

July 1, 1924.

1,499,546

A. E. OXLEY

TESTING MACHINE

Filed Feb. 13, 1924

2 Sheets-Sheet 1

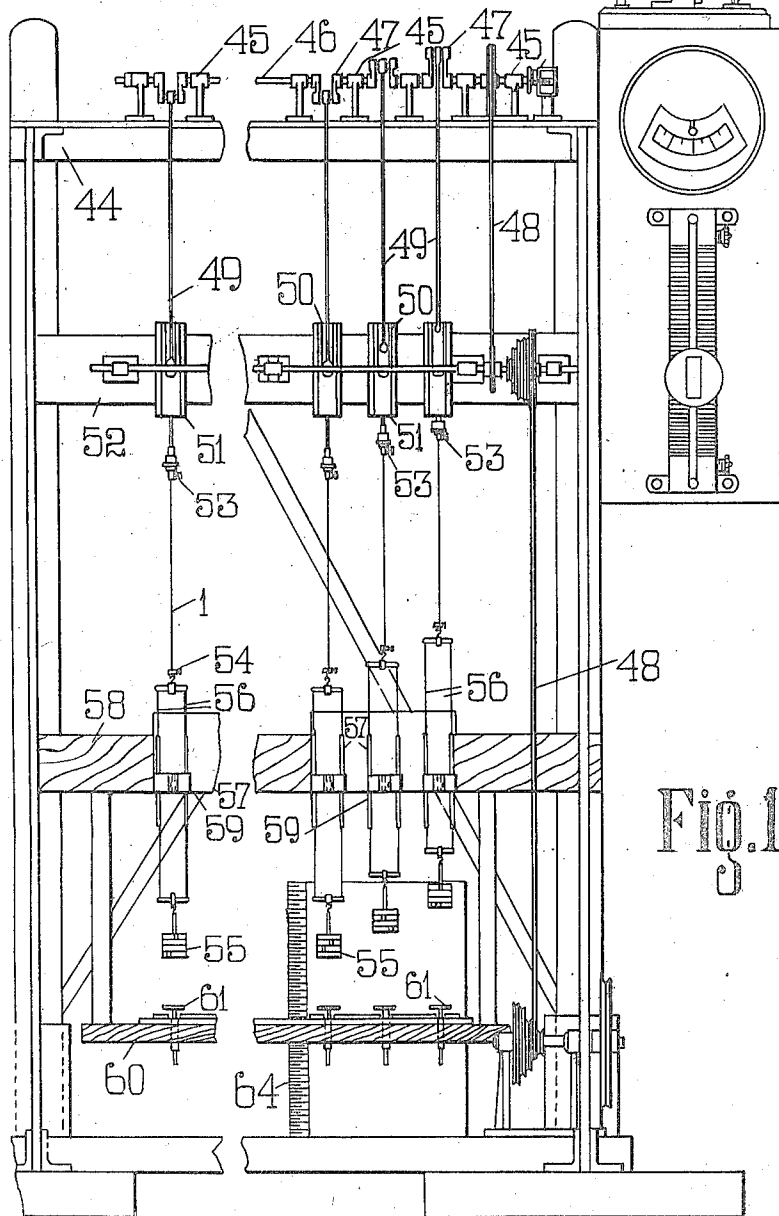


Fig. 1.

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2 Sheets-Sheet 2

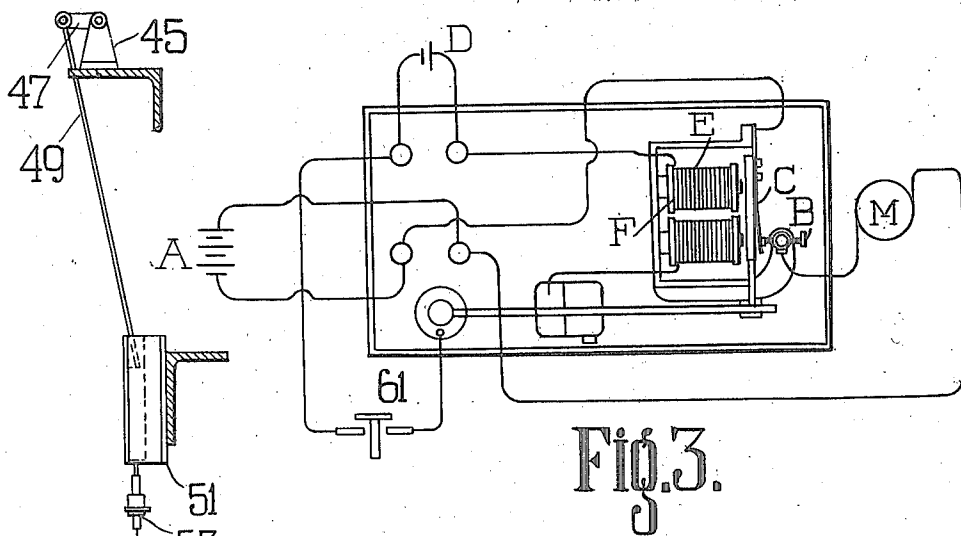


FIG. 2.

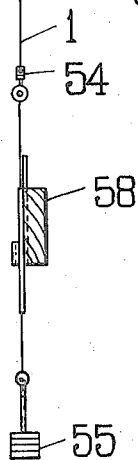
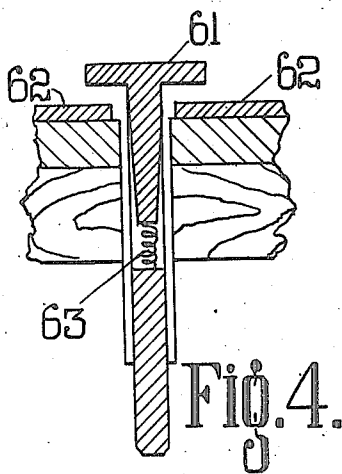


FIG. 4.

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UNITED STATES PATENT OFFICE.

ARTHUR ERNEST OXLEY, OF DIDSBURY, MANCHESTER, ENGLAND, ASSIGNOR TO THE
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TESTING MACHINE.

Application filed February 13, 1924. Serial No. 692,618.

To all whom it may concern:

Be it known that I, ARTHUR ERNEST OXLEY, a subject of the King of Great Britain, residing in Didsbury, Manchester, in the county of Lancaster and Kingdom of England, have invented certain new and useful Improvements in Testing Machines, of which the following is a specification.

This invention relates to a machine for testing threads and the like.

According to the present invention cyclical variation of stress is applied to a length of thread suspended in a machine. Further by this invention means are provided to prevent the rotation of the thread about its axis to cause untwisting of the same.

This invention also includes a method of recording automatically the extension of the thread in conjunction with the automatic recording of the number of cycles of the applied stress.

In one form of construction of the machine the threads are connected to cranks at one end and carry loading weights at the other, the load being such that the maximum loading on the thread which occurs with the crank at one extreme position relatively to the thread will always be less than the breaking load of the thread.

The numbers of variation of stress applied in this manner previous to the rupture of the thread is a measure of the strength of the thread when submitted to cyclical variations of stress.

The invention is more particularly described with reference to the accompanying drawings, in which;

Figure 1 shows a machine for mechanically causing a cyclical stress.

Figure 2 is a detail view.

Figure 3 is a diagram of the cut out circuit.

Figure 4 is a detail of the electrical cut out.

Referring to Figs. 1 and 2 a device for submitting threads to cyclical variations of stress is shown. Mounted on a suitable frame work 44 are a series of bearings 45 in which is mounted a crank shaft 46 carrying cranks 47, the shaft 46 being driven in any suitable manner as shown by the belt drive 48. The cranks 47 are connected by a connecting rod 49 to slides 50 working in guides 51 mounted on a suitable girder 52.

Attached to the slides 50 are screw grips

53 supporting the threads 1, the lower end of which are attached to lower grips 54 supporting weights 55 through a bifilar suspension 56 comprising a pair of cords passing through vertical glass or the like tubes 60 57 attached to a cross beam 58 by adjustable clamps 59. The bifilar suspension prevents any untwisting action liable to occur in the thread.

Mounted below the member 58 is a catch board 60 clamped at any desired distance to allow for a specimen of any desired length. The catch board 60 carries electrical contacts 61 arranged below the weights 55 so that if a specimen breaks its weight falls upon the corresponding stud 61 to complete an electric circuit and thus to stop the machine.

Arranged opposite the movement of the weights are graduated scales 64 so that any extension of the thread may be recorded by reading the lowest position of the weight at intervals.

Alternatively, the scales may be arranged opposite the point of attachment of the thread to the bifilar member 56, thus avoiding any possibility of the reading including any extension of the bifilar members 56.

It is evident that as the cranks rotate the weights 55 are caused to move vertically upwards and downwards with a motion which is approximately simple harmonic and by their inertia produces a cyclical variation of tension in the specimen 1.

Instead of the system of cranks and slides just described to produce the simple harmonic motion of the weights, cams may be employed to give any desired type of motion, the connecting rods being held in contact with the lower edge of the cams by springs or supported by gravity from the upper edge. Alternatively the system of cranks shown in Fig. 1 may be retained but the cranks driven at a non-uniform angular velocity by means of a cam driving mechanism or eccentric pulley. In this manner the motion given to each individual specimen may be varied to produce differences in the cyclical stress.

Figs. 3 and 4 show a convenient cut out mechanism.

Referring to Fig. 3 it will be seen that the motor M is connected across the battery A through the contact B and corresponding movable armature contact C, so that on the

insertion of the switch the motor is supplied with current in the usual manner. On the depression of the stud 61 the relay circuit is complete causing the battery D to energize the coils E of the electro-magnet F in this manner pulling the contact arm C and breaking the contact between B and C thereby stopping the motor.

Fig. 4 shows the stud 61 in detail which is maintained in an elevated position above the corresponding contact plates 62 by means of a spring 63.

I declare that what I claim is:—

1. In a machine for testing threads or the like the combination of means to suspend said thread means to apply a cyclical variation of tensile stress axially of said thread, and means to prevent the rotation of said thread about its axis tending to untwist the same.

2. In a machine for testing threads the combination of means to suspend said thread by one end thereof, a weight attached to the end of said thread remote from said suspending means, means to move said suspending means through a cyclical path to produce variation in the stress imparted to said thread, and means to prevent the untwisting of said thread about its axis.

3. In a machine for testing threads the combination of a weight attached to one end of the thread, suspension means for the other end of said thread, a rotary crank connected to said suspension means, means to rotate said crank, and means to prevent the untwisting of said thread.

4. In a machine for testing threads the combination of a weight attached to one end of the thread, suspension means for the other end of said thread, a rotating crank, a connecting rod connected to said crank at one end and at the other to said suspension means, a guide for said connecting rod and means to prevent untwisting of said thread.

5. In a machine for testing threads the combination of a weight attached to one end of the thread, suspension means for the other end of said thread, a rotating crank, a connecting rod connected to said crank at one end and at the other to said suspension means, means forming a slide way to guide said connecting rod, means to prevent untwisting of said thread, and means to stop said rotating crank automatically on the breakage of a thread.

6. In a machine for testing threads the combination of suspension means for said thread a rotating crank, a rod connecting said crank to said suspension means, a guide for said latter end of said rod in order to give reciprocating motion to said suspension means, a weight, bifilar connections between said weight and the end of said thread remote from said suspension means, and means to retain said bifilar connections in the same relative positions in order to prevent untwisting of the thread.

7. In a machine for testing threads the combination of suspension means for said thread a rotating crank, a rod connecting said crank to said suspension means, a guide for said latter end of said rod, a weight, bifilar connections between said weight and the end of said thread remote from said suspension means, and a stationary sleeve encircling each element of said bifilar connection.

8. In a machine for testing threads the combination of suspension means for said thread a rotating crank, a rod connecting said crank to said suspension means, a guide for said latter end of said rod, a weight, bifilar connections between said weight and the end of said thread remote from said suspension means, a stationary sleeve encircling each element of said bifilar connection, and an electric cut out arranged beneath said weight and adapted to stop the rotation of said crank on the falling of said weight through the breakage of said thread.

9. In a machine for testing threads the combination of suspension means for said threads a rotating crank means to give said crank non-uniform angular motion a rod connecting said crank to said suspension means, a guide for said latter end of said rod in order to give reciprocating motion to said suspension means, a weight, bifilar connections between said weight and the end of said thread remote from said suspension means and means to retain said bifilar connections in the same relative positions in order to prevent untwisting of the thread.

In witness whereof, I have hereunto signed my name this 28 day of January 1924, in the presence of two subscribing witnesses.

ARTHUR ERNEST OXLEY.

Witnesses:

JOHN WILLIAMSON,
WILLIAM LENNON.