July 26, 1927. 1,636,945

H. E. VAN NESS

STOP MOTION DEVICE FOR SPINNING FRAMES

Filed Sept. 17, 1925 3 Sheets-Sheet 1

Fig. 1.

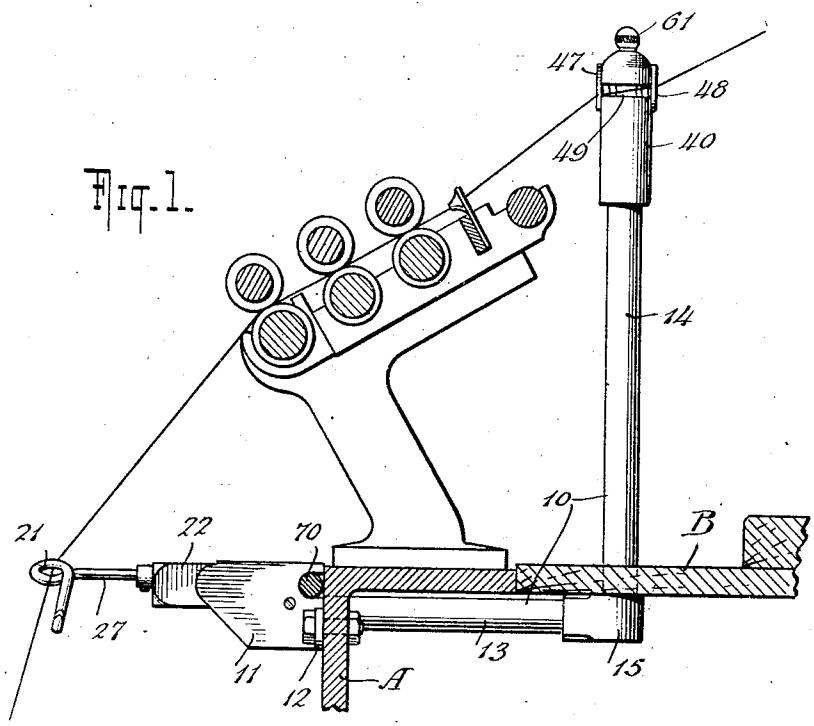
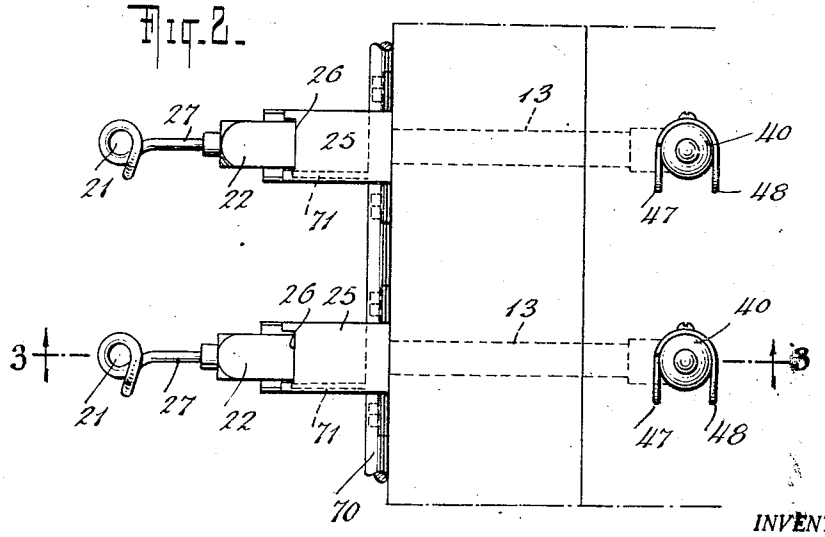


Fig. 2.



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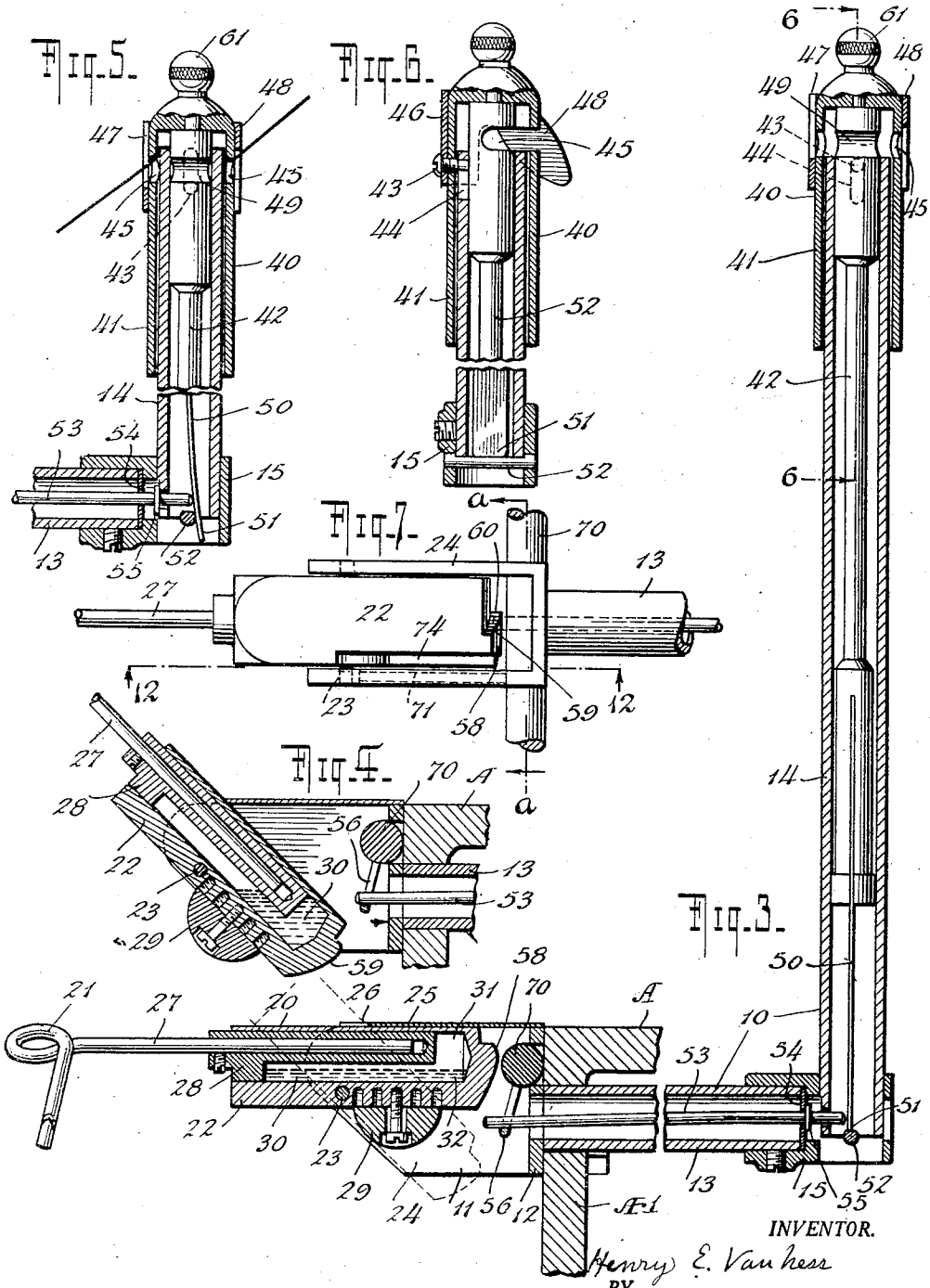
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Fig. 8.

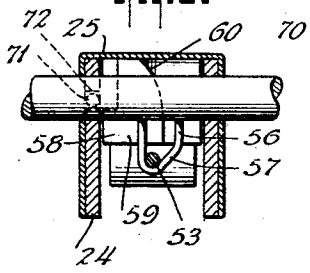


Fig. 9.

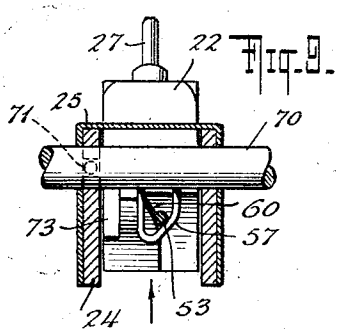


Fig. 10.

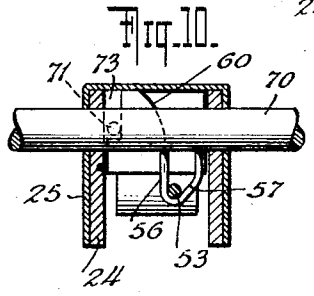


Fig. 11.

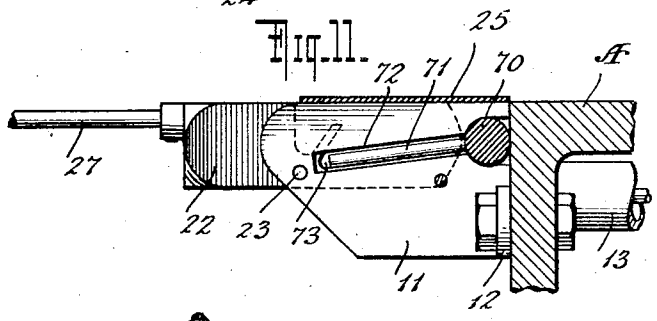
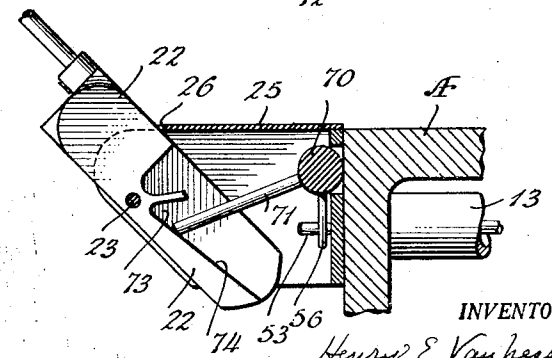


Fig. 12.



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UNITED STATES PATENT OFFICE.

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STOP-MOTION DEVICE FOR SPINNING FRAMES.

Application filed September 17, 1925. Serial No. 56,794.

This invention relates to stop-motion devices for spinning frames and aims to provide a simple and rugged device of this character which cannot be injured or prematurely operated by careless handling or accidental blows.

The invention relates to that class of stop-motion devices in which a trigger engaging a roving between the drawing rolls and a spindle serves, on the breaking of a roving, to actuate a clamp or other breaker for stopping the feed of that roving to the drawing rolls. In practical devices of this character, particularly those operated by gravity, it has been customary, in order to attain the delicacy of operation necessary to avoid undue strain of the trigger on the roving, to make the trigger in the form of a long unstably balanced lever, and to pivot the breaker as well as the trigger and set it also nearly in the position of unstable equilibrium. The use of long swinging parts in such devices has made it impossible to enclose them in a casing small enough to be out of the way in a spinning machine, and in consequence it has been customary to leave all the working parts of such devices exposed. Besides subjecting the apparatus to danger of injury, the exposure of the working parts and the unstable position of the breaker has led to danger of accidental operation of the breaker, which requires unnecessary piecing of the ends and delays the spinning operation.

In accordance with the present invention, these disadvantages are overcome by providing a stop-motion device whose working parts are enclosed within a small pipe-like frame which may conveniently be secured on a spinning machine without in any way interfering with its use or obstructing access to any part of it. The mounting of the working parts within such a frame is made possible by giving the breaker and all connecting mechanism straight line movements, and thus eliminating all pivoted or swinging parts except the trigger itself, which is made short and positioned at one end of the pipe-like frame. The necessary delicate balance and forcible movement of the trigger, which have heretofore been attained to some extent by the use of long lever arms, are, in accordance with the present invention, obtained in a very short trigger lever by providing in the lever an unconstrained body of heavy liquid, such as mercury, which shifts its position as soon as the lever starts to tilt and furnishes the force necessary to enable the lever to operate the breaker.

Another feature of the invention consists in avoiding accidental movement of the breaker by providing it with a fixed support, which is concealed within the frame and from which it can be dislodged only through operation of the trigger.

Another feature of the invention consists in utilizing the triggers of a series of stop-motion units to replace the hinged thread board customarily used on spinning machines, by mounting the triggers wholly outside a roll-beam of the spinning frame and providing means for tilting them simultaneously for doffing.

Other features and advantages of the invention are hereinafter described in connection with a detailed description of a specific stop-motion device embodying the invention which is illustrated in the accompanying drawings, in which:—

Fig. 1 is a side elevation of a stop-motion device applied to a spinning frame, of which the rolls, roller beams and table are shown in transverse section;

Fig. 2 is a top view of two such stop-motion devices applied to a spinning frame, omitting the rolls and roll stand shown in Fig. 1;

Fig. 3 is an enlarged side elevation of the stop-motion device, sectioned on the line 3—3 of Fig. 2, showing all parts in running position and indicating the tipped position of the trigger in dotted lines;

Fig. 4 is a partial section similar to Fig. 3 showing the trigger in tipped position;

Fig. 5 is a partial section similar to Fig. 3 showing the breaker and rod in positions corresponding to the tipped position of the trigger lever shown in Fig. 4;

Fig. 6 is a front elevation of the breaker sectioned on the line 6—6 of Fig. 3;

Fig. 7 is a top view of the trigger lever and parts associated with it;

Figs. 8, 9 and 10 are views of the rear end of the trigger lever sectioned on the line *a*—*a* of Fig. 7 and indicating the relative position of the cam surfaces of the trigger and the trip rod in running position, during resetting of the trigger, and preparatory to doffing, respectively;

Fig. 11 is a side view of the trigger and its housing with the cover of the housing cut on the line 12—12 of Fig. 7, showing the trigger in running position; and

Fig. 12 is a side elevation of the trigger, with the housing sectioned on the line 12—12 of Fig. 7, showing the trigger in doffing position.

The stop-motion device illustrated in the drawings has a rigid frame-work consisting of a hollow L-shaped frame 10 and a housing 11. This frame-work is mounted on a spinning frame by bolting the back wall 12 of the housing 11 against the outer side of a roll-beam A of the frame, so that the housing occupies the position usually occupied by the inner portion of a hinged thread board. The horizontal pipe 13 of the frame 10 extends inwardly from the back of the housing through a hole drilled in the front flange A^1 of the roll-beam and lies below the table B. The vertical pipe 14 of the frame 10 extends upwardly from an elbow or adaptor 15 secured to the inner end of the pipe 13, through a hole in the table or creel filler B or the spinning frame, to a point between the creel bobbins and the drawing rolls.

In the bracket 11 at the lower end of the L-shaped frame 10 is mounted a trigger 20, bearing a thread guide 21 to direct a roving from the drawing rolls to a spindle; and at the upper end of the frame 10 is mounted a breaker 40 through which the roving passes on the way to the drawing rolls. Within the frame 10 is mechanism operatively connecting the trigger with the breaker.

The trigger 20 has a short body 22, which is mounted on a pivot 23 extending between the sides 24 of the housing 11. The trigger is free to tip between a normal horizontal position, in which the upper surface of the rear portion of the body 22 engages the under surface of a cover 25 secured to the housing 11, and an inclined position (shown in dotted lines in Fig. 3) in which the front portion of the top of the body engages the recessed front edge 26 of the cover 25. An arm 27 bearing the thread guide 21 extends from the outer end of the body 22 and is adjustably secured therein by means of an adaptor 28, so that the thread guide 21 may be positioned directly over a spindle in machines of different dimensions. A weight 29 adjustably secured to the body 22 permits the balancing of the lever in any position to which the arm 27 and thread guide 21 may be adjusted. The weight 29 may be adjusted so that the lever has a very slight tendency to tip or even so that the lever is in perfect balance.

The body 22 contains a longitudinal bore, which is closed at one end and partially filled by the adaptor 28, so that it provides a chamber 30 extending lengthwise in the body at both sides of the pivot 23, and an enlargement 31 at the inner end of this chamber. The chamber 30 is partially filled with a heavy liquid, such as mercury 32, which is free to move therein.

This unconfined body of mercury makes the trigger both delicate and forceful in operation. When the trigger is in its normal balanced position, the mercury lies partly at each side of the pivot 23. Slight movements occur in the liquid because of the vibration of the whole spinning frame, but they are not sufficient to cause any material strain on a roving passing through the thread guide 21, and the roving effectively prevents any tilting of the lever so long as it is intact. When, however, the roving has been broken for any reason, the slight vibratory movements in the body of mercury cause the lever to start to tip, and as soon as the tipping begins, the body of mercury rushes to the inner end of the chamber 30 and into the enlargement 31, completely unbalancing the lever and causing it to tip quickly and forcibly into its inclined position.

The roving-breaker 40 includes a cap 41 and a plunger 42 secured therein. The cap 41 is slidably mounted on the upper end of the vertical pipe 14. The breaker is prevented from turning, and its up and down movement is limited, by a screw 43 fixed in the cap and extending into a vertical slot 44 formed in the pipe 14 near its upper end. The cap 41 contains a transverse slot 45 extending in to its axis. The roving may pass freely through this slot when the cap is raised so that the slot lies above the upper edge of the pipe 14, as shown in Figs. 3 and 6. A thread guide 46 having upwardly and downwardly directed ears 47, 48 is attached to the cap 41 by means of the screw 43 in order to facilitate drawing a roving into the slot 45.

The plunger 42 at the upper end of which the cap 41 is mounted fits loosely within the pipe 14. The plunger contains a transverse slot 49 registering with the slot 45 in the cap so that the plunger does not interfere with drawing a roving through the slot 45. At the lower end of the plunger is a resilient extension having the form of a flat spring 50 whose lower end 51 normally rests on a cross pin 52 fixed in the elbow 15 just

below the lower end of pipe 14. This pin provides a fixed support on which the breaker rests firmly in a position of stable equilibrium. When resting on the support the breaker is in its free position with its slot 45, 49 above the upper end of the pipe 14. The breaker can be dropped into a position to clamp and stop the feed of the roving only by dislodging the lower end 51 of the spring 50 from the supporting pin 52. This requires a side blow on the spring near its lower end.

A rod 53 slidable within the horizontal pipe 13 serves to give the spring such a side blow when the trigger tips up. This rod is slidably held in a hole in a washer 54 fixed at the inner end of the pipe 13 and its longitudinal movements are limited by a collar 55 fixed on the rod and located between the washer 54 and the side wall of the pipe 14. The front end of the rod 53 rests in a loop 56 depending from a shaft 70 (which is used in raising the trigger levers for doffing in a manner hereinafter described). The loop 56 has an inclined bottom 57 so that the outer end of the rod is normally positioned in the lower corner of the loop, as shown in Fig. 8.

The rear end of the trigger body 22 is provided with a cam 58 having a rear cam surface 59 which engages the end of the rod 53 and moves the rod lengthwise as the trigger moves from its normal to its tipped position, and a lateral cam surface 60 which engages the side of the rod 53 near its end and moves the outer end of the rod sideways along the inclined bottom of the loop 56 when the trigger lever is moved back from its tipped to its normal position, as shown in Fig. 9.

When a roving passing through the thread guide 21 breaks, the trigger tips up, and because of the mercury which it contains and the fact that it acquires momentum in the first part of its movement, which is unrestrained, the tipping of the lever brings the rear cam surface 59 of the cam 58 into forcible contact with the end of the rod 53 pushing the rod against the lower end of the spring 50 to dislodge it from the fixed pin 52 so as to permit the breaker 40 to drop to the position shown in Fig. 5, in which the roving passing through its slot 45 is clamped between the upper edges of this slot and the upper edge of the pipe 14. In order to rethread the roving, the breaker is raised manually by grasping a ball 61 provided at its upper end. The upward movement of the breaker is arrested by the screw 43 just as the lower end of the spring 50 comes above the pin 52. The resiliency of the spring moves it into a central position over the pin 52 and also pushes the rod 53 back from the position shown in Fig. 5 to its normal position shown in Fig. 3. The roving may then be pieced and threaded through the slot of the breaker and passed through the drawing rolls. The trigger 20 is manually returned to its normal position as, or just after, the roving is passed through the thread guide 21. During the return movement of the trigger the front end of the rod 53 is pushed sideways by the cam surface 60 so that the cam 58 passes the rod without giving it any endwise motion.

In equipping a spinning frame with a complete stop-motion mechanism, a series of stop-motion devices identical with that described is secured along each side of the spinning frame so that one of such devices is associated with the roving or rovings passing to each spindle of the frame. In order that the trigger levers of such a series of stop-motion devices may replace a hinged thread board in the doffing of the spindles, means are provided for tipping all the triggers at one side of the spinning frame simultaneously and for locking them in their tipped or in their normal position. Such means include the shaft 70, hereinbefore referred to, which is slidably and rotatably mounted in the rear end of the housing 11 of each stop-motion device on one side of the spinning frame. The shaft extends the entire length of the spinning frame and its ends may be provided with handles of any convenient sort. The shaft is provided with radial arms 71 which are spaced along it at distances equal to the distances between the stop-motion devices, so that each arm 71 may be normally positioned in a slot 72 formed in one of the side walls 24 of the housing 11 of each stop-motion device. When the arms 71 are in these slots they in no way interfere with the movement of the trigger levers. When the spindles are to be doffed the shaft 70 is given a slight longitudinal movement which brings each of its arms 71 into engagement with a V-shaped depression 73 formed in one side of the trigger body 22 of each stop-motion device. This longitudinal movement of the shaft also moves the loop 56 of each stop-motion device sufficiently to move the end of the rod 53 which is carried by the loop out of line with the cam 58 on the trigger lever. After this longitudinal movement, the shaft 70 is turned slightly in a direction which forces the lower end of each arm 71 against the lower edge 74 of the depression 73 in the trigger body of each stop-motion device, thus forcing downward the inner arms of all the triggers on one side of the spinning frame, raising the thread guides 21 to the position shown in Fig. 12 so that they are out of the way during the doffing of the spindles. After the doffing has been completed, the shaft 70 is turned back to move all the trigger levers into their normal horizontal position. The shaft may then be left

with its arms 71 in engagement with the trigger levers to lock them in normal position during the threading and piecing up of the ends. It is then moved longitudinally to reinsert each arm 71 in its slot 72 and to bring each rod 53 back into alignment with the cam 58 of each trigger.

A recess 75 is formed in the side of the trigger body above the recess 73 to permit moving the shaft 70 longitudinally when some of the trigger levers are in tipped position. If for any reason it is desirable to stop the spinning machine, all the trigger levers may be locked in whatever position each occupies at the time by a longitudinal movement of the shaft 70 which brings the pins 71 into engagement with the recesses 73 of those levers which are in normal position and the recesses 75 of those levers which are in tipped position.

What is claimed is:

1. A stop-motion device, which comprises a pipe-like frame, a trigger and a breaker at opposite ends of the frame, and elements located within the frame and movable longitudinally thereof to connect the trigger with the breaker.

2. A stop-motion device, which comprises a pipe-like frame, a trigger and a breaker at opposite ends of the frame, and elements within the frame connecting the trigger with the breaker, and in which the breaker and the connecting elements are mounted for lengthwise movement.

3. The combination with a spinning frame of a pipe-like frame extending around the drawing rolls, a trigger at one end of said frame engaging a roving leaving the drawing rolls, a breaker at the other end of said frame engaging said roving as it enters the drawing rolls, and mechanism connecting the trigger with the breaker and located within said frame.

4. The combination with a spinning frame, of a pipe-like frame extending from the outer side of the roll-beam to the entrance side of the drawing rolls, a slidable breaker at the upper end of the frame, a slidable connecting element in the frame, a short roving-engaging trigger at the front end of the frame for actuating the breaker through the connecting element, and an unconfined body of liquid in the trigger to accentuate its movement on the breaking of a roving.

5. In a stop-motion device for spinning frames, a hollow L-shaped frame, and means for attaching said frame to a spinning frame so that it extends under and inside the drawing rolls of the spinning frame.

6. A frame for a stop-motion device for spinning frames, comprising a bracket secured to the outer side of a roll beam of the spinning frame, a pipe extending inwardly from said bracket through the roll beam and below the table of the spinning frame, an elbow at the rear end of said pipe, and a pipe extending vertically upward from said elbow through the table of the spinning frame to a point in advance of its drawing rolls.

7. A stop-motion device for spinning frames, comprising a horizontal and a vertical pipe forming an L-shaped frame, a trigger at the outer end of the horizontal pipe, a breaker slidably mounted on the upper end of the vertical pipe, a slidable plunger in the vertical pipe connected with the breaker, and a slidable rod in the horizontal pipe movable by the trigger to cause sliding of the plunger.

8. In a stop-motion device, a substantially balanced roving-engaging trigger containing an unconfined body of liquid to accentuate its movement on the breaking of a roving.

9. In a stop-motion device, a trigger lever containing a closed longitudinal chamber, and a body of liquid partially filling said chamber and lying partly at each side of the fulcrum of the lever when the lever is in running position.

10. In a stop-motion device, a trigger lever comprising a pivoted body containing a longitudinal chamber having an enlargement at one end thereof, a roving-engaging element extending from the other end of the body, and a body of liquid partially filling said chamber and adapted to flow into said enlargement on tipping of the lever.

11. In a stop-motion device, a substantially balanced roving-engaging trigger containing a body of liquid free to flow toward one end of the trigger when the trigger tips on the breaking of a roving, and a breaker-actuating member spaced from the trigger and positioned to be engaged thereby after the trigger has tipped sufficiently to cause such flow of the liquid therein.

12. The combination with a spinning frame, of a stop-motion device, including a roving-engaging trigger lever located wholly in front of a roll-beam of the frame and containing an unconfined body of liquid to accentuate its movement on the breaking of a roving.

13. The combination with a spinning frame, of a stop-motion device including a bracket extending horizontally outward from the front of a roll beam of the spinning frame, and a normally horizontal trigger lever pivoted on said bracket and having an outer arm extending over a spindle of the spinning frame and an inner arm terminating outside the roll-beam.

14. In a stop-motion device, the combination of a housing, a pipe extending from the back wall of the housing, a rod slidable in said pipe, and a trigger lever pivoted between the side walls of the housing so that its rear end swings across the end of the pipe to actuate the rod.

15. A stop-motion device for spinning frames, comprising a breaker engaging a roving in advance of the drawing rolls and yieldably urged to move from free to operative position, a fixed stop obstructing such movement of the breaker, and means actuated by breaking of the roving in or beyond the drawing rolls to knock the breaker clear of said stop so that it can move past said stop.

16. A stop-motion device for spinning frames, comprising a breaker engaging a roving in advance of the drawing rolls and movable downwardly from free to operative position, a fixed support on which the breaker rests when in free position, and means actuated by breaking of the roving in or beyond the drawing rolls to knock the breaker clear of said support so that it can fall past said support.

17. A stop-motion device for spinning frames, comprising a breaker engaging a roving in advance of the drawing rolls and yieldably urged to move from free to operative position, a fixed stop obstructing such movement of the breaker, a trigger engaging said roving beyond the drawing rolls and containing an unconfined body of liquid to accentuate its tipping on the breaking of said roving, and means actuated by a tipping of the lever to knock the breaker clear of said stop so that it can move past said stop.

18. A stop-motion device for spinning frames, comprising a hollow frame, a trigger located at one end of said frame and engaging a roving beyond the drawing rolls, a vertically movable breaker at the other end of the frame engaging said roving in advance of the drawing rolls and having a part projecting within the casing, a fixed support within the casing on which said part of the breaker rests when the breaker is in free position, and an element located within the frame and actuatable by a tilting of the trigger to knock said part of the breaker clear of said support so that it can fall past said support.

19. In a stop-motion device, the combination of a fixed stop, a breaker yieldably urged to move towards said stop, a laterally resilient spring extending between the breaker and the stop and fixed to one of them, and an element movable to push the free end of the spring sideways to permit the breaker to approach the stop.

20. In a stop-motion device, the combination of a fixed stop, a breaker yieldably urged toward said stop and manually movable away from said stop, a laterally resilient spring extending between the breaker and the stop and fixed to one of them, an element movable to push the free end of the spring sideways to permit the breaker to approach the stop, and means for limiting movement of the breaker away from the stop when the free end of the spring is in position to return the pushing element to its first position.

21. In a stop-motion device, the combination of a vertical pipe containing a fixed stop, a plunger slidable in the pipe and having at its lower end a resilient extension normally resting on said stop, an element normally located at one side of said extension, means for pushing said element against the extension to free it from said stop so that it slides by the stop, and means for arresting upward movement of the plunger when the end of the extension is above the stop and below said element so that the extension strikes said element and returns it to its former position.

22. A roving-breaker for a stop-motion device, comprising a combined cap and plunger having a transverse hole therethrough for the passage of a roving, and a sleeve slidable between said cap and plunger to obstruct said hole and clamp a roving therein.

23. In a stop-motion device, a slidable breaker-actuating rod, a trigger lever positioned to swing across one end of the rod, and a cam on the trigger having a surface formed to move the rod endwise when the trigger swings in one direction, and a surface formed to displace the end of the rod sideways on return movement of the trigger.

24. In a stop-motion device, a slidable breaker-actuating rod, an inclined transverse support for the front end thereof, a trigger lever positioned to swing across the front end of the rod, and a cam on the trigger having a surface formed to move the rod endwise when the trigger swings in one direction, and a surface formed to displace the end of the rod sideways up said inclined support on return movement of the trigger.

25. In a stop-motion device, the combination of a fixed support, a slidable breaker having at its lower end a resilient extension normally resting on said support, a slidable rod located on one side of said extension, a trigger lever positioned to swing across the other end of said rod, a cam on the trigger having a surface formed to move the rod endwise to push said resilient extension from said support when the trigger swings in one direction, and a surface formed to displace the end of the rod sideways on the return movement of the trigger, and means for arresting upward movement of the breaker when the end of its extension is above the support and below the rod so that the extension may strike and return the rod.

26. The combination with a spinning frame, of stop-motion devices arranged along one side of the spinning frame and each having a rigid trigger lever located in front of a roll beam and bearing a thread guide at

its outer end, and means for simultaneously depressing the inner arms of said levers to raise said thread guides during doffing.

27. In a stop-motion device, the combination with a breaker and a trigger movable by gravity on the breaking of a roving, of means for connecting the trigger with the breaker when the trigger tips by gravity, means for mechanically tipping the trigger during doffing, and a member supporting said connecting means and said tipping means and movable to bring them alternately into operative relation to the trigger.

28. The combination with a spinning frame, of a series of slotted plates projecting from one side of the frame, a trigger lever pivoted on each of said plates and having a lateral recess registering with the slot therein, and a shaft extending across said plates and behind said levers, having radial arms, and slidable to move said arms between the slots in the plates and the recesses in the trigger levers.

29. A stop-motion device, comprising a breaker, a support therefor, a roving-engaging trigger tiltable by gravity on breaking of the roving, a connecting element movable by tilting of the lever to disengage the breaker from its support, means for moving the connecting element out of operative relation with the trigger, and mechanical means for tilting the trigger during doffing.

In testimony whereof I have hereunto set my hand.

HENRY E. VAN NESS.