever 41 is pivoted on the frame of the machine and is provided with an extending lug 42 adapted to coact with the shaft of the roller 3 so that when the lever is rotated about its pivot the roller 3 is elevated by raising its shaft in slot 43. This raises the roller 3 out of contact with roller 4 so that the strand may be threaded through and adjusted preparatory to operation of the device.

While one particular embodiment of the invention has been described in detail as an illustration thereof, it is not intended so to limit the invention inasmuch as variations in the parts which perform the various functions of my machine may be made as will be clear to one skilled in the art without departing from the invention, the scope of which is indicated in the following claim.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

A device for measuring the stretch in strands having a pair of juxtaposed synchronously driven rollers for continuously passing a strand therethrough without slippage, a second pair of juxtaposed rollers and means for driving same in synchronism with the first mentioned pair of rollers to continuously pass a strand therethrough without slippage, there being a loop formed in the strand between the first and the second pair of rollers, a pulley hung in the loop, a weighted frame suspended from the pulley, means for guiding the frame in rectilinear movement, a stylus carried by the frame, a movable chart adapted to cooperate with the stylus, and means for moving the chart transversely with respect to the direction of movement of the stylus and in synchronism with the rollers.

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