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SETTING DEVICE ON MECHANICAL AND ELECTRIC MEASURING INSTRUMENTS
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Fig.1

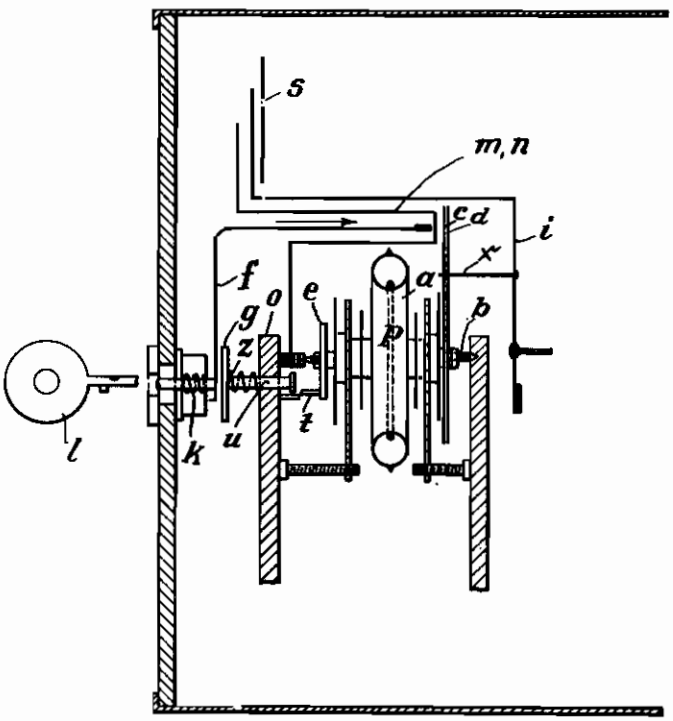
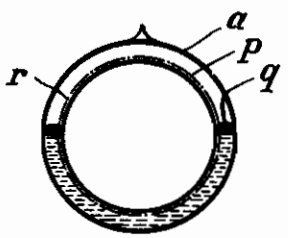


Fig.2



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SETTING DEVICE ON MECHANICAL AND ELECTRIC MEASURING INSTRUMENTS

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In mechanical and electric measuring instruments in which, when a certain maximum or minimum value is attained, a feeding proceeding is released with the aid of a mercury switch tube connected with the hand of the measuring instrument, it is already known to fix the ring-shaped metal tube on a hand shaft, the ring-shaped tube turning in accordance with the hand shaft. Constructions have further become known, in which the ring-shaped tube is arranged separate in front of the work hand of the indicating instrument, a stop pin being provided and the tube being carried along by a catch on the work indicating hand. For adjusting the contact of the mercury ring-shaped tube for contact giving when a certain maximum- or minimum value of the instrument has been attained, the casing of the instrument must be opened. It is then either necessary to hold the extended hand shaft in order to adjust the mercury tube, or the ring-shaped mercury tube itself must be adjusted in order that the stop pin can be adjusted. The circumstance that the protecting case must be opened for the setting is impeding and inconvenient. Further, in arrangements of this type, an accurate adjusting to the desired scale value is extremely difficult and time wasting and cannot be carried out by every one, as it is necessary to open the instrument. According to the invention the setting takes place from the outer side and can be carried out by any one without opening the case.

The invention relates to a setting device on mechanical and electric measuring instruments, in which by means of mercury switch tubes connected with the hand of the measuring instrument a feeding proceeding is disengaged when a certain maximum or minimum value of the measuring value is attained. By the invention the problem is to be solved in an especially suitable manner, to enable the setting of the maximum or minimum values from the outer side of the measuring instrument. According to the invention this is effected thereby, that one or two catch-hands are fixed on the shaft carrying the mercury switch tube so that, when the shaft is held fast, the hands can be adjusted independently the one from the other from the outer side by means of a separate device or by an element accessible from the outer side.

Other features of the invention relate to the additional provision of hands indicating the set value and to a facilitated possibility of providing the seals for the current leads on the mercury switch tube. The cooperation of these two further improvements effects, that measuring instruments equipped with these devices are suitable for the highest demands.

According to the invention two other hands are arranged, axially parallel to the catch-hands but separate from the same, these hands serving for indicating the maximum and minimum value. These hands indicating the set value are within the range of action of the setting lever, and they are shiftable by means of this lever parallel to the catch-hands to any desired point of the scale. Their position can, however, not be altered by the catch pin contrary to the two catch hands. The additional hands are bent at right angles so that their part destined to indicate on the scale moves in front of and over the catch hands so that the adjusted initial value can always be ascertained and read. These hands indicating the set value are preferably fixed on the front fixation plate on the existing bracket, or on a bracket especially provided herefor, that is separate from the shaft, and so that they are resilient.

An other feature of the invention relates to the enlargement of the contact range of the mercury switch tube. This mercury switch tube, as is generally known, serves for establishing a connection between the seal for the current supply and the seal for the current discharge as long as the mercury is in contact with the two seals. As usually the mercury filling amounts to about 180° or fills half the ring-shaped tube, a connection can take place only in this angular position, which means that a connection is always ensured according to the height of the mercury filling related to the degree of angle. In order that the seals may be arranged as desired and in order to further ensure a reliable current connection for the angular oscillations happening in practice, a metal ring connected with a seal is provided according to the invention on the inner circular or ring-shaped wall part of the mercury ring tube corresponding to the angular oscillation. This arrangement presents at the same time the advantage, that the mechanical resistance otherwise occurring at the seals is overcome and thereby the turning moment of the tube becomes considerably more favorable.

Several embodiments of the invention are illustrated in the accompanying drawings, in which

Fig. 1 shows the setting device in side elevation,

Fig. 2 shows the mercury switch tube.

On a shaft *b* a mercury ring tube *a* of suitable

shape is fixed or several such mercury ring tubes. On one end of the shaft two catch hands *c* and *d* are mounted so that they can be adjusted independently the one from the other when the shaft *b* is held fast. On the other end of shaft *b* a holding device *e* is mounted, which consists of a disc with abutment pin *t*, said disc adapted to be securely held in its position by a bolt *u* of a disc *g* after this bolt has been pressed inwards. The shaft *b* with the two catch hands *c* and *d*, the mercury ring tube *a*, and the disc *e* and with the necessary current takers is revolvably mounted. The apparatus hand *i* has a catch pin *x* engaging between the two catch hands *c* and *d*. If the apparatus hand *i* moves over one of the set values, the catch pin *x* carries along the catch hand c or *d*, whereby the shaft *b* and with the same the mercury ring tube *a* is turned and at the same time the contacts on the mercury ring tube *a* are switched-in or cut out. To alter the switch limit as desired, it is possible to adjust the two catch hands *c* and *d*. This is attained in that the adjusting lever *f* is pressed inwards from the outer side in the direction of the arrow by means of a handle *l*, whereby the holding device is actuated, in that the bolt *u* of disc *g* is pressed against the stop pin of disc *e* so that the shaft *b*, same as the mercury ring tube *a*, can no longer turn. The catch hands *c* and *d* can then be adjusted on the scale as desired. As soon as the adjusting to the desired value has been carried out, the adjusting lever *f* and the disc *g* with its bolt *u* are brought again into the initial position by the action of springs *k* and *z*. The holding device is then actuated by means of a handle *l*, for instance a socket key or set screw.

According to the invention it is further possible, when one or several shafts is or are arranged which carry the mercury ring tubes, to stop these mercury tubes singly or all at the same time in order to actuate the catch hands arranged on one of these shafts. In this instance the holding device may also be provided so that a screw or the like is actuated, and also the actuation of the catch hands *c* and *d* is then effected by other means, such as toothed wheels or the like.

Two hands *m* and *n* indicating the set values are arranged on the bracket *o* in the range of action of the adjusting lever *f* and axially parallel to the catch hands but separated from the same. These hands *m* and *n* may be shifted, parallel to the catch hands c, *d* to any point on the scale *s*. The hands *m*, *n* are independent on the catch pin *x*, contrary to the two catch hands c, *d*, as this pin *x* cannot shift the hands *m* and *n* out of their position.

The hands *m* and *n* are bent at right angles so that their indicating part moves in front of and over the catch hands *c*, *d* and can act to securely hold the initial or set values. Evidently, the hands for indicating the set value may be fixed on the front fixation plate or on an existing or separate bracket without departing from the inventive idea. This fixation is effected by means of resilient elements so that each one of the two hands can be set or adjusted alone, that is independently the one on the other.

The mercury switch tube *a* of ring-shape, shown in Fig. 2, has a metal ring *p* on its inner ring-shaped wall part, said ring being connected with the outer seal *r*. By turning the mercury ring tube the seal *q* is connected with the seal *r* through the mercury and the metal ring so that contact is produced. The inserted metal ring *p* ensures, even at great angular oscillation at the turning of the ring tube always a permanent connection with the mercury, so that even at great angular oscillation corresponding to the mercury filling always a perfect connection is ensured, and an interruption between the two seals cannot occur even at excessive turning angle of the ring tube.

The knowledge according to the invention to carry out the actuation of the holding and adjusting means from the outer side of the casing includes the possibility, that especially the engaging point may be situated also inside the front wall of glass.

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