Feb. 14, 1956 R. C. BERKER 2,734,956

STOP-MOTION DEVICE

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Fig. 1.

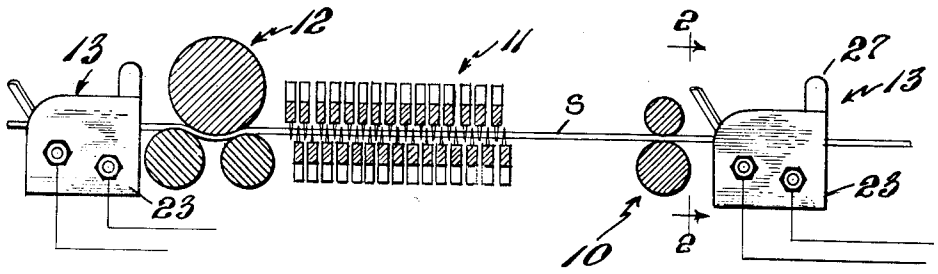


Fig. 3.

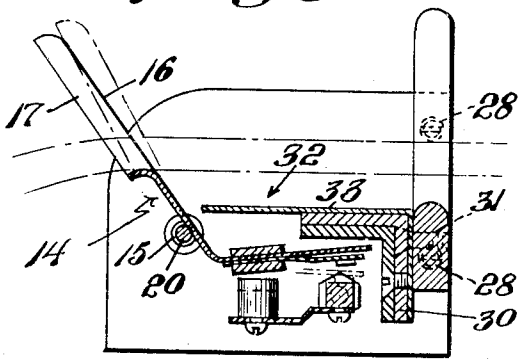


Fig. 4.

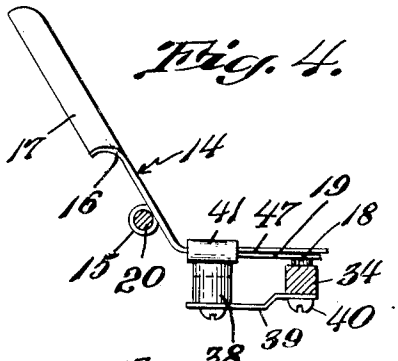
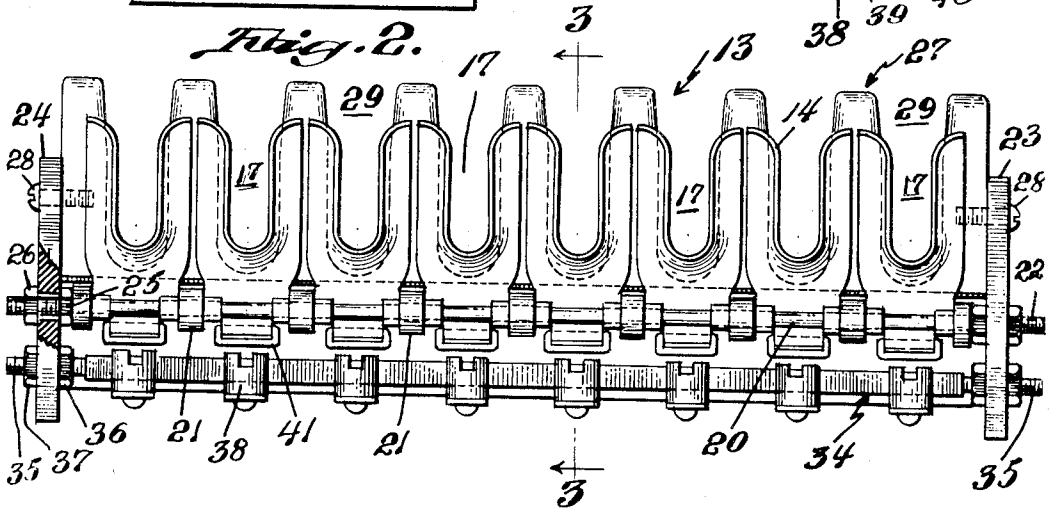


Fig. 2.



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STOP-MOTION DEVICE

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4 Claims. (Cl. 200—61.18)

This invention relates to improvements in an electrically operated stop-motion device for a yarn processing machine, particularly a stop-motion for a gill drawing frame.

The usual electrical stop-motion device heretofore used on gill drawing frames comprises a pair of electrical contacts, one of which is held out of engagement with the other by being supported by a sliver processed in the machine. Upon failure of the said sliver, such as the breaking or running out thereof, the said supported contact upon being free of the sliver will fall by gravity to engage and make contact with the other of said contacts in an electric circuit. This will cause the motor controlling circuit of the machine to arrest the motion thereof. The nature of the sliver processed in the gill drawing frame is such as to require that the force exerted against it by the weight of the contact held thereby be quite small. However, the vibration of the machine is such that considerable tension or force is required between the said electrical contacts to prevent them from chattering and as a result causing arcing and burning out of the contacts.

An object of the invention is to provide a stop-motion device of the above character which will provide a desired light pressure against the sliver when the contacts are being held open thereby and also to provide the necessary force required to hold the contact against chattering when said contacts move to the closed relation thereof.

Another object of the invention is to provide a stop-motion device in which the contacts will be held in the closed relation by a magnetic force.

Another object of the invention is to provide a stop-motion device of the above character in which the contacts will be resiliently related and held in the closed relation by a magnetic force.

A more specific object of the invention is to mount one of the contacts of the stop-motion on a light spring which is so arranged as to make contact just prior to the full effect of a magnetic force exerted on the contacts to hold the same against chattering.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a diagrammatic view showing the drawing rollers and faller combs of a gill drawing frame and stop-motion device positioned to be affected by the sliver passing through the machine to be processed thereby;

Figure 2 is a front elevational view of the stop-motion device shown in Figure 1 looking in the direction of the arrows thereon on line 2—2 with a portion in section;

Figure 3 is a sectional view taken along lines 3—3 of Figure 2; and

Figure 4 is an elevational view of the electrical contacts forming a part of the stop-motion device.

In carrying out my invention, I provide a set of electrical contacts which are held out of engagement or in open circuit relation by one of the contacts being supported by the sliver to be processed through the machine. This is accomplished by mounting one contact so that its center of gravity will be so located as to tend to move it into engagement with the other contact but which is held out of engagement in an unbalanced condition by the sliver. Thus the force exerted on the sliver will

be substantially that of the unbalanced weight which may be chosen to be as light in weight as desired. I may arrange to mount one contact in such a manner that it may be moved into engagement with the other contact by means of a light spring pressure acting thereon which spring is opposed by the engagement of the sliver therewith. Thus the force exerted on the sliver would be that merely of a light spring. Upon freeing of the contacts, such as by a break in the sliver, the contacts will move into closed relation. In order to provide sufficient force or tension on the contact to hold the same against chattering when in the closed position, I mount a magnet at a location to exert a magnetic force on the movable contact in a direction tending to move said contacts into engagement with each other. The magnet may be permanent or an electromagnet depending on the choice or the condition of operation, it being of sufficient strength to positively hold the contacts closed. The magnet will be so positioned relative to the contacts that a positive physical engagement between contact and magnet will be had when the contacts are in the closed relation.

Referring to the drawings for a more detailed description of one embodiment of the invention, **10** designates generally the back rollers of a gill drawing frame between which passes a sliver S to be guided therefrom to the faller combs **11** which operate to combine the slivers into a lesser number and comb the fibers thereof to straighten the same into general parallelism with each other. The sliver, after being acted upon by the faller combs **11**, is drawn therefrom by means of front draft rolls **12** and passes from these rollers to be collected by known mechanism (not shown). A stop-motion device **13** forming the subject of the present invention is positioned at the entrance side of the rollers **10** and a similar device **13** may be positioned at the delivery side of the draft rollers **12** or at any other location along the path of travel of the sliver S to operate to arrest the machine should there be a sliver failure at such location.

The device **13** comprises a plurality of electrical contacts designated generally **14**, there being a contact for each sliver to be controlled. Each of said contacts is similar to the other and comprises an elongated member having ears **15** intermediate the ends thereof providing an arm **16** having an elongated slot **17** therethrough which is open at the upper end for readily receiving a sliver S therein. A tail portion **47** extends at an obtuse angle from the other side of the ears **15** and the point **18** of the contact **14** is mounted on a resilient finger **19** which may be made of a flat spring and attached to the tail portion **47** in any manner such as by welding the same in place or by riveting in a well-known manner. These contacts **14** are made of relatively thin electrically conducting sheet material such as a brass alloy. They are mounted by means of the ears **15** on a rod **20** to be positioned side by side on said rod and spaced from each other by spacer collars or the like **21**. The rod **20** is also made of electrically conducting material such as copper or brass alloy and has threaded end portions **22** which extend through end supports **23**, **24** which are made of electrically insulating material. A nut **25** is positioned at each end of the rod **20** inwardly of the supports **23**, **24** to abut against the supports and a similar nut **26** engages the outer side of the portions **22** to securely clamp the rod **20** in position. The contacts **14** are mounted on this rod **20** in a manner so that the center of gravity of the contacts are so located that the tail portion **47** will tend to swing the contacts about the rod **20** in a clockwise direction as seen in Figure 4.

These supports **23**, **24** are tied together by a sliver guide **27** which extends transversely between the said end supports with the ends of the guide abutting against the said end support which are there secured as by means

of screws **28**. The guide **27** has a plurality of guide slots **29**, there being one such slot for each contact **14**, which is in line with the guide slot **17** therein, these slots **29** being likewise open at the upper edge of the guide for readily placing a sliver therein. The support is additionally made more rigid by means of an angle-shaped member **30** (see Figure 3) which extends transversely of the end support and is secured to the guide **27** as by means of screws **31**. An angle plate **32** is superimposed upon this angle member **30** and the side **33** thereof extends from the guide **27** to a position adjacent to the rod **20**, providing a cover wall for preventing lint and other foreign matter from falling on to the point **18** of the contacts **14**.

As previously described, the contacts **14** and the rod **21** are made of electrically conducting material and the openings in the ears **15** are made of a size to engage the said rod **20** somewhat snugly to provide for good electrical conductivity therebetween. However, the relation is such that the contacts **14** will be free for swinging movements to move into engagement by gravity with a fixed electrical contact designated **34** and which contact is common to all the contacts **14**. The contact **34** is in the form of a rod which is rectangular in cross section and made of electrically conducting material such as a brass alloy. The end portions **35** of the contact **34** are made cylindrical and threaded and extend through the end supports **23**, **24** and there secured in place by means of nuts **36**, **37** in a manner similar to that used for securing the rod **20** in position. It will be apparent that the contacts **14** and **34** are electrically insulated from each other by means of the end supports **23**, **24**.

The device **13** is attached to the machine so that the contacts **14** extend transversely and beneath the path of the slivers through the machine. The upper portion of the contacts **14** extends above the path of movement of the slivers and with the slot **17** therein in position to receive a sliver. The sliver being led through the guide **16** will engage the side walls thereof and the weight of the sliver and drag thereof will be sufficient to keep the tail portion **47** of the contacts in the raised position as shown in Figure 3 so that the point **18** is out of contact with the contact **34**. Upon the breaking or running out of slivers the unbalanced weight of the contacts **14** will as previously described tend to move the point **18** into electrical engagement with the contact **34**. However, this weight or force is insufficient to hold the point **18** with sufficient firmness on contact **34** to prevent chattering due to the machine vibration. In order to provide for a positive holding of the contacts together against chattering, I mount a magnet **38** at a position to attract and draw to itself the said tail portion **47** when the same is moved in the zone of the influence of the magnet. The magnet **38** in the instant disclosure is of the permanent type and is attached to a strap **39** which in turn is fixed to the contact **34** as by means of a screw **40**. The strap **39** extends from the contact **34** to position a magnet at a location such that when the point **18** has made contact with the contact **34**, the tail portion **47** will be in physical engagement with the magnet **38**. Since the contact **14** is made of a brass alloy, an iron or steel plate **41** is attached to the tail portion **47** providing an armature for the magnet **38**. This armature **41** may be simply a flat strip of steel material wrapped about the tail and spring **19** as shown in Figure 3.

It will now be apparent that upon a contact **14** being free of a sliver, the former because of its unbalanced condition will swing to move its point **18** into electrical engagement with the contact **34**, and just subsequent to the making of the contact, the armature **41** will have moved in the field of the magnet **38** so that the full force of the magnet will further draw the tail **47** toward the contact **34** and firmly hold the point **18** against the contact **34**. It will be apparent that the spring **19** may be adjusted so as to predetermine the engagement of the point **18** with the contact **34** to close the contacts just prior to the armature **41** making contact with the magnet **38** whereby to insure a positive closed contact for the magnet to exert its maximum force on the said armature.

In operation the contacts of the device **33** operate through a much reduced voltage the coils of a relay not shown which is incorporated in the control circuit of the machine motor. Wire connections to the said coils may be made in a usual manner to the contacts **14** through the ends **22** of the rod **20** and through the contact **34** through the ends **35**.

I claim:

1. In a stop-motion device for a yarn processing machine comprising a first electric contact, a second electric contact mounted so as to have its center of gravity located at a position thereon tending to move said second contact into engagement with the first contact, said second contact being normally positioned to be engaged by a sliver to be moved in a direction tending to oppose movement of the said second contact into engagement with said first contact, said second contact moving into engagement with said first contact upon being free of said sliver, and a magnet for applying a magnetic force on said contact to hold the same into engagement with said first contact upon said second contact moving into engagement with the first contact, said magnet being spaced from said second contact a distance beyond the effective lines of force of said magnet when said second contact is at the said normal sliver engaged position thereof.

2. In a stop-motion device for a yarn processing machine comprising a first electric contact, a second elongated electric contact pivotally mounted intermediate the ends thereof at a location thereon so that its center of gravity will be so positioned as to tend to move said second contact by gravity into engagement with the first contact, said second contact moving into engagement with said first contact upon being free of said sliver, and means for applying a magnetic force on said second contact subsequent to said second contact being free of said sliver to hold the second contact into engagement with said first contact upon said second contact moving into engagement with the first contact.

3. In a stop-motion device as set forth in claim 2 wherein said magnetic force comprises a magnet of the permanent type.

4. In a stop-motion device for a yarn processing machine comprising a first electric contact, a second electric contact movably mounted for movement towards said first contact and having a resilient finger for engagement with the first contact, said second contact being positioned in the path of movement of a sliver through said machine to be engaged by said sliver to be held thereby out of engagement with said first contact, said resilient finger being moved by said second contact into engagement with said first contact upon the second contact being free of said sliver, and magnetic means for applying a magnetic force on said second contact upon the engagement of said resilient finger with the first contact to hold the contacts against chattering, said magnetic means being spaced from said second contact a distance beyond the effective lines of force of said magnet when said second contact is at a normal sliver engaged position.

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