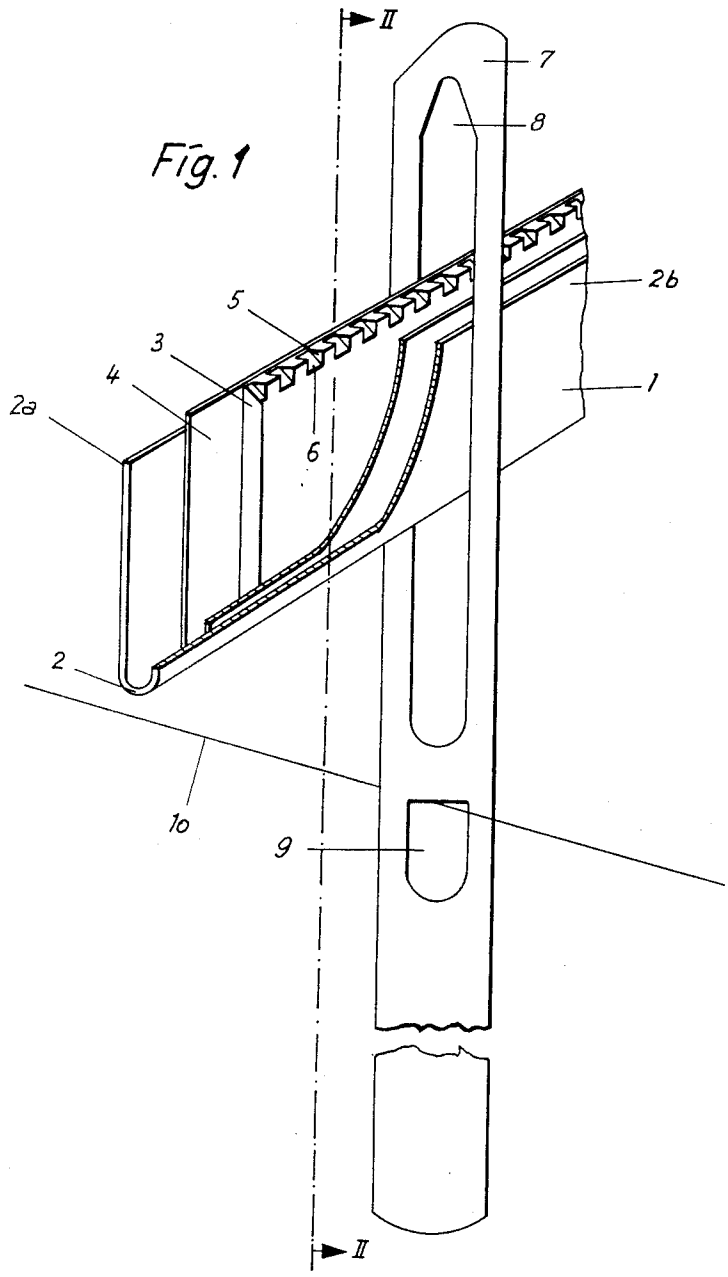
April 12, 1966 B. KOCH 3,246,091

ELECTRIC CONTACT BAR FOR THREAD STOP MOTIONS

Filed May 23, 1963 2 Sheets-Sheet 1

Fig. 1



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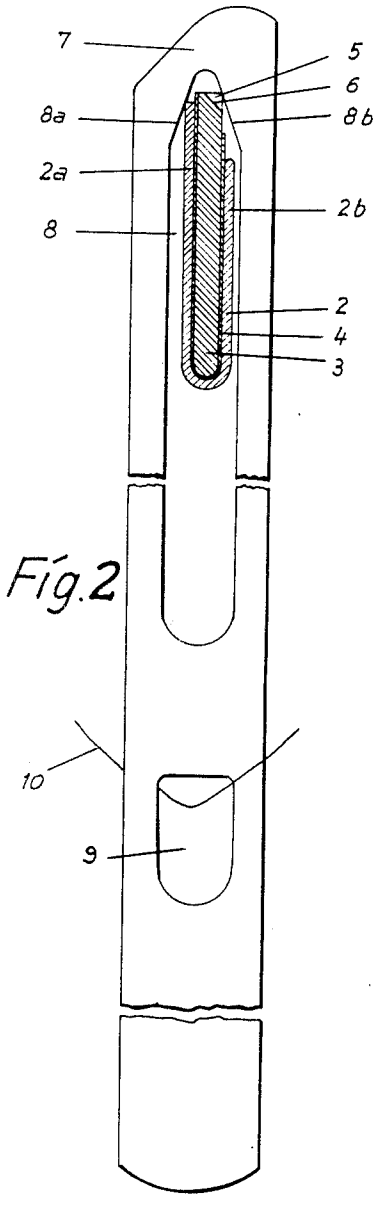

Fig. 2

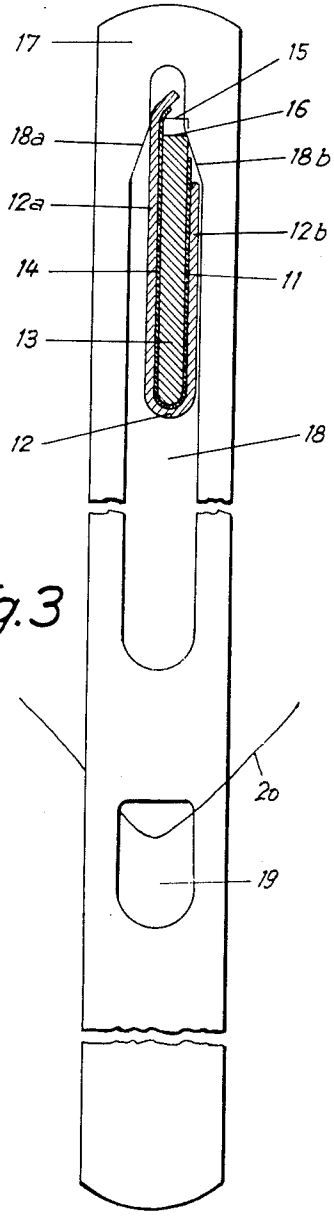

Fig. 3

United States Patent Office

3,246,091

Patented Apr. 12, 1966

3,246,091

ELECTRIC CONTACT BAR FOR THREAD STOP MOTIONS

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Filed May 23, 1963, Ser. No. 282,615
Claims priority, application Switzerland, July 11, 1962, 8,342/62
6 Claims. (Cl. 200—61.18)

The invention relates to an electric contact bar for broken thread stop motions of weaving looms, warpers-, sectional warping-, knitting machines and the like, which stops the machine by closing an electric circuit when a thread has broken.

Usually a so-called drop wire is riding on each of the threads to be controlled, and drops when the thread breaks or becomes excessively slack. The drop wires are riders made of strip steel or similar material and above and/or below the eyelet or slot through which the thread is to pass, they are provided with a slot through which a contact bar runs. The latter consists of two live bars insulated from each other and connected with the opposite poles of an electric control circuit, the drop wires riding on the threads touching one only of the two live bars. If a thread breaks, the drop wire falls and in its final position touches both live bars simultaneously, thus closing the electric control circuit.

Known contact bars consist of a U-profile outer bar in which a flat inner live bar is embedded with insulating material interposed, the inner live bar protruding over the outer one. The upper end of the drop wire slot for the contact bar is chamfered at one side so that the fallen drop wire, which rests on the inner live bar, is shifted laterally against one side of the outer live bar.

Owing to the upper end of its contact slot being chamfered at one side this drop wire is asymmetrical, which excludes it from being used on known automatic machines for drawing-in the warp through the thread eyelet. The drop wires to be used on such machines must have their head chamfered at one side so they can be presented to the drawing-in machine with their heads alternately chamfered on the right and left. The drop wires hang on an auxiliary rod running through the contact slot and should form a row which is not wider than the individual drop wire itself. This requirement cannot be met by drop wires, the top end of the contact slot of which is chamfered on one side, since their longitudinal axis is always offset from the vertical axis of the auxiliary rod.

For the purpose of easily recognizing the broken warp end the protruding edge of the inner live bar of the aforesaid contact bar may be serrated. By moving the contact bar to-and-fro, the fallen drop wire is caught in the serration and dragged along.

Another type of contact bars consists of two vertical live bars, the outer one being bent hooklike on the top and bottom, partly reaching over the inner bar, with an insulating strip interposed. At least the outer C-profile live bar is provided with a longitudinal rib in the middle. The respective drop wires are provided in the upper part of their contact slot with two projections pointing inwards, opposite each other. If, when a warp end breaks, a drop wire falls, the same is moved laterally by the cooperation of one of the said projections in the contact slot with the longitudinal rib of the outer C-profile bar, whilst the other projection is drawn towards the inner live bar, thus short-circuiting the two live bars with one another.

It is a disadvantage that this known contact bar cannot be furnished with a reliable thread breakage indicator to mark the fallen drop wire. On the other hand, the drop wire is symmetrical and is therefore suited for automatic drawing in. However, the pasage between the two projections in the contact slot must be at least of the same width as the contact bar. Thus, if the contact slot is to be of the same width, a narrower slot between the projections results, which calls for thinner and less sturdy contact bars, or otherwise the contact slot must be wider than normal. Consequently the drop wire, in order to have the same torsional strength, has to be manufactured of wider and consequently more expensive strip steel. In addition, the drop wire riding on the thread can be pulled forward in the running direction of the thread since the contact slot must have more play compared with the thickness of the contact bar.

A further known type of contact bar also consists of an outer live bar into which an inner flat live bar is inserted in a vertical position, with insulating material interposed. The upper end of the outer live bar is strongly chamfered so that its upper edge reaches approximately the same height as the inner live bar. Furthermore the inner bar is laterally offset with respect to the vertical axis of the outer bar.

At the upper end of the contact slot the associated drop wire has a wedge-shaped projection pointing towards the contact bar. When the drop wire falls, this projection wedges itself between the inner bar and the upper edge of the outer live bar and thus closes the circuit.

Owing to the asymmetrical positioning of the inner live bar this contact bar is comaparatively thick and necessitates a wider contact slot of the drop wire. Such contact bars cannot be fitted with a thread breakage indicator. The projection in the upper end of the contact slot pointing downwards can get entangled with the heads of neighbouring drop wires and makes it difficult to thread them on auxiliary rods. In the groove on the upper edge of the contact bar fluff and fly can gather and prevent proper contact.

The invention has the primary object of providing an electric contact bar for thread stop motions which overcomes the disadvantages of the known types without abandoning their advantages.

With this and other objects in view which will become apparent later from this specification and the accompanying drawings, I provide an electric contact bar for thread stop motions comprising in combination: a U-profile outer live bar, an inner live bar arranged within the U-profile of said outer live bar insulated from the latter, and a toothing arranged on top of said inner live bar, said outer live bar having shanks of different length the longer one reaching at least to the lowest level of the bottom of said toothing of said inner live bar.

These and other features of my said invention will be readily understood from the following description of two embodiments thereof illustrated by way of example in the accompanying drawings, in which:

FIG. 1 shows part of a contact bar in perspective with a drop wire riding on a tight thread.

FIG. 2 is a cross-section on the line II—II of FIG. 1 on a larger scale through the contact bar with fallen drop wire.

FIG. 3 is a cross-section through another type of contact bar with fallen drop wire.

The embodiment of the contact bar **1** according to the invention, as illustrated in FIGS. 1 and 2 consists in a conventional U-profile outer live bar **2** with the two shanks **2***a* and **2***b*, an inner flat live bar **3** and an insulating strip **4** separating the two live bars. The upper edge of the inner live bar has a transverse toothing **5** with oblique bottom **6**. According to the invention the upper end of one shank **2***a* of the U-profile live bar is extended at least to the lowest level of the oblique bottom of the tooth **6**. A drop wire **7** is placed onto the contact bar **1**. The upper end of its contact slot is angular, its inner

edges being symmetrically slanted with respect to the longitudinal plane of symmetry. An eyelet 9 with the drawn-in thread 10, on which the drop wire is riding (FIG. 1), is situated below the contact slot 8. In this position the contact slot 8 can touch the outer live bar 2 only.

FIG. 2 shows the contact bar in cross-section on line II—II of FIG. 1, but with a broken thread 10. The drop wire 7 rests with the upper angular end of the contact slot 8 on the two live bars of the contact bar 1. By this shape of the contact bar 1 it is achieved that one of the angular edges 8*a* rests on the upper outer edge of the longer shank 2*a* of the outer live bar 2. The other angular edge 8*b* rests on the opposite upper edge of the inner live bar 3. Thus the two live bars are short-circuited with one another and the machine is brought to a standstill.

By moving the contact bar to-and-fro in its longitudinal direction, the slanted edge 8*b* of the drop wire gets caught by the transverse toothing 5 of the inner live bar 3, causing the drop wire to follow its movement and to be recognized as distinct from the drop wires which have not fallen and have maintained their position.

These drop wires can be threaded on auxiliary rods for drawing in by machine without their longitudinal axis getting offset from the vertical axis of the auxiliary rod, because the upper end of the contact slot 8 of the drop wire is symmetrical. In spite of this it is possible to quickly recognize the fallen drop wire by laterally moving the contact bars in the warp stop motion. The width of the contact slot 8 has to be only slightly wider than the contact bar 1. On the one hand this permits to make the contact bar sturdy without the drop wire having to be made any wider, on the other hand it is possible to guide the drop wire 7 properly in the running direction of the thread 10 owing to the comparatively narrow contact slot 8.

FIG. 3 shows a cross-section of a similar type of contact bar 11. The one shank 12*a* of the likewise U-profile live bar 12 having shanks 12*a* and 12*b* is extended over the inner live bar 13 and bent towards the centre line of the inner live bar 13. Here the live bars are likewise separated by an insulating strip 14. The associated drop wire 17 too has a contact slot 18 and an eyelet 19. When the warp 20 is broken as shown, the drop wire rests on and touches the live bars 12 resp. 13 at the same time and thus closes the circuit of the shut-off device. The upper end of the contact slot 18 also has symmetrical angular slanted edges 18*a* and 18*b*.

The transverse toothing 15 of the inner live bar 13 is covered by the protruding shank 12*a* of the outer live bar and therefore facilitates the worker's leaning on the contact bar 11.

The new contact bar as described herein has the advantage over the embodiments known hitherto, that one of its live bars has a toothing which by being moved to and fro makes it possible to quickly recognize the broken warp end or the fallen drop wire, respectively, and is suitable for drop wires with symmetrical contact slots. This contact bar can be kept narrow since the vertical axis of its inner live bar co-incides with that of the contact bar and therefore is also suited for narrow 7 mm. or 8 mm. wide drop wires, which require correspondingly narrow contact slots. Neither the inner nor outer live bar has any lateral longitudinal ribs, and no projections in the contact slot are necessary. For a given width of the contact slot, which depends on the width of the drop wire, the contact bar can be kept thicker and thus more sturdy. The contact slot of the drop wire needs only be slightly wider than the contact bar and accordingly can be properly guided by the contact bar in the running direction of the thread.

While I have described herein and illustrated in the accompanying drawings what may be considered typical and particularly useful embodiments of my said invention, I wish it to be understood, that I do not limit myself to the particular details and dimensions described and illustrated; for obvious modifications will occur to a person skilled in the art.

What I claim as my invention and desire to secure by Letters Patent, is:

1. An electric contact bar for thread stop motions comprising in combination: a U-profile outer live bar having shanks of different length, one of said shanks being of a greater length than the other, an inner live bar arranged between said shanks insulated from said outer live bar, and a series of spaced notches forming a toothing arranged on top of said inner live bar, the longer one of said shanks reaching a point adjacent the upper edge of said live bar and in the proximity of said toothing of said inner live bar.

2. An electric contact bar as claimed in claim 1, comprising drop wires having contact slots with inner edges slanting inwardly in a direction toward the center lines thereof.

3. An electric contact bar as claimed in claim 1, wherein the bottom of said toothing is inclined in a direction upwardly toward the upper edge of said live bar.

4. An electric contact bar as claimed in claim 1, wherein said longer shank of the U-profile outer live bar extends beyond said toothing of the inner live bar.

5. An electric contact bar as claimed in claim 4, wherein said longer shank is bent over the upper edge of said inner live bar and at least partly covers the same.

6. In an electric stop motion comprising in combination: an electric contact bar of U-shaped section having opposed shanks, one of said shanks being of a greater height than the other, an inner contact bar arranged between said shanks, insulating material between the inner contact bar and the contact bar of U-shaped section, said inner contact bar being provided along its upper edge with a series of spaced notches having susbtantially vertical wall portions connected by inclined floor portions, said floor portions being obliquely directed in a direction from one side of said inner contact bar to the upper edge thereof and a drop wire having a longitudinal slot for receiving said contact bars, said slot being of a length to permit said drop wire to be normally held out of engagement with the upper edges of said contact bars and being formed at one end with a symmetrical portion for engaging said bars during thread breakage.

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