(No Model.) 3 Sheets—Sheet 1.

# J. BOYD.

## STOP MOTION MECHANISM FOR TWISTING AND WINDING MACHINES, &c.

No. 303,209. Patented Aug. 5, 1884.

FIG. 1

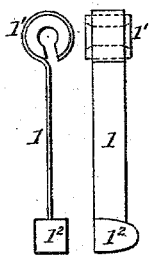


FIG. 4.

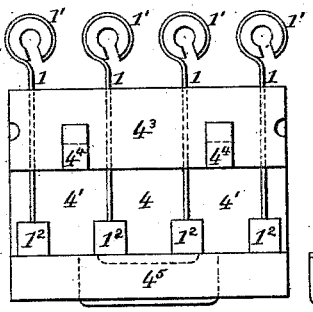


FIG. 7.

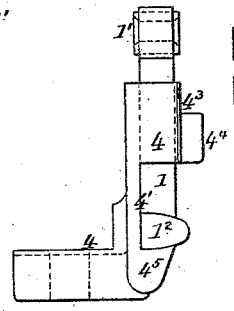


FIG. 9.

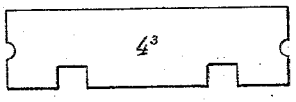


FIG. 8.

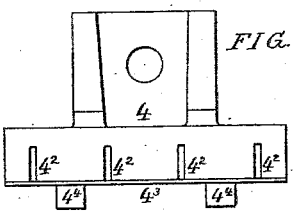


FIG. 2.

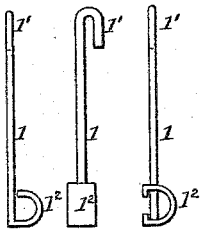


FIG. 5.

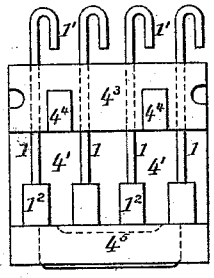


FIG. 10.

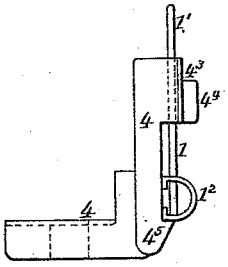


FIG. 12

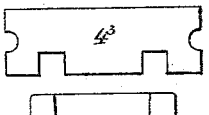


FIG. 11.

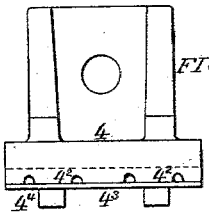


FIG. 3.

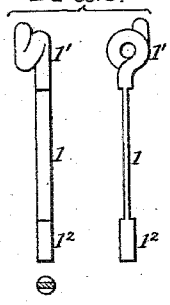


FIG. 6.

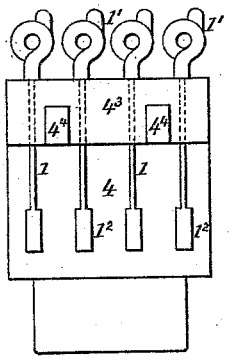


FIG. 13.

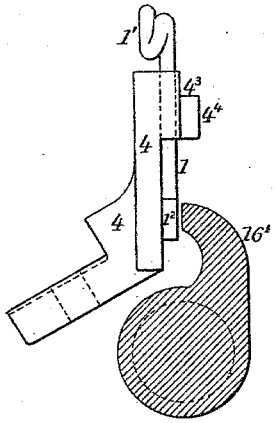


FIG. 15

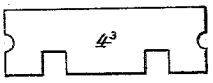
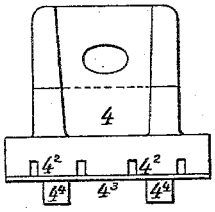


FIG. 14.



Witnesses:-
John E. Parker
James F. Jobin.

Inventor
John Boyd
by his Attorneys
Howson & Sons

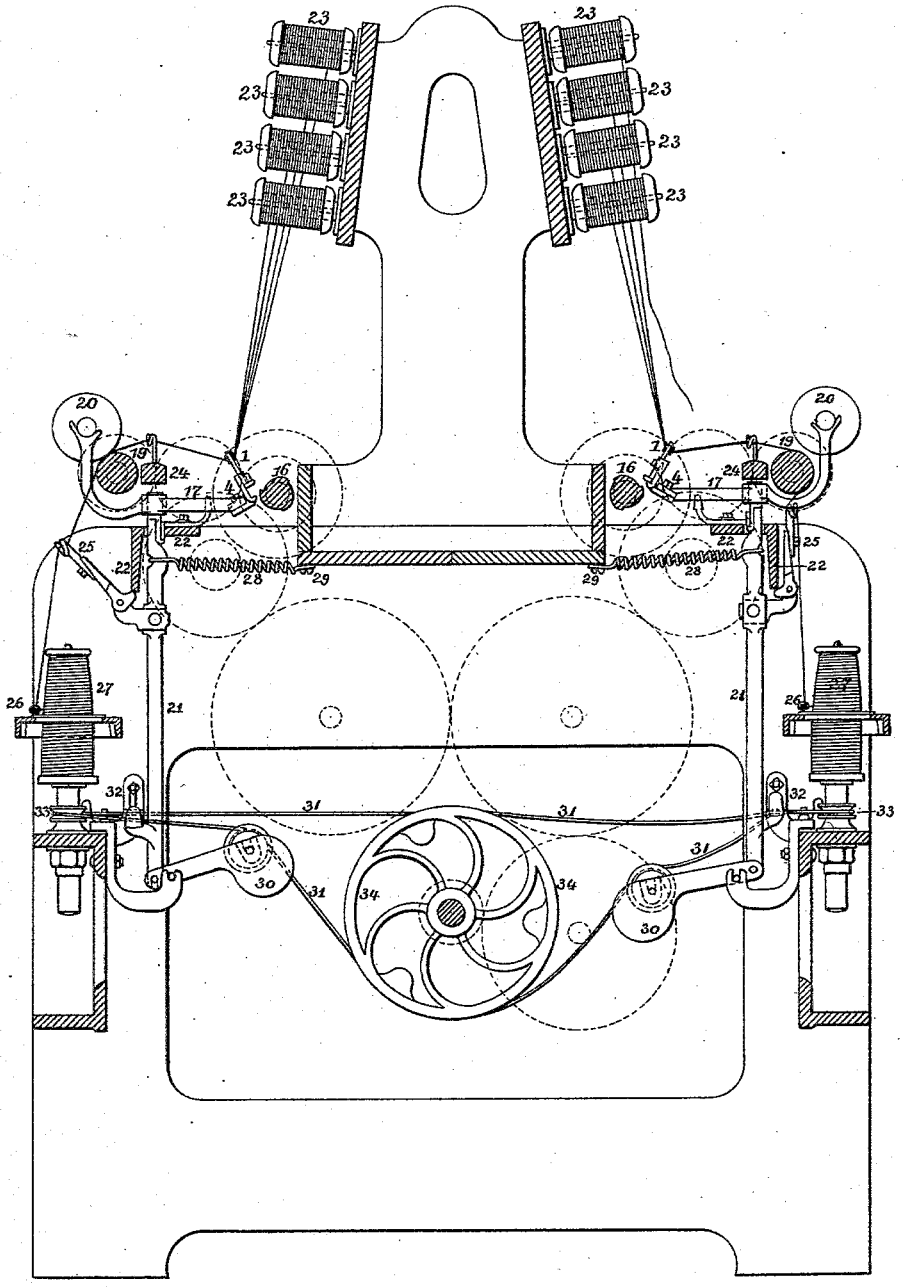
(No Model.) 3 Sheets—Sheet 2.

# J. BOYD.

## STOP MOTION MECHANISM FOR TWISTING AND WINDING MACHINES, &c.

No. 303,209. Patented Aug. 5, 1884.

*FIG. 16.*




Witnesses:-
John E. Parker
James F. Johns

Inventor.
John Boyd
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Howson & Sons

(No Model.) 3 Sheets—Sheet 3.

# J. BOYD.

## STOP MOTION MECHANISM FOR TWISTING AND WINDING MACHINES, &c.

No. 303,209. Patented Aug. 5, 1884.

FIG. 17.

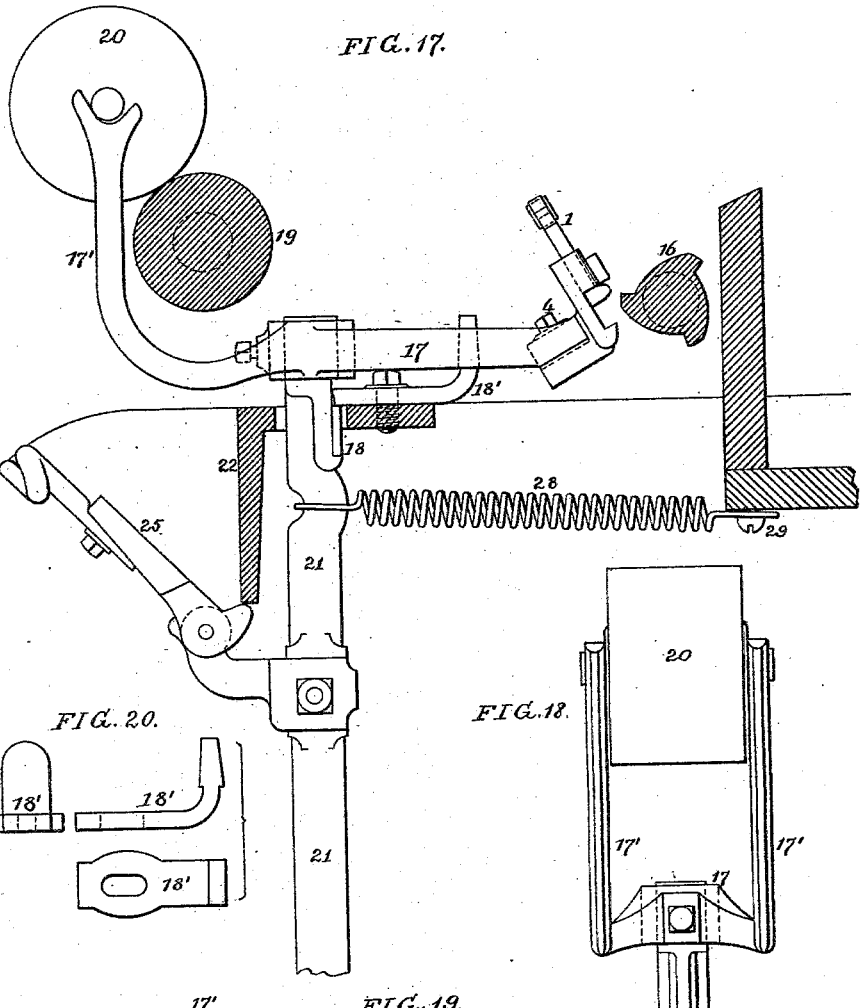



FIG. 20.




FIG. 18.

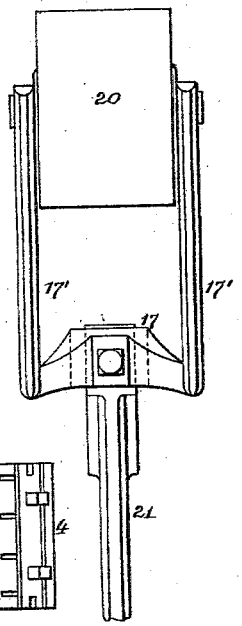
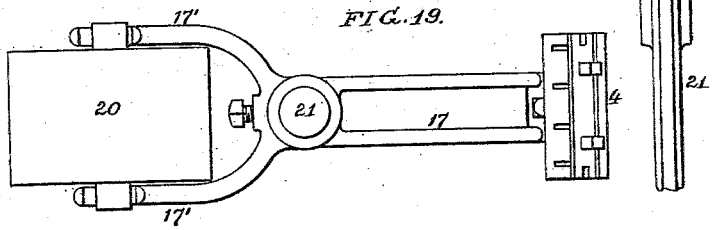



FIG. 19.




Witnesses:—
John E. Parker
James J. Jobin

Inventor
John Boyd
by his attorneys
Houston & Sons

# UNITED STATES PATENT OFFICE.

JOHN BOYD, OF GLASGOW, COUNTY OF LANARK, SCOTLAND.

## STOP-MOTION MECHANISM FOR TWISTING AND WINDING MACHINES, &c.

SPECIFICATION forming part of Letters Patent No. 303,209, dated August 5, 1884.

Application filed July 30, 1883. (No model.) Patented in England May 26, 1883, No. 2,619, and in Germany July 8, 1883, No. 27,171.

*To all whom it may concern:*

Be it known that I, JOHN BOYD, of Glasgow, county of Lanark, Scotland, in the Kingdom of Great Britain and Ireland, have invented a new and useful Improvement in Stop-Motion Mechanism for Twisting and Winding Machines, &c., of which the following is a specification.

My invention consists of certain improvements in the construction of the stop-motion mechanism for twisting, doubling, and winding machines for which patents were obtained June 7, 1881, No. 242,591, and November 28, 1882, No. 268,178, the main part of my present invention having reference to the construction of the detectors and detector-holders, as more fully described hereinafter.

In the accompanying drawings, Figures 1, 2, and 3 are views of different forms of my improved detectors; Figs. 4, 5, and 6, end views of the detector-holders carrying the detectors. Figs. 7, 10, and 13 are corresponding side views of the holders with their detectors, the moving cam also being shown in section in Fig. 13. Figs. 8 and 9, 11 and 12, 14 and 15, are corresponding views of the holders separately and their retaining-plates for the detectors. Fig. 16 is a vertical section of a spinning, twisting, and winding machine; Fig. 17, a sectional view of a part of the same drawn to a larger scale; Figs. 18 and 19, views of the bracket or cradle for the upper feed-roll, and Fig. 20 detached views of the catch-plate.

The main object of my invention is to provide a simplified form of detector, and one which shall be less liable to be injured by the stopping action than those hitherto in use; and this object I attain by so constructing the detector and holder therefor that when the detector drops in response to the breakage or failure of the thread a projection or foot is interposed between a positively-moving cam and the movable holder, and the detector is thus subjected to compression only, and not to any bending or other strain that could possibly injure it.

In order to understand more clearly the construction and application of my improvement, I will first refer to the view Fig. 16, which illustrates my invention as applied to a machine of the same general construction as shown in Patent No. 268,178. The stopping devices are shown applied to opposite sides of the machine, the devices on the left-hand side being shown as when the twisting is in progress, while those on the right are shown as when a thread is broken and the twisting stopped.

It will suffice here to describe the general operation of the main parts of the machine, and then describe the detailed construction and operation of my improvements in the detector mechanism, catch-plates, and feed roller brackets. The threads to be doubled and twisted are led from the bobbins 2 3 through detectors 1, (hereinafter described,) varying in number according to the number of strands to be twisted. They are then led through guide-curls in the usual traverse-bar, 24, thence between the under and top feed-rollers 19 and 20, through the thread-hook 25 and ring-traveler 26 to the twist-bobbin 27, whose spindle is driven by a cord, 31, passing round the pulley 33 and a pulley, 34, on a driving-shaft. When any thread breaks, its detector falls into the path of the rotating cam 16, the latter pushes the detector-holder 4 and the vertical rod 21 over against the pull of the spring 28 until the catch-plate 18 on the rod is disengaged from a catch-piece, 18′, on the main top rail, 22. Then the counter-weight 30 will raise the rod 21, and with it the bar 17 (hereinafter described) and top feed-roller, 20, clear of the under driven roller, 19, and stop the feed, and also raise the detectors clear of the cam 16, and move the thread-hook and starting-lever 25 from the position shown on the left-hand side of Fig. 16 to the position shown on the right-hand side. At the same time the counter-weight 30, falling, leaves the cord 31 slack and holds the same with the grips 32, so that the bobbin-spindle driven by the cord 31 will cease to revolve. The cam-shaft 16 and feed-roller 19 may receive their motion from the shaft carrying the pulley 34 through any suitable gearing, as indicated by dotted lines in Fig. 16.

The detectors and detector-holders are illustrated in detail on a larger scale on Sheet 1 of

the drawings. The holder may form part of a bar secured to the vertical rod 21; but preferably the holder consists of a separate angled piece, 4, Figs. 4 and 7, adjustably secured to a bar, 17, Figs. 16, 17, and 19, attached to the head of the vertical rod 21. The holders are shown as adapted each to carry four detectors, 1.

The detector shown in Figs. 1, 4, and 7 consists of a strip of thin flat metal provided with a porcelain-lined eye, 1′, at its upper end, and having at its lower end an enlarged block, foot, or projection, $1^2$, which may be cast or otherwise formed on the detector, as shown in Fig. 1, or may consist of a bent piece of metal secured to or forming part of the metal strip, as shown in Figs. 2, 5, and 10. The detector shown in these latter figures is formed of round wire, and has a simple hook at its upper end for the thread, this form of detector being suitable for fine numbers, while the detector shown in Fig. 1 is better suited for heavy and medium yarns.

The detector shown in Figs. 3, 6, and 13 has a curl, 1′, at its upper end for the thread, and has its foot $1^2$ formed in one with the stem, the sides of the stem being reduced. These detectors are adapted to vertical slots $4^2$ in the holder 4, which is cut away or has a broad horizontal groove, 4′, for the feet $1^2$, to allow of the necessary limited vertical movement of the detectors in their slots $4^2$. A small cover or retaining-plate, $4^3$, Figs. 9, 12, and 15, detachably adapted to notched projections or studs $4^4$, fixed on the face of the holder 4, retains the detectors in place, but permits their ready removal and replacement. The ledge $4^5$, forming the bottom of the groove 4′, serves as a support for the detectors when the latter are not held in their elevated positions by the threads. Each holder is preferably fixed with its face and the detectors in an inclined position, as shown in Figs. 16 and 17, with its lower part near the continuously-moving cam 16, which effects the stoppage. This position of the holder has the double advantage of requiring a comparatively small movement of detectors to act with less weight on their threads. While the several detectors of one holder are held up by their threads the cam 16 rotates without touching; but when a thread breaks or fails the corresponding detector, 1, slides down its groove in the holder 4, and its foot $1^2$ forms, as it were, a projection on the holder in the way of the cam 16, which projection is by preference slightly below the horizontal center plane of the cam. The cam, in rotating, presses on the projecting foot $1^2$ against the holder 4, causing the latter, bar 17, and rod 21 to move away from the cam. This movement of the detector-holder 4 and part carrying the same may be arranged to bring about the stoppage of the winding or twisting and winding action in any convenient way, but is by preference made to act in connection with catch-plates 18 and 18′ and other parts, as above described.

The detector-holder shown in Figs. 6, 13, and 14 is by preference fixed in a vertical position and adapted to be worked in connection with a continuously-rocking cam, 16′, instead of a rotating cam, and is so constructed that when the detectors are held up by threads the cam 16′, in its to-and-fro movement, will not touch them or the holder; but when a detector drops its foot $1^2$ will come into the path of the said cam, so that the latter will move the holder and its connected parts over to operate the stopping of the machine, as before described.

Instead of having two continuously-revolving feed-rollers, as in my previous patents, I use only one positive-motion roller, 19, and the movable feed-roller 20, when in operation, rests on the upper and outer part of the roller 19, and is guided and moved by the cradle and lifter 17′, which, with the top roller, 20, is shown in Figs. 17, 18, and 19. The cradle 17′ consists of two curved arms formed in one, with the slotted bar 17, secured to the head of the rod 21, and carried under and up in front of the lower roller, 19, and provided with forks at the upper ends of the arms for the journals of the roller 20. The bar 17 is slotted, and the fixed catch-plate 18′, as shown in detached view, Fig. 20, is made with a turned-up portion fitting into the slot to guide the bar 17. This plate is fixed to the rail 22 by a screw passing through a slot, Fig. 20, whereby the plate 18′, and consequently the distance between the detector-holder 4 and its detectors and the cam 16, can be readily adjusted.

I claim as my invention—

1. The combination of winding mechanism and driving devices, substantially as described, with a rod controlling the said driving devices, a moving cam, a detector-holder connected to said rod, and a detector having a foot adapted to interpose itself directly between the cam and the said holder, whereby on the breakage or failure of a thread the said detector is subjected to a compression-strain only, and not to any bending-strain, substantially as set forth.

2. The combination of winding mechanism, a cord-tightening lever, and cord-grip with a rod connected to said lever, a detector-holder carried by said rod, a moving cam, and a detector having a foot adapted to interpose itself between the cam and said holder on the breakage of a thread, whereby the stoppage of the winding is effected.

3. The combination of winding mechanism, feed-rollers, and a moving cam with a detector-holder, a cradle for the upper feed-roller, a counterbalanced rod carrying said holder and cradle and catches for retaining the rod, and a detector adapted to interpose a foot between the cam and detector-holder, substantially as described.

4. The combination of a moving cam and a slotted detector-holder with detectors having curls or hooks at their upper ends and enlarged feet at their lower ends, and adapted

to have a limited motion in said slots, as and for the purpose set forth.

5. The combination of the frame, counterbalanced rod 21, and catches 18 18′, the latter adjustable on the frame, and having a turned-up portion, with a bar, 17, having a slot to which the said turned-up portion is adapted as a guide, and carrying a detector, detector-holder, and a moving cam, substantially as specified.

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

JOHN BOYD.

Witnesses:
JOHN FRIEL,
ROBERT BERRY.