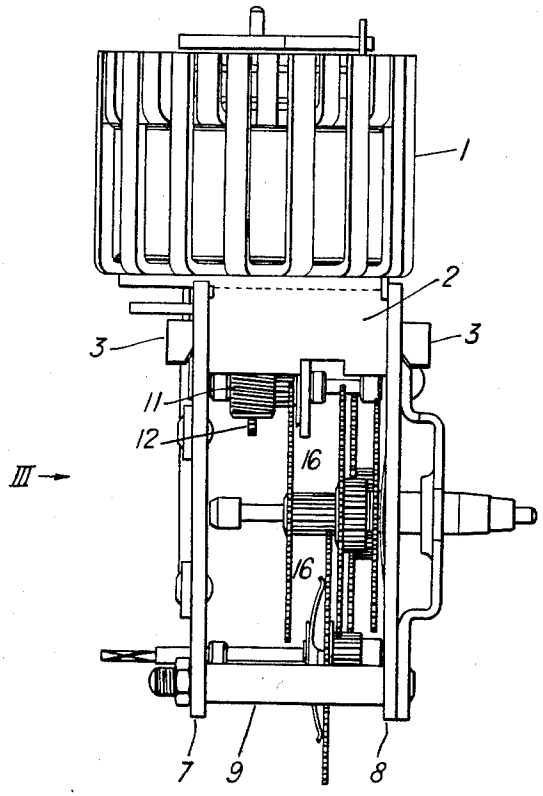
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METHODS OF JOINING PARTS

Filed May 28, 1956 3 Sheets-Sheet 1

Fig. 1.



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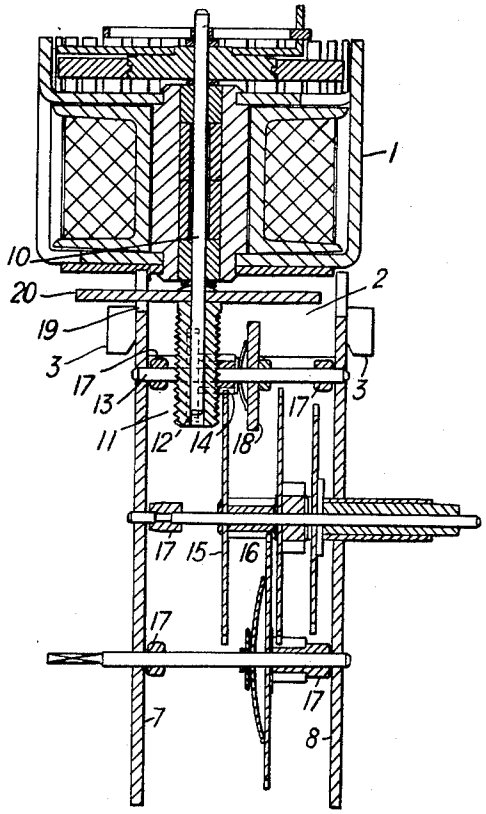
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Fig. 2.



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Fig. 3.

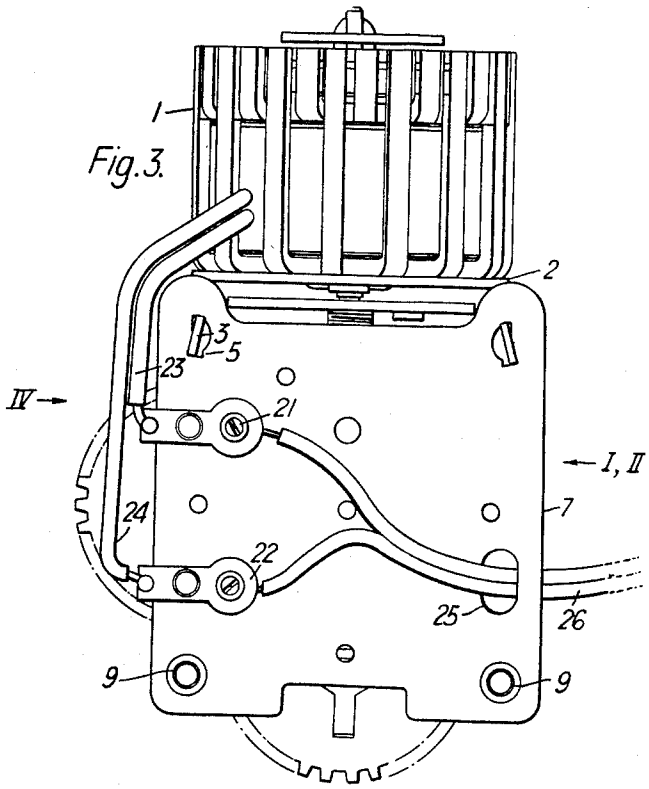
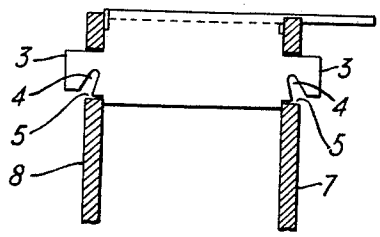


Fig. 4.



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METHODS OF JOINING PARTS

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Application May 28, 1956, Serial No. 587,813

Claims priority, application Great Britain May 27, 1955

3 Claims. (Cl. 29—513)

The present invention relates to a method and means for joining parts together in a simple, cheap, and effective manner, so that assembly and dismantling are facilitated.

It has been previously proposed to form one of two parts to be joined together with a slot extending therethrough, the other part being of deformable material (such as sheet metal) and being provided with a tongue capable of extending through the slot and engaging with the sides thereof, the parts being joined together by twisting or bending over the part of the tongue extending beyond the slot. It has also been proposed to form a further slot in the tongue itself and extending part way therethrough, this slot being substantially parallel to the adjacent surface of the first part. These proposals suffer from the disadvantage that in certain circumstances the relative location of the parts provided thereby is not sufficiently definite.

A timing mechanism embodying the features of the present invention will now be described with reference to the accompanying drawings, of which:

Figure 1 shows a general view in elevation of the movement.

Figure 2 shows a sectional view from the same direction as Figure 1.

Figure 3 shows a view from the direction of arrow III in Figures 1 and 2.

Figure 4 shows a detail view from the direction of arrow IV in Figure 3.

This comprises an electric motor 1, having a stator with two sets of interdigitated poles lying in a circle, this being mounted upon a sheet-metal member 2 in the general form of a shallow U. The spindle 10, of the motor extends through the base of the member 2, in the direction of the arms. Each arm of the member 2 is formed with a pair of metal lugs, as indicated at 3, one on either side thereof (Figure 4), extending in the plane of the arm and at right angles to the direction of the motor spindle. The end of each lug 3 is parallel to the side of the arm, and a slot 4 extends part-way through each lug, adjacent its end, making an acute angle of, preferably, about 30° with the end of the lug. The lugs each extend through a slot 5 formed in one of two plates, 7, 8, of synthetic resinous fabric based material, conveniently of the kind known under the trademark "Tufnol." Thus the plates are rigidly located with respect to each other and to the member 2 by twisting the end portion of each lug so that the sloping edge of each

end portion engages with one side of the associated slot 5. Plates 7, 8 are further located relative to each other by means of a pair of pillars 9 attached to each plate adjacent to the side away from the slots 5.

The end of the motor spindle 10 carries a worm 11 engaging with gear 12 carried upon a spindle 13 journalled in holes formed in plates 7 and 8. Spindle 13 carries, rigidly attached thereto, a pinion 14 engaging with a further gear wheel 15 which constitutes the first member of a conventional gear train, indicated generally at 16, arranged to position conventional hours, minutes and seconds hands. The remaining members of the gear train are carried upon further spindles journalled in plain holes formed in plates 7 and 8, being located against endwise movement by collars such as 17. Spindle 13 also carries, frictionally mounted thereon, an arm 18, one end of which engages with one arm of member 2 when the motor rotates in the desired direction and the other end of which is eventually brought into a position in which it engages with a projection 19 attached to a fly wheel disc 20 rigidly attached to spindle 10, if the motor rotates in the reverse direction. In these circumstances an impulse will be transmitted to the motor rotor to reverse its direction of rotation. The arm 18, and projection 19, thus constitute a directional control.

Electric terminals 21, 22, are mounted on plate 7, and are connected through leads 23, 24 to the ends of the motor winding. Plate 7 is formed with a slot 25, through which a twin insulated electric flex 26, may be passed to anchor it, the ends of the flex leads being connected to terminals 21, 22.

I claim:

1. In combination a method of making a re-usable, readily separable assembly by joining a first part and a second, deformable, part together, the steps of forming a first slot extending through the first part, forming a tongue on the second part capable of extending through the first slot and engaging with the sides thereof, forming the portion of the tongue extending beyond the first part with a further slot, extending from a point on the edge of the tongue lying beyond the first part towards and beyond the surface of the first part at an acute angle thereto, and twisting the end portion of the tongue, after its insertion through the slot, to join the parts with one edge of the second slot engaging with one edge of the first slot, said engagement being a camming engagement offering a large amount of resistance as the twisting of the end portion is increased.

2. A method as claimed in claim 1, comprising also the step of forming the second part with a shoulder to engage with the first part on the side away from the end portion of the tongue.

3. A method as claimed in claim 1 wherein the first and second parts are formed of sheet material.

References Cited in the file of this patent

UNITED STATES PATENTS

1,808,040	Hyatt et al.	June 2, 1931
2,236,922	Schutt	Apr. 1, 1941
2,274,765	Zalkind	Mar. 3, 1942
2,305,918	Belsky	Dec. 22, 1942
2,560,290	Helberg	June 10, 1951
2,722,625	Bingeman et al.	Nov. 1, 1955