T. BENTLEY.

MEANS FOR PREVENTING SINGLES IN ROVING FRAMES.

APPLICATION FILED JUNE 20, 1910.

988,925.

Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.

Fig: 1.

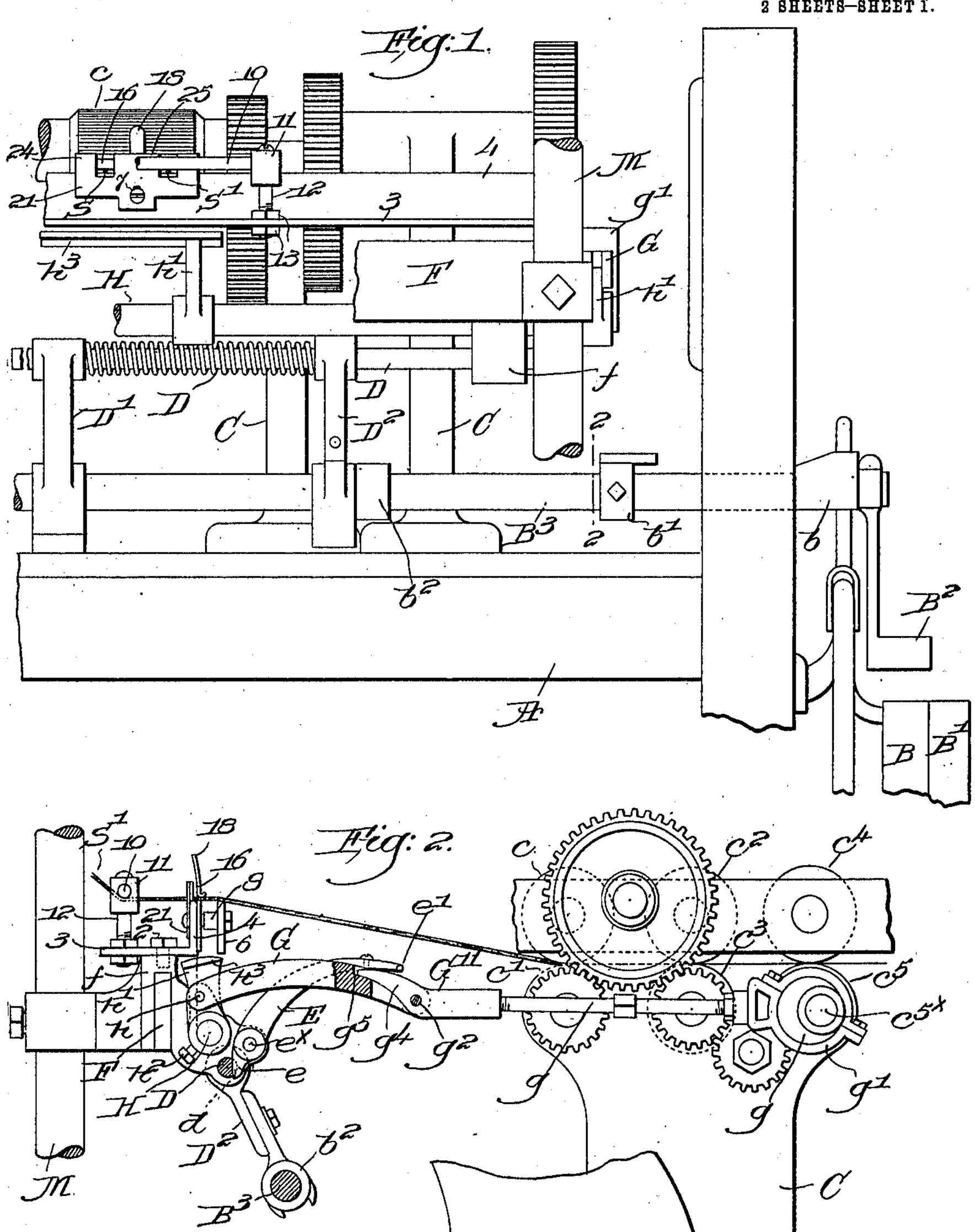

Fig: 2.

Witnesses,
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2 SHEETS—SHEET 2.

Fig: 3.

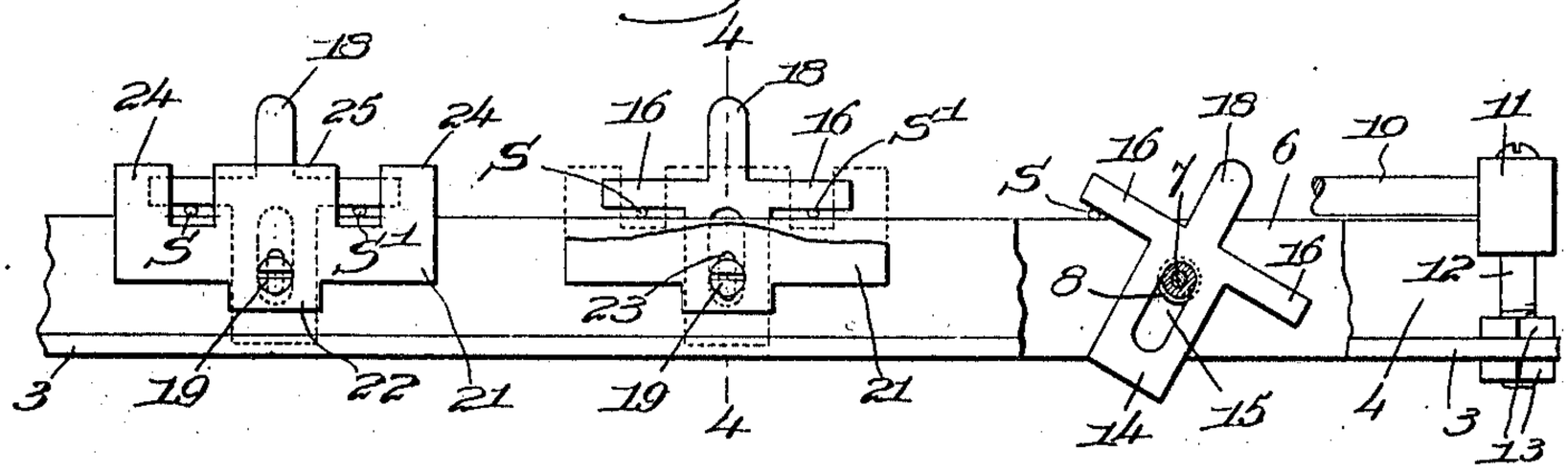


Fig: 6.

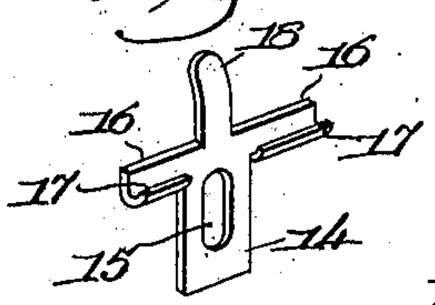


Fig: 4.

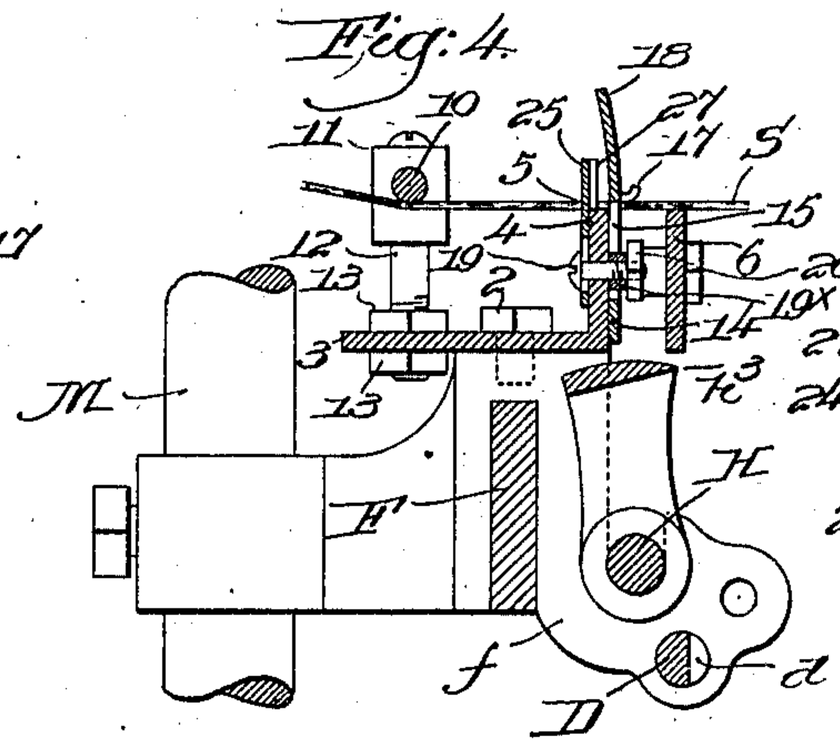


Fig: 8.

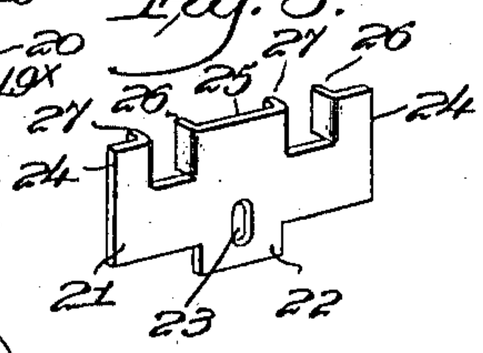


Fig: 7.

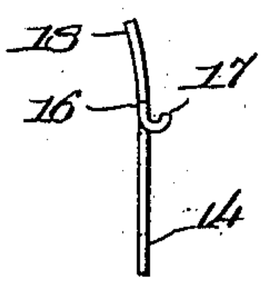


Fig: 5

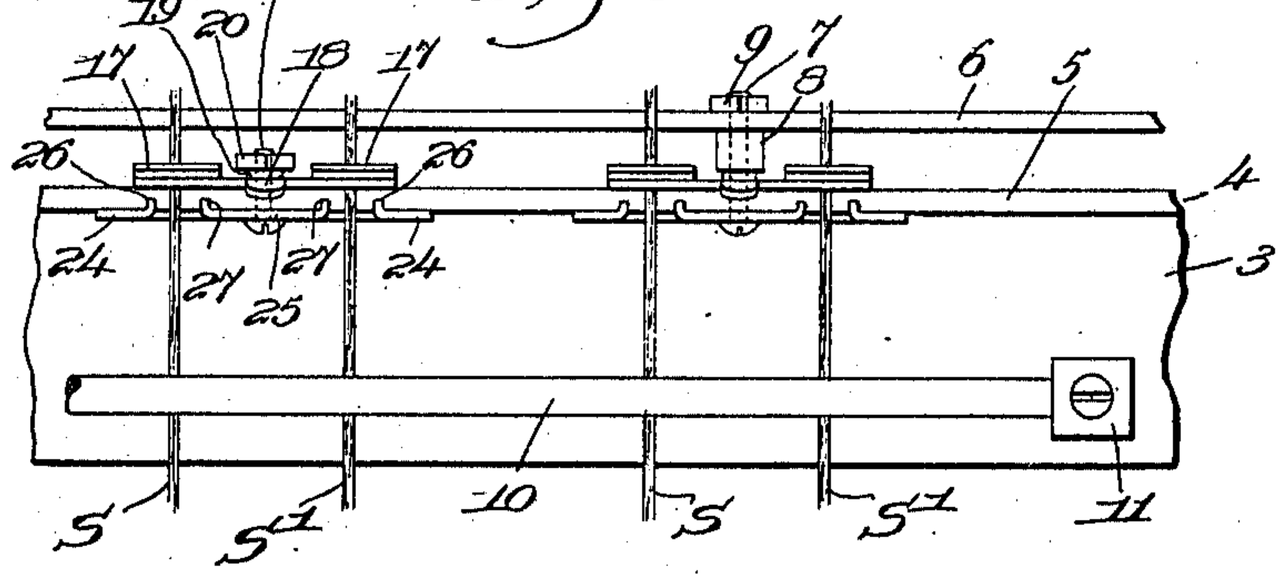
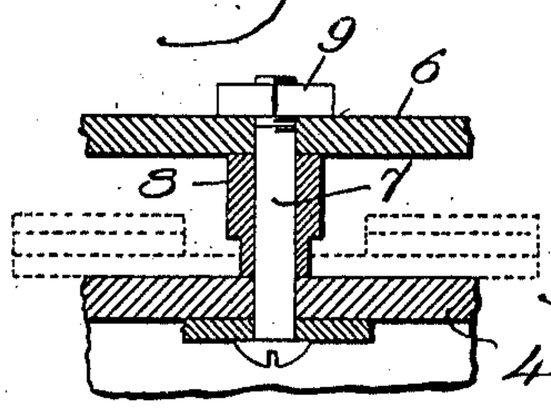


Fig: 9.



Witnesses,
Edward D. Allen.
Joseph M. Ward.

Inventor;
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UNITED STATES PATENT OFFICE.

THOMAS BENTLEY, OF DRACUT CENTER, MASSACHUSETTS, ASSIGNOR OF ONE-FOURTH TO WILLIAM H. BENT, OF LOWELL, MASSACHUSETTS, AND ONE-FOURTH TO MARTIN V. PHIPPS, OF HOPKINTON, MASSACHUSETTS.

MEANS FOR PREVENTING SINGLES IN ROVING-FRAMES.

988,925. Specification of Letters Patent. Patented Apr. 4, 1911.

Application filed June 20, 1910. Serial No. 567,800.

To all whom it may concern:

Be it known that I, THOMAS BENTLEY, a citizen of the United States, and resident of Dracut Center, county of Middlesex, State of Massachusetts, have invented an Improvement in Means for Preventing Singles in Roving-Frames, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention has for its object the production of novel means for preventing singles in apparatus for doubling threads, yarns and slivers, and the invention is more particularly adapted for use in connection with the drawing and doubling of slivers in roving machines, the construction and arrangement being such that a single detector serves to detect the failure of either one of a set or pair of slivers.

I have so constructed the mechanism that the detector will operate properly and with promptness whenever either sliver of a set fails, no matter whether the failure occurs in front of or behind the detector, which latter in practice is located between the creel or other similar frame and the back-rolls of the set of drawing rolls. This enables the attendant to piece up a broken end rapidly and easily, the release or movement of a detector to abnormal position bringing into action suitable stopping mechanism before the broken end is drawn into the rolls.

The abnormal position of a detector is made effective to cause the operation of the stopping mechanism by or through the arrest of a vibrator or feeler of any suitable character, such feeler normally vibrating below the detectors, which latter are arranged in a series depending in number upon the number of sets of drawing rolls with which the machine is provided.

I have herein shown a practical stopping mechanism and means for effecting the normal vibration of the feeler, for purposes of illustration, however, as no claim is made herein to the particular form of stopping mechanism, nor to the means for vibrating the feeler, and other suitable devices may be used instead of those shown without departing from my present invention.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a rear elevation of a sufficient portion of a roving frame or similar machine, with one embodiment of my present invention applied thereto; Fig. 2 is a left-hand end view of a portion of the mechanism shown in Fig. 1, with the shipper-rod in section on the line 2—2, Fig. 1; Fig. 3 is an enlarged detail in rear elevation of several of the detectors and the adjacent means for supporting the same in position to coöperate with the slivers, the guides for the slivers also being shown; Fig. 4 is a transverse sectional detail on the line 4—4, Fig. 3, looking toward the left, and showing certain details omitted from Fig. 3; Fig. 5 is a top plan view of the structure shown in Figs. 3 and 4; Fig. 6 is a perspective view, enlarged, of one of the detectors; Fig. 7 is an edge view of the detector; Fig. 8 is a perspective view of the sliver-guide, whereby the slivers of a set are properly guided as they travel to the rolls; Fig. 9 is a detail in horizontal section, to be referred to.

Referring to Figs. 1 and 2 the frame A, fast and loose pulleys, B, B′, Fig. 1, belt-fork B^2 attached to the longitudinally movable shipper-rod B^3, the stop-collars b, b' to limit movement of the shipper-rod; the roll-stand C, carrying the upper and lower drawing-rolls, arranged as usual in pairs, as c, c'; c^2, c^3 and c^4, c^5, may be and are all of well known construction and operate in a manner familiar to those skilled in the art.

A controller-rod D is shown in Fig. 1 in parallelism with the shipper-rod and moved to the right by a spring D^x interposed between a bearing D′ for said controller-rod and an arm D^2 depending from such rod and coöperating with a collar or other projection b^2 on the shipper-rod. When the spring D^x is free to act the rod D is moved to the right and acts through arm D^2 and the projection b^2 to move the shipper-rod B^3

in the same direction, to shift the belt, (not shown) from the fast to the loose pulley. The controller-rod has a notch *d*, Figs. 2 and 4, to receive a latch *e* on a latch-carrier E fulcrumed at $e^{\times}$ on a suitable bracket *f* attached to a horizontal rail F, this rail in practice being provided with a plurality of such brackets, and the rail is suitably secured to supports, as M, for the usual creel-frame, not shown. When the controller-rod is retracted, in the position shown, the latch *e* enters the notch *d* and maintains said rod and the shipper-rod B^3 in running position, and at such time spring $D^{\times}$ is compressed. The front end of the latch-carrier E has a lateral extension *e'* which projects over a two-part connector G, G'. The member G at its rear end is pivotally attached at *h* to a rocker-arm *h'* fast on the feeler rock-shaft H, and a blade-like feeler h^3 is connected with said shaft H by a series of arms, as *h'*, said arms being held in fixed position on the rock-shaft by set-screws h^2, Fig. 2.

Referring to Fig. 2, the shaft $c^{5\times}$ of the lower front drawing-roll c^5 is provided with an eccentric *g* having a strap *g'*, and this strap is rigidly connected by a preferably adjustable link g^3 with the front end of the connector member G'. The adjacent ends of the members G, G' are pivotally connected at g^2 in such manner that the tail g^4 of member G' overlaps and normally rests in a notched part g^5 of the member G, so that the said members cannot drop at their pivotal connection g^2, the latter normally lying just above a straight line intersecting the centers of the shaft $c^{5\times}$ and the pivot-pin *h*. As the eccentric *g* revolves the two-part connector G, G' will be reciprocated as a unit, to thereby vibrate the feeler h^3, the extension *e'* of the latch-carrier at such time being located just above the overlapped portions of the members of said connector. When the rearward swing of the feeler is arrested by a released detector, as will be explained, the connector members will swing upward at their pivotal connection g^2 and thereby the extension *e'* will be engaged, to lift the front end of the latch-carrier and withdraw the latch *e* from engagement with the controller-rod D. The latter is immediately moved longitudinally by spring $D^{\times}$, causing a corresponding movement of the shipper-rod B^3 to shift the belt from the fast to the loose pulley, to stop the machine. This stopping mechanism is convenient and efficient, and it acts promptly and easily, but I make no claim thereto in this application, nor do I make any claim herein to a normally vibrating feeler to cooperate with and be arrested by a released detector, as mechanism of the same general character is shown and described in my Patent No. 723,576 granted to me March 24, 1903.

The horizontal tops of the brackets *f* have attached to them, as by screws 2, Fig. 4, the horizontal and rearwardly extended flange or foot 3 of a back rail 4 which extends practically the length of the roving frame, said rail standing vertically, as shown, and having a smooth and rounded upper edge 5. A front rail 6, parallel to said rail 4, is attached to the latter at suitable intervals by long screw studs 7, Fig. 9, which pass through shouldered sleeves 8 interposed between and spacing apart the rails a fixed distance, a retaining nut 9 on the front end of the stud serving to lock it when set up, the upper edge of the front rail also being rounded and smooth.

The slivers, yarns or threads, arranged in sets of two each, and indicated at S, S', pass from the creel-frame under a guide-rod 10 and forward over the rounded upper edges of the supporting rails 4, 6 to the drawing-rolls, and between said rails I arrange a series of detectors, each coöperating with the slivers of a set and being maintained inoperative thereby so long as the slivers are intact. The feeler h^3 vibrates in a path just below the two rails, as shown in Figs. 2 and 4, the lower ends of the detectors being held above the feeler path while the slivers remain intact.

The guide-rod 10 is fixedly held in heads 11 on posts 12 threaded at their lower ends to pass through holes in the rail-flange 3, and held in place by check-nuts 13, so that by manipulating the latter the guide-rod may be adjusted vertically.

Each detector is herein shown as T-shaped, and is preferably made of plate metal shaped by suitable dies, the detector comprising an elongated shank 14, longitudinally slotted at 15, and provided at its upper end with opposite, lateral extensions 16, the lower edges of which are rolled over toward the front of the detector, at 17, to form smooth and transversely-convex surfaces which rest upon the slivers. The shank and extensions are flat, and in the same plane, but an upright, narrow head 18 on the upper end of the shank is bent rearward, as shown in Figs. 6 and 7, for a purpose to be described. The detectors are located between the sliver-supporting rails 4 and 6, Figs. 4 and 5, one for each set of slivers, so that while the latter are intact the curved edges 17 of the extensions 16 rest upon such slivers between the upper edges of the rails, to maintain the detector in upright position with the lower end of its shank above the path of the feeler h^3.

Each detector is guided and supported by a stud extended loosely through the slot 15

of the shank, and in some instances this stud is provided by the smaller part of a sleeve 8, while intervening detectors are guided by collars $19^{\times}$ on the shanks of screw-studs 19 extended through holes in the back rail 4, and having at their front ends suitable retaining nuts 20, the sleeve $19^{\times}$ being clamped between the nut 20 and the rail 4. With either form of stud the detector thereon is permitted a tilting as well as a vertical movement, the stud retaining the detector in place between the rails upon failure of one or both of its coöperating slivers, but permitting the lower end of its shank to descend into the path of and arrest the feeler h^3.

Viewing the detector at the extreme right in Fig. 3 it is supposed that its sliver S′ has failed, so that the detector drops into operative position as it is tilted over by the intact sliver S. In other words, while both slivers of a pair are intact the detector is held up and balanced thereby, but upon failure of either sliver the detector is unsupported at that side of its longitudinal center, and is overbalanced, tilting over to that side as it drops into feeler-engaging position. At such time the head 18 of the released detector will engage the upper edge of the back guide-rail 4 so that the detector can not turn completely over, such head also affording a convenient part to be grasped by the attendant when piecing up. So far as failure of a sliver is concerned it may be behind or in front of the supporting rails, but in either case the released detector will move instantly into operative position, to arrest the feeler. The weight of a detector is small, as the slivers have comparatively little strength, but as the slivers are supported by the rails 4 and 6 behind and in front of a detector, respectively, the latter is readily sustained in inoperative position as long as the slivers of a set are intact.

It is necessary to provide means to guide the slivers laterally as they pass under the extensions 16 of the detectors, to prevent running off at the ends of the extensions, and herein I have shown very simple, efficient, and inexpensive sliver guiding means. Each sliver-guide is shown as an elongated body 21, Fig. 8, made preferably of plate metal died out to shape, the lower edge of the body having a depending extension 22, vertically slotted at 23, while the upper edge of said body is shaped to present three upright, laterally separated extensions 24, 25, and form open sliver-seats. The inner upright edges of the outside extensions 24 are bent forward at 26, and the upright edges of the central extension are similarly bent at 27, the bottom edges of such bends being somewhat above the upper edge of the body 21 between the extensions. One of these sliver-guides is mounted on the back rail 4 behind each detector, being clamped on the rail by the head of the screw-stud 7 or 19, as the case may be, and so adjusted vertically that the upper edges of the plate 21 between the extensions 24 and 25 is below the level of the rounded edge 5 of the rail 4. Each sliver passes between the bent edge 26 of one extension 24 and the adjacent bent edge 27 of the central extension 25, and over the edge 5 of the rail 4, so that the slivers have perfect freedom of movement in the direction of travel, but lateral movement thereof is limited by the opposed bent edges, which latter project forward over the top of rail 4, and are substantially at right angles to the plane of the body and extensions of the sliver-guide. The bending of the edges provides a perfectly smooth surface at each side of a sliver, and the latter travels through the open spaces or seats in the guide and under the extensions 16 of the detector, the sliver-guide preventing undue lateral movement of the slivers which would tend to run them off at the ends of the detector extensions. I prefer to make the sliver-guides separate, as shown, and provide one for each detector, as thereby the construction is simplified and the cost of production minimized, and each guide can be adjusted independently of its fellows. The supporting studs for the detectors serve also to clamp the sliver-guides in position, as has been explained. The guide-rod 10 holds the slivers down so that they cannot lift out of the seats or openings between the upright extensions of the sliver-guide, but said guide-rod presents no appreciable obstacle to the free forward travel of the slivers.

In Fig. 3 the sliver-guide is shown complete at the left, the one at the right is omitted altogether, and the middle one is broken off to show the detector beyond it.

It will be understood that the pairs of slivers are led from the creel-frame forward under the guide-rod 10 and through the open seats of the sliver-guides, over the supporting rails 4, 6 and under the detector-extensions 16, to the drawing rolls, and in practice the pairs of slivers pass through a laterally-traversing guide back of the rolls, (not shown) as is usual in roving frames.

The slackening of a sliver following a break, whether in front of or behind the supporting rails, is sufficient to release the cooperating detector and permit its movement to operative position with the lower end of its shank in the path of and to arrest the feeler.

Various changes in details of construction and arrangement may be made by those skilled in the art without departing from

the spirit and scope of my invention as set forth in the claims annexed hereto.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In apparatus of the class described, in combination with means for effecting longitudinal movement of the slivers, a pair of rails spaced apart and arranged transversely of and to support the slivers behind said means, a series of detectors located between said rails and each having opposite lateral extensions to rest upon the slivers of a set between the rails, a support for and upon which each detector is adapted to tilt and move vertically, and a guide for each set of slivers, maintained in position adjacent the back rail by the support for the adjacent detector and having upturned, laterally separated extensions to receive the slivers between them.

2. In apparatus of the class described, in combination with means for effecting longitudinal movement of the slivers, a pair of sliver-supporting rails spaced apart and located behind said means and transverse to the direction of travel of the slivers, a series of vertically movable and tiltable detectors located between said rails and each having opposite lateral extensions to rest upon and be supported by the intact slivers of a set, and a guide for each set of slivers, said guide having upturned, laterally separated extensions to receive the slivers between them, said guide being clamped upon the back rail behind the detector coöperating therewith.

3. In apparatus of the class described, in combination with means for effecting longitudinal movement of the slivers, a pair of sliver-supporting rails spaced apart and located behind said means and transverse to the direction of travel of the slivers, a series of vertically movable and tiltable detectors located between said rails and each having a depending, longitudinally-slotted shank and opposite lateral extensions to engage and be supported by the intact slivers of a set, an adjustable guide having open notches for and to limit lateral movement of each set of slivers, and a combined guide clamp and supporting member for the detector, extended through the slotted shank of the latter.

4. In apparatus of the class described, in combination with means for effecting longitudinal movement of the slivers, a pair of sliver-supporting rails spaced apart and located behind said means and transverse to the direction of travel of the slivers, a series of vertically movable and tiltable detectors located between said rails and each having opposite lateral extensions to rest upon and be supported by the intact slivers of a set, a guide-rod behind and parallel to the rails, the slivers passing under the guide-rod, and sliver-guides between said guide-rod and the back rail, each guide comprising a flat body having upright, laterally separated extensions to receive between them the slivers of a set, the upright edges of adjacent extensions being bent forward to present smooth surfaces at each side of a sliver, the guide-rod preventing rise of the slivers from between the extensions of the guide.

5. In apparatus of the class described, in combination with means for effecting longitudinal movement of the slivers, a pair of sliver-supporting rails spaced apart and located behind said means and transverse to the direction of travel of the slivers, a series of vertically movable and tiltable detectors located between said rails and each having opposite lateral extensions to rest upon and be supported by the intact slivers of a set, a guide-rod behind and parallel to the rails and under which rod the slivers travel, a sliver-guide back of each detector and between it and the guide-rod, each guide comprising a flat body having open seats for the slivers of a set, to limit lateral movement of the slivers and retain them in engagement with the detector extensions, the guide-rod preventing escape of the slivers from the open seats, and means to clamp the sliver-guides in adjusted position.

6. In apparatus of the class described, in combination with means for effecting longitudinal movement of the slivers, a pair of sliver-supporting rails spaced apart and located behind said means and transverse to the direction of travel of the slivers, a series of vertically movable and tiltable detectors located between said rails and each having opposite lateral extensions to rest upon and be supported by the intact slivers of a set, a guide-rod behind and parallel to the rails, the slivers passing under the guide-rod, and sliver-guides between said guide-rod and the back rail, each guide comprising a flat body having upright, laterally separated extensions to receive between them the slivers of a set, the upright edges of adjacent extensions being bent forward across the top edge of the back rail and presenting smooth surfaces at each side of a sliver path, the guide-rod retaining the slivers in position between the extensions of the guide.

7. In apparatus of the class described, a detachable and vertically adjustable sliver-guide made of plate metal and comprising an elongated body having at its top upright central and side extensions laterally separated to form open topped sliver-seats, the upright edges of adjacent extensions being bent substantially at right angles to the

plane of the extensions, to form smooth sides for the seats, and attaching means to hold the guide in vertically adjusted position.

8. A detector for apparatus of the class described, comprising a relatively thin, flat shank having a central longitudinal slot therein, and opposite lateral extensions on the shank at its upper end and at right angles thereto, the lower edge of each extension being rolled over throughout its length to present a transversely-convex surface.

9. A detector for apparatus of the class described, comprising a thin and flat, longitudinally slotted shank having an upturned and rearwardly bent head, and lateral extensions projecting oppositely from the upper end of and at right angles to the shank, the lower edge of each extension being curved forward and upward to present a smooth, convex engaging surface.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

THOMAS BENTLEY.

Witnesses:
JOHN C. EDWARDS,
FREDERICK S. GREENLEAF.