Nov. 9, 1965 B. W. GOSSETT ETAL 3,216,063

MECHANICAL STOP-MOTION FOR CARDING ENGINES

Filed May 6, 1963 2 Sheets-Sheet 1

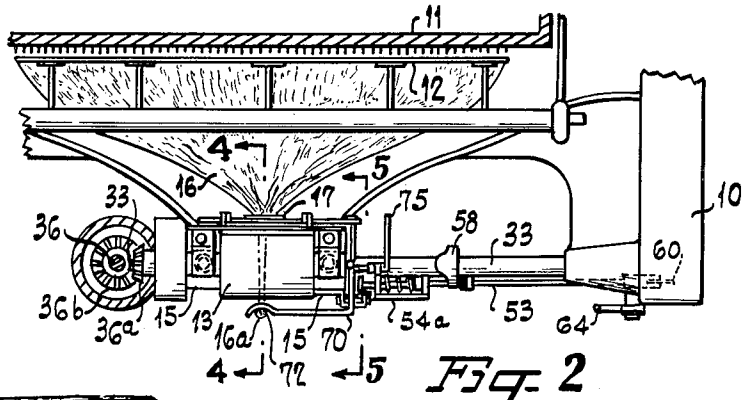

FIG. 2

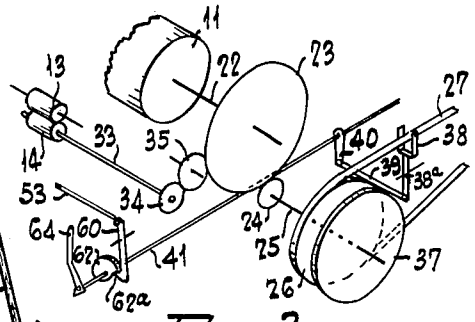

FIG. 3

FIG. 1

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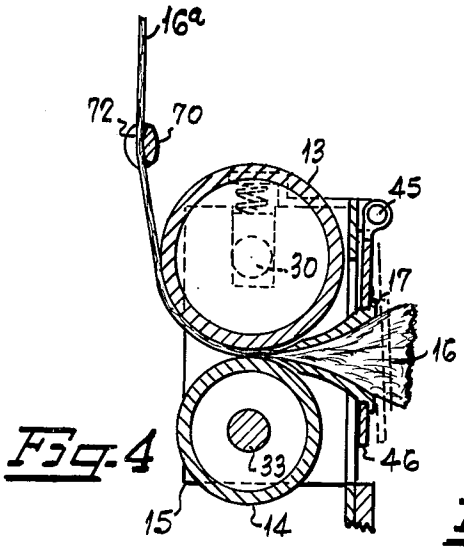

Fig. 4

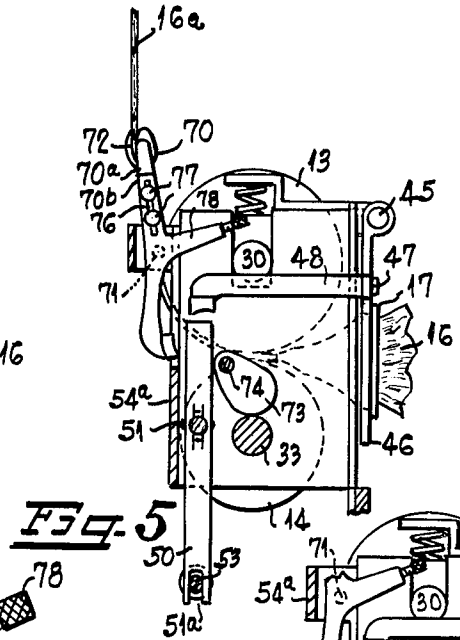

Fig. 5

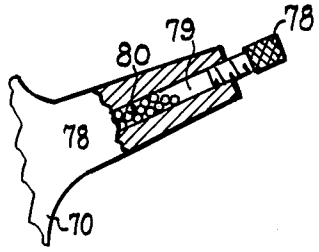

Fig. 9

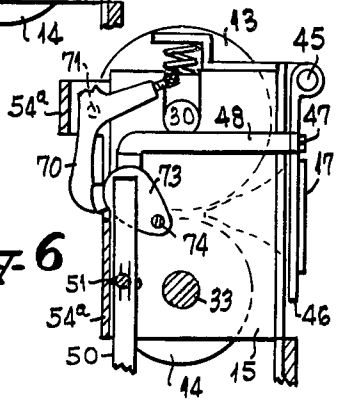

Fig. 6

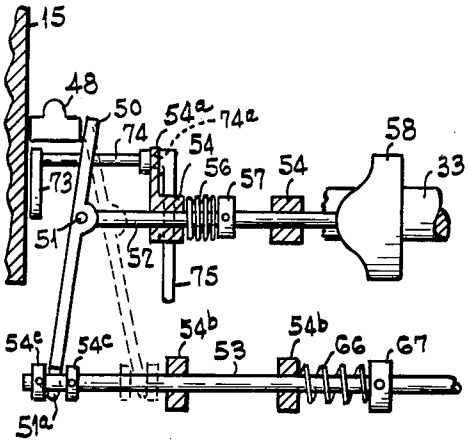

Fig. 8

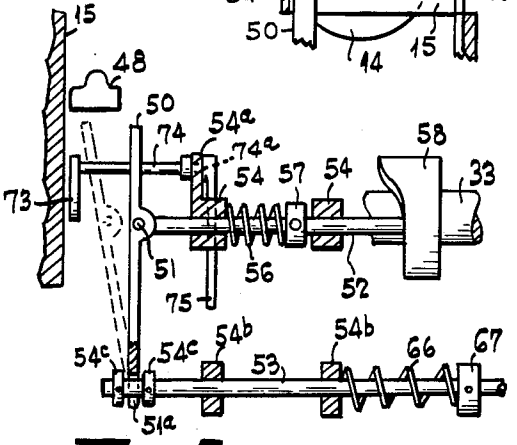

Fig. 7

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MECHANICAL STOP-MOTION FOR CARDING ENGINES

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3 Claims. (Cl. 19—.25)

This invention relates to mechanical stop-motions for carding apparatus and more particularly to devices of this character designed to effect stoppage upon breakage of a carded web or a sliver strand or the production of a carded web or a sliver of sub-standard size, weight or tensile strength.

It is an object of this invention to provide a stop-motion of the class described which is capable of more effectively limiting the operation of carding machines to the production of sliver meeting prescribed standards and during only such periods in which the related machine components are fuctioning properly.

It is another object of this invention to provide a stop-motion for carding machines controlled jointly and separately by feelers located respectively at opposite sides of the calender rolls between which a continuous fiber mass passes, said feelers being movable in response to the tension in the fiber mass.

It is still another object of this invention to provide a dual control stop-motion responsive to incremental variations in thickness, size and strength of a travelling carded web and of the sliver formed therefrom, and capable of adjustment between prescribed limits.

Some of the objects of invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which,

FIGURE 1 is an elevation of a carding machine and a sliver coiler, showing the present invention associated therewith;

FIGURE 2 is a sectional plan view taken along line 2—2 in FIGURE 1;

FIGURE 3 is a schematic view showing a conventional driving mechanism for the doffer cylinder and calender rolls of the carding machine, in combination with means for connecting and disconnecting the driving mechanism from the driven members;

FIGURE 4 is an enlarged section view taken along lines 4—4 in FIGURES 1 and 2 showing a continuous fiber mass passing between the calender rolls of the carding machine and a pair of stop motion arms held in inoperative positions by the mass respectively at the intake and discharge sides of the rolls;

FIGURE 5 is an enlarged sectional view taken along lines 5—5 in FIGURES 1 and 2;

FIGURE 6 is a view similar to FIGURE 5, but showing the stop-motion arms held in inoperative positions by a manually operated cam;

FIGURE 7 is an enlarged sectional view of the central portion of FIGURE 1, illustrating the operation of the stop-motion actuating mechanism during normal operation of the carding machine at which time both the carded web and the sliver strand meet the required specifications;

FIGURE 8 is a view similar to FIGURE 7, showing the position of the parts of the stop-motion actuating mechanism after the carding machine has been stopped due to a defective carded fiber web, and

FIGURE 9 is an enlarged sectional detail view showing counterweight means for incrementally adjusting the lateral pressure exerted against the sliver strand by a portion of the stop-motion actuating mechanism for the delivery side of the calender rolls.

Referring more specifically to the drawings, the numeral 10 denotes the frame of a conventional carding engine having doffer cylinder 11, oscillatory stripper or comb 12, and top and bottom calender rolls 13 and 14 respectively mounted in bearings 15, 16. During operation, a continuous mass of fibers travels from the engine, between the rolls, and into a coiler head 18. This fiber mass is in the form of a web 16 when removed from cylinder 11 by stripper 12, after which, it is condensed into sliver strand 16*a* at trumpet 17, passed between rolls 13 and 14, drawn upwardly into coiler head 18, and then deposited into can 19, all in a well-known manner.

A conventional drive for the doffer cylinder 11 and calender rolls 13 and 14 is schematically illustrated in FIGURE 3. The drive for cylinder 11 comprises a shaft 22 extending from the cylinder, gears 23 and 24, shaft 25, and pulley 26 fixedly mounted upon the shaft. Belt 27 is mounted upon and drives the pulley 25. The drive for calender rolls 13 and 14 comprises shaft 30 extending from roll 13, intermeshing pinions 31 and 32 (FIGURE 1), shaft 33, and intermeshing pinions 34 and 35 (FIGURE 3), the latter of the last-named pinions also meshing with previously described gear 23. It will be noted in FIGURE 3 that both of said drives have in common the elements designated by numerals 23 through 27.

Coiler head 18 is provided with conventional vertical shaft 36 which is driven from calender roll shaft 33 by suitable means such as beveled gears 36*a* and 36*b* (FIGURES 1 and 2).

The conventional stopping mechanism for calender rolls 13 and 14 and doffer cylinder 11 comprises a pulley 37 loosely mounted upon shaft 25, a shifter fork 38 pivoted as at 38*a* and engageable with the belt 27, link 39, lever 40, and oscillatable shaft 41. When shaft 41 is caused to rotate in a clockwise manner in FIGURE 3 by mechanism to be later described, the fork 38 will be rotated about its pivot 38*a* to shift belt 27 from fixed pulley 26 onto loose pulley 37, thereby stopping rotation of doffer cylinder 11, calender rolls 13 and 14, and coiler shaft 36.

Defective or broken sliver at the delivery side of calender rolls 13 and 14 sometimes occurs while the condensing fiber web 16 at the intake side is functioning properly. The converse is likewise true; hence, the necessity for a feeler device at the intake and at the delivery side of the rolls for initiating operation of the stopping mechanism of the carding machine. In the present invention, these feelers control a common actuating means which, in turn, controls the shifting of driving belt 27 from its operative position on fixed pulley 26 to an inoperative position on loose pulley 37.

Trumpet 17 is located at the intake side of calender rolls 13 and 14 and it serves as a feeler for condensing the aforementioned fiber web 16 into a sliver strand 16*a* at the bight or point of entry between the rolls. Trumpet 17 is mounted upon vertically disposed plate 46 suspended from pivots 45, said plate having secured thereto as at 47 a laterally extending stop-motion blocking arm 48 which is more fully described hereinafter. It is thus apparent that arm 48 is swingable about pivots 45 along with plate 46. During normal operation, the carded fiber web 16 slidably engages the inside of trumpet or feeler 17 and the resulting friction increases the web tension and causes the plate and feeler to be rotated or swung to bold line position toward the bight of calender rolls 13 and 14 as shown in FIGURE 4.

Movement of trumpet 17 and plate 46 to bold line position in FIGURE 4 also raises the free end of arm 48 to its uppermost position as shown in FIGURES 5 and 7 and in a non-obstructive position relative to the actuation mechanism described below and which controls stoppage of the carding machine. When the web 16 is diminished

a predetermined amount in thickness, the web tension will be reduced and the frictional contact of the fibers with the interior of trumpet **17** will be insufficient to hold the plate **46** and trumpet **17** in the bold line position (FIGURE 4), thus permitting the plate and trumpet to swing by gravity to dotted line position under the weight of arm **48**. The falling of arm **48** to the position shown in FIGURE 8 will position the free end thereof in the normal path of oscillation of lever or rocker arm **50** of the stop motion actuation mechanism which controls shifting of belt **37** as described above. Likewise, when the tension at trumpet **17** causes web **16** to break on account of excessive web thickness, the free end of stop-motion arm **48** will fall into the path of oscillating rocker arm **50** and block its movement.

By observing FIGURE 7, it will be noted that the upper end of rocker arm or bar **50** is disposed immediately below the free end of arm **48**, said bar being pivoted intermediate its ends as at **51** to one end of a horizontally movable cam rod **52**. Bar **50** has its lower end forked as at **51***a*, said fork straddling horizontally movable actuating rod **53** and connected to the latter by spaced collars **54***c* attached to the rod. Rod **52** is mounted in bearings **54**, **54** of bracket **54***a*, which bracket is secured to the face of bearing **15** as at **55**. A spring **56** is mounted upon rod **52** at a point between one of the bearings **54** and a collar **57** secured upon the rod. Spring **57** normally urges the right-hand end of rod **52** against a side cam **58** which, in turn, is fixedly secured upon shaft **33**.

The left-hand end portion of actuating rod **53** (FIGURE 1) is slidably mounted in bearings **54***b*, **54***b* integral with bracket **54***a*, and the right-hand end of the rod is pivotally secured as at **59** to the upper end of vertically disposed lever **60**. Lever **60** is pivotally secured intermediate its ends as at **61** to a bracket **61***a* extending from the frame of the carding machine, the lower end of said lever having a hook formed thereon for engaging notch **62***a* of cam **62** fixedly secured upon the shaft **41**. The intermediate portion of a vertically disposed hand lever is fixedly secured upon the end of shaft **41**, the lower end of said lever having one end of a tension spring **65** attached thereto as at **64***a* and the other end of the spring being secured to the carding machine frame as at **64***b*. Spring **65** or its equivalent releasably holds cam notch **62***a* in engagement with the hook of lever **60**.

Cooperating with spring **65** is another spring **66** mounted around rod **53** with one end abutting a fixed bearing **54***b* and its other end abutting a collar **67** fixed upon shaft **53**. Spring **66** normally urges shaft **53** to the right in FIGURE 1 to cause the lower hooked end of lever **60** to yieldingly engage the periphery of cam **62**.

As previously stated, the free end of arm **48** is positioned above the upper end of oscillating bar **50** when the sliver passing through trumpet **17** is of the proper tension and thickness. At the same time, the actuating rod **53** and forked end **51***a* of bar **50** are held in the position shown in FIGURES 1 and 7 by the hooked end of lever **60** and the cooperating cam notch **62***a*. With the parts so held, the forked end **51***a* will function substantially as a fixed pivot and the lever **50** will oscillate between bold line and dotted line positions in FIGURE 7 during normal operation.

Let us assume, however, that the web thickness and tension at trumpet or feeler **17** (FIGURES 4, 5 and 6) falls below prescribed limits. Upon such an occurrence, the plate **46** and feeler **17** will swing about pivot **45** from bold line to dotted line position, thereby permitting the free end of arm **48** to rotate downwardly about the same pivot **45** from the position shown in FIGURE 7 to that in FIGURE 8 where it will block the movement of the upper end of oscillating bar **50**. When the upper end of the bar **50** strikes the end of lowered arm **48** the bar **50** will oscillate about its upper end instead of its lower end, that is, between bold line and dotted line positions shown in FIGURE 8.

The movement of the lower end of bar **50** to the left in FIGURES 1 and 8 will move actuating shaft **53** in the same direction to release the lower hooked end of lever **60** from cam notch **62***a*, thus permitting spring **65** to rotate shaft **41** in a clockwise direction in FIGURES 1 and 3 and effect shifting of belt **27** from fixed pulley **26** to loose pulley **37**. At this time, the carding machine will be stopped so that the sliver defect can be remedied.

The feeler at the delivery side of the calender rolls **13** and **14** comprises L-shaped lever **70** pivoted intermediate its ends as at **71** to bracket **54***a*, the upper end of said lever pressing laterally against upwardly moving sliver strand **16***a* as at **72** and its lower end positioned adjacent, but out of the path of movement of, the upper end of bar or rocker arm **50** as shown in FIGURE 5. When sliver strand **16***a* is of adequate tensile strength, it will offer sufficient resistance to the lateral pressure of the upper end of the feeler to hold the lower end of the latter above the path of oscillation of rocker arm **50** as shown in FIGURES 5 and 7.

On the other hand, when the required lateral resistance is absent at point **72** due to breakage or insufficient strand strength, the lower end of lever **70** will rotate in a counterclockwise direction about pivot **71** until it blocks the path of oscillation of the upper end of bar **50**, that is, to a position slightly below the position occupied by arm **48** in FIGURE 8. At this time, bar **50** will again oscillate about its upper end as a pivot (FIGURE 8) to effect operation of the stopping mechanism in the same manner as described in connection with stoppage produced on account of defective sliver at the intake side of the calender rolls.

When stoppage is effected on account of defective fiber mass at either side of the calender rolls **13** and **14**, the ends of members **48** and **70** should be removed from and held out of the path of oscillatory bar until the defect is remedied. For this purpose, a manually operable cam **73** is provided, said cam being mounted upon one end of shaft **74** rotatably mounted as at **74***a* in bracket **54***a* (FIGURE 7). Shaft **74** has lever **75** secured thereon which is operated manually to rotate cam **73** from the position shown in FIGURE 5 to the position shown in FIGURE 6 when it is desired to remove the ends of levers **48** and **70** to non-obstructing positions relative to bar **50**.

In order to vertically adjust the point of lateral contact **72** with sliver strand **16***a*, the upper end of feeler **70** is made from two overlapping parts **70***a* and **70***b* (FIGURE 5), one of said parts having an adjustment slot **76** therein which is penetrated by screws **77**, said screws being threadably secured in the other part.

It is important to note that contact **72** engages a laterally unsupported length of strand **16***a* which is disposed adjacent the delivery side of calender rolls **13** and **14** (FIGURE 1), the calender rolls serving as a support for one end of this unsupported strand length and the upper portion of coiler head **18** as a support for the other end. The lateral pressure exerted by contact **72** will therefore be resisted by the end supports for said strand length. By varying the distance between pivot **71** and contact **72** (FIGURE 5), the laterally reacting stresses at the end supports for the strand length will be varied accordingly to thereby vary the stress at the bight of the calender rolls resulting from the lateral pressure of contact **72**.

In order to provide incremental adjustment of the lateral pressure at **72** against sliver strand **16***a*, suitable counterweight means is provided (FIGURE 9) comprising cantilevered arm **78** integral with lever **70**, said arm having a bore **79** therein for receiving small weighted bodies **80** which are preferably of uniform size and gauged in accordance with the weight of sliver processed. The number of bodies present in bore **79** determines the magnitude of the counterweight force. Bore **79** is closed by suitable means such as screw or plug **81**.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In a carding machine having a doffer, a pair of calender rolls, a pivotally mounted trumpet for condensing and guiding a web of fibers from the doffer to the intake side of said rolls, said web being discharged from said rolls as a sliver strand, means for driving said rolls to provide tension in the web between said doffer and rolls, means for disconnecting said driving means from said rolls, and means for taking up and maintaining tension in said discharging sliver strand, a stop-motion comprising: a longitudinally reciprocable shaft, a rocker arm pivotally mounted intermediate its ends to said shaft, means for confining said arm for rocking movement about one of its ends, means connecting said confining means to said disconnecting means, means for reciprocating said shaft to rock said arm blocking means movable into and out of the path of the other end of said rocking arm, said blocking means being normally maintained out of said path by a predetermined tension in said web at said trumpet and movable into said path upon reduction of the tension below said predetermined tension, a second blocking means movable into and out of said path, said second blocking means being normally maintained out of said path by a predetermined tension in said discharging sliver strand and movable into said path upon reduction of the last-named tension, and means responsive upon movement of one of said blocking means into said path for rocking said arm about its other end to release said confining means and actuate said disconnecting means.

2. In a carding machine having a pair of calender rolls for drawing a continuous fiber mass therebetween, means for driving said rolls, means for maintaining tension in said fiber mass, means for disconnecting said driving means from said rolls, a stop-motion comprising: a longitudinally reciprocable shaft, a rocker arm pivotally mounted intermediate its ends to said shaft, means for

confining said arm for rocking movement about one of its ends, means connecting said confining means to said disconnecting means, means for reciprocating said shaft to rock said arm, gravity-actuated blocking means movable into the path of the other end of said rocking arm, means responsive to a predetermined tension in and engageable with said fiber mass for maintaining said blocking means out of said path whereby a decrease of said last-named tension will permit said gravity-actuated blocking means to fall into said path, and means responsive upon movement of said blocking means into said path for rocking said rocker arm about its other end to release said confining means and actuate said disconnecting means.

3. Apparatus as defined in claim 2 wherein said tension responsive means comprises a pivoted first arm having its free end yieldingly pressing laterally against said continuous fiber mass and wherein said gravity-actuated blocking means comprises a second arm integral with said first arm, and further comprising counterweight means for said first and second arms, said counterweight means including a plurality of relatively minute loose bodies.

References Cited by the Examiner

UNITED STATES PATENTS

1,450,044	3/23	Morris	19—.2
2,554,104	5/51	Hand	19—.23

FOREIGN PATENTS

611,315	7/26	France.
651,593	10/28	France.
283	1875	Great Britain.
1,031	1862	Great Britain.
19,575	1908	Great Britain.
166,602	7/21	Great Britain.

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