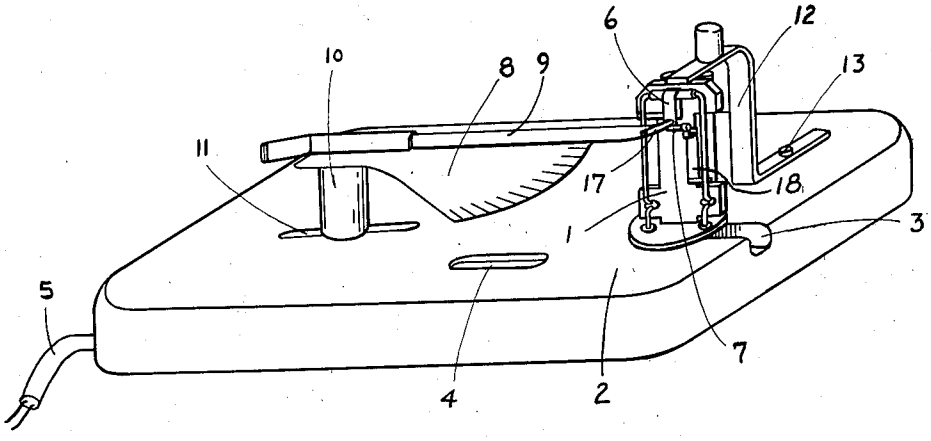
Aug. 4, 1942. H. J. McCARTHY 2,292,235

TENSION ADJUSTING DEVICE

Filed Dec. 6, 1940

Fig. 1



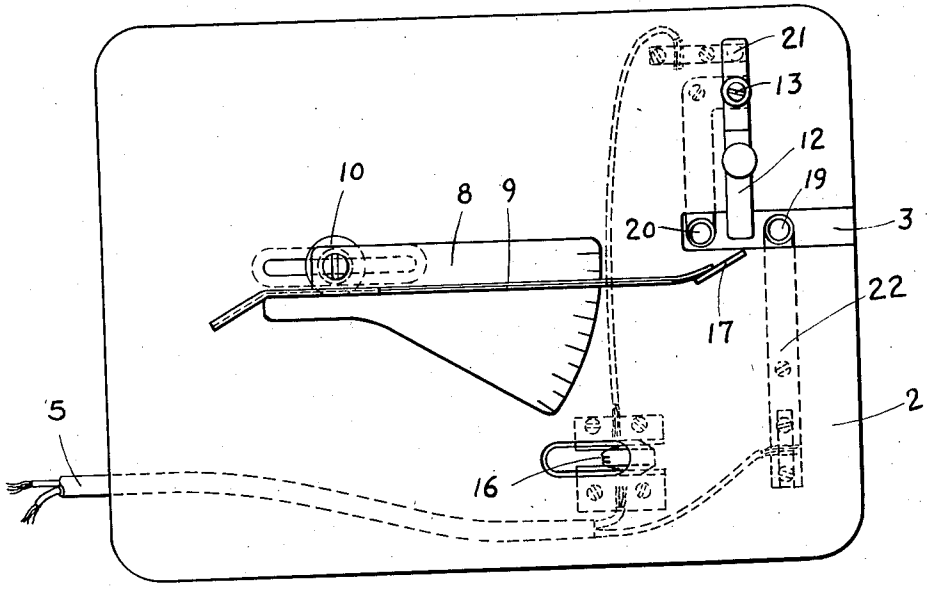


Fig. 2

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UNITED STATES PATENT OFFICE

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TENSION ADJUSTING DEVICE

Henry J. McCarthy, Danvers, Mass., assignor to Hygrade Sylvania Corporation, Salem, Mass., a corporation of Massachusetts

Application December 6, 1940, Serial No. 368,876

1 Claim. (Cl. 265—1)

This invention relates to apparatus for adjusting thermal relays.

An object of this invention is to provide a means for obtaining a high degree of accuracy in the timing of the relay.

Another object is to provide a means for adjusting the thermal relay so as to obtain maximum efficiency.

A further object is to provide a means for making fine and delicate adjustments quickly and at the same time in a manner as to permit the attainment of high production.

Further objects, advantages and features will be apparent from the specification below taken in conjunction with the accompanying drawing in which:

Figure 1 is a perspective view of the testing apparatus with a thermal relay in position to be tested;

Figure 2 is a plan view of the testing apparatus.

Similar reference characters refer to similar parts throughout the several views of the drawing.

Since some type of thermal relay is usually used in the starting apparatus for electric gaseous discharge lamps and more particularly in fluorescent lamps, in order to permit the desired preheating period for the filamentary electrodes of the lamp, it is highly desirable that this period be gauged accurately. The filaments should be heated sufficiently to be capable of carrying the discharge across the lamp, yet it is not necessary that they be heated for any longer period.

If a thermal relay or starter switch, similar to the one described in co-pending application Serial No. 356,566, filed September 12, 1940, is used, this apparatus may be used to properly gauge the tension of the resistance contact point against the bimetallic strip therein employed. Once a switch has been found in which the tension is such as to provide just the desired filament preheating period, this tension is measured on my apparatus so that all other switches may be similarly adjusted.

Figure 1 shows the manner in which the switch is adjusted. The switch 1 is inserted into position in the adjustment box 2 through the slot 3 provided therefor. When the switch reaches the position shown in this figure, it establishes electrical contact through line 5. When the positioning arm 12 has been brought into the position here shown, the circuit through the switch and the adjustment box becomes closed and a small indicator light 16 will glow. This light is recessed in the slot 4 in the adjustment box 2 and indicates that the circuit through the switch 1 is closed.

In actual operation in the starting apparatus for fluorescent lamps, the length of time it will take for the bimetallic strip 6 to become sufficiently heated to break away from the carbon contact 7 will depend on the tension which the strip 6 is exercising against the contact 7. For example, if the strip 6 is exercising a great tension against the contact 7, the circuit through the switch will remain closed for a longer period and thus produce a longer preheating period than would result if there were only a slight tension betwen the strip 6 and the contact 7. The tension measuring device of my invention provides a measure for insuring substantially the same tension in all starter switches of the same size and type.

When it has been ascertained that a certain starter switch provides the desired period for preheating the filaments before breaking the circuit, this switch is placed in position in the adjusting box 2, as shown in Figure 1, and the scale 8 with the spring steel finger 9 mounted thereon is swung into position, pivoting about the stud 10 projecting from the elongated slot 11. The stud 10 may be moved forward or backward in this slot 11 in order to properly locate the scale 8 and the finger 9 in relation to the bimetallic strip 6 depending on the size and type of switch being adjusted. In this device, finger 9 is pivoted about pivot 10. The positioning arm 12, pivoting on the stud 13 is swung over to hold the switch firmly in position, thus closing the circuit while the tension calculation is being made.

The rearward end of the spring finger 9 is attached to the rearward end of the scale 8 on which it is mounted. The scale 8 is calibrated in units of force. Thus, when the forward tip 17 of the finger 9 is brought forward by manually pivoting it about stud 10 and starts to exert a pressure on the bimetallic strip 6, the spring finger 9 will deflect. The finger 9 will continue to deflect until the pressure at the tip 17 of the finger 9 against the bimetallic strip 6 is great enough to push the strip away from the carbon contact and thus open the circuit. The breaking of the circuit will be indicated by the extinguishing of the indicator light 16.

This spring finger 9 consists of two pieces of spring steel which may be .003 inch in thickness. They are clamped firmly together at the pivot end and have a steel tip 17 welded at the for-

ward extremity thereof. The use of two pieces of spring steel clamped together impart a substantially uniform deflection as the tip 17 exerts pressure on the bimetallic strip 6.

When the pressure on the strip 6 is sufficient to open the circuit through the switch 1, the location of the finger 9 in relation to the calibrated scale 8 is noted by the operator. Thus, each switch thereafter adjusted will have substantially the same tension of the strip 6 against the contact 7. Since this tension is a determining factor in the calculation of the filament preheating period, and since the master switch used was one proven to be highly efficient and calculated to a high degree of accuracy, all switches may very easily be timed substantially the same by using the apparatus of my invention. The adjustment on the various switches may be made by bending the arm 18 on the end of which the contact 7 is carried.

Figure 2 shows the manner in which the electrical circuit may be connected in the adjusting box 2. Spring contact pins 19 and 20, located at the inner end of the slot 3, serve as the means for establishing electrical contact with the base pins projecting from the bottom of the switch 1. The positioning arm 12 will be thrown over to hold the switch 1 firmly in position to secure positive contact. At the same time the arm 12 is thrown over, the circuit will be completed through the arm contact point 21 and the contact finger 22, whereupon the indicator light 16 will go on. When this is accomplished the switch is ready for tension adjustment.

Although I have described the manner in which my tensioning device operates with reference to my copending thermal relay application, the device of my invention may be used as a tension adjusting means for any similar devices without departing from the spirit of my invention.

What I claim is:

Apparatus for measuring the tension necessary to disengage a pair of normally closed electrical relay elements, said apparatus comprising: a base having an elongated slot and adapted to receive an electrical relay in testing position; a stud projecting upwardly through said elongated slot in said base, said stud being adjustably positioned in said base along the horizontal axis thereof; a scale pivotally mounted atop said stud; and an arm comprising a pair of elongated resilient members joined to each other and having its rearward end fixed to the pivoted end of said scale, and its forward and free end cooperating with said scale and adapted to be engaged with one of said electrical relay elements for disengaging said elements.

HENRY J. McCARTHY.