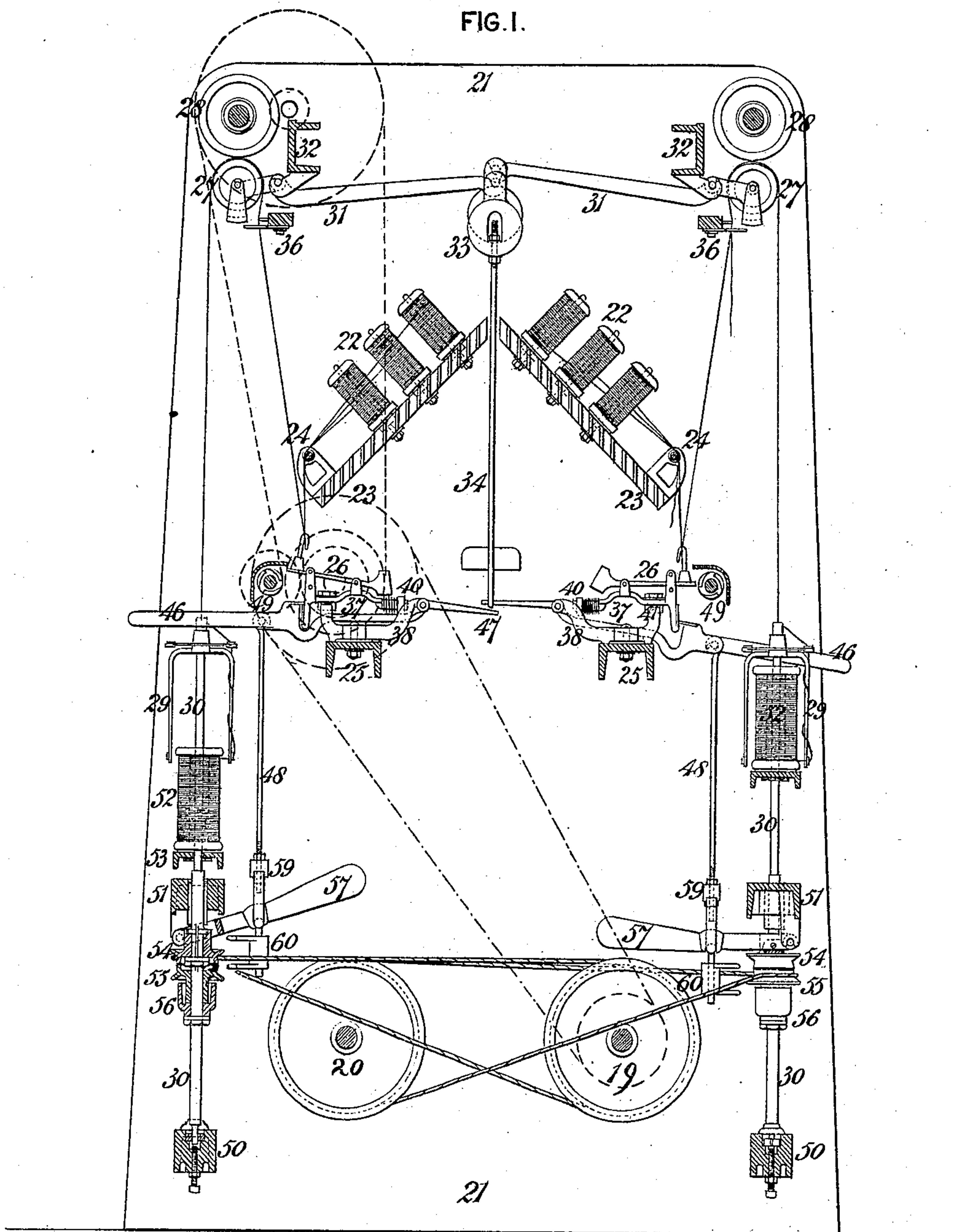


(No Model.)

2 Sheets—Sheet 1.

J. BOYD.
Doubling, Twisting, and Winding Machinery.
No. 240,957.
Patented May 3, 1881.

FIG. 1.



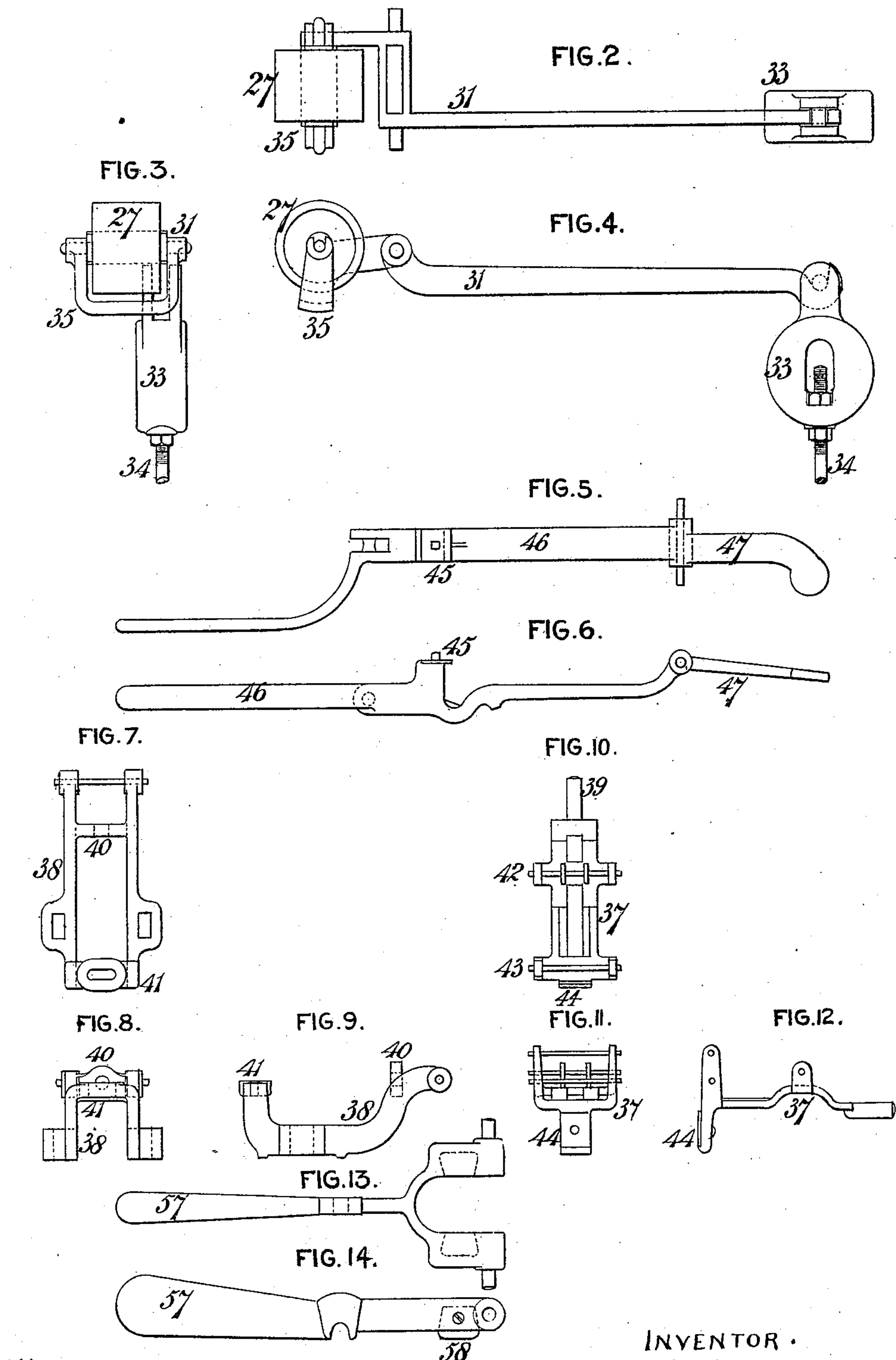
WITNESSES

J. Francis Tobin
Henry Howson Jr.

INVENTOR.

John Boyd
by his Attorneys
Howson and Son

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UNITED STATES PATENT OFFICE.

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

DOUBLING, TWISTING, AND WINDING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 240,957, dated May 3, 1881.

Application filed May 3, 1880. (No model.) Patented in Great Britain, November 13, 1877.

To all whom it may concern:

Be it known that I, JOHN BOYD, a subject of the Queen of Great Britain, and residing at Shettleston, in the county of Lanark, Scotland, have invented certain Improvements in Combined Doubling, Twisting, and Winding Machinery, (for which I obtained British Letters Patent, dated November 13, 1877, No. 4,241, and still in force,) of which the following is a specification.

My invention has for its object the constructing and combining together of mechanism so as to effect, in an improved and satisfactory manner, the combined operations of doubling, twisting, and winding yarns, and so that each spindle and the parts connected with it shall, on the breaking or failing of any one of its set of yarns, have its action arrested so speedily and in such a manner as to give extremely little trouble in piecing and in rearranging the parts and restarting the motions. In my improved machinery the yarns proceed over a horizontal guide-rail, and thence down to detector-levers, from which they ascend to a pair of feeding-rollers, the upper one of which is driven and stationary in position, the lower one being on a lever, which is connected to the detector and stopping mechanism in such a manner as, when a yarn breaks or fails, to lower the lower roller and the yarns passing round it down out of contact with the upper roller, whereby the feeding action is stopped. The twisting and winding spindle, fitted with the usual flier, is driven by means of a cord, which, when a stoppage is required, is shifted from a fast to a loose pulley on the spindle by a rod, which simultaneously applies a brake to the fast pulley or spindle to insure quick stoppage. The detector-levers are centered on a carrier, which, when a lever drops, is, by the action of a rotating cam-shaft on the lever, moved so as to release a catch which holds up a weighted stopping-lever, and this lever, when thus released, acts on the lower feeding-roller lever above and on the cord-shifting and brake details below, so as to speedily stop the feeding above and the twisting and winding below.

My improved machinery is shown in the accompanying two sheets of drawings.

Figure 1 on Sheet 1, is a transverse vertical section. The figures on Sheet 2 are enlarged

views of details, and will be most conveniently and intelligibly specified in the course of the following description.

The machine is in Fig. 1 represented as having the usual two sets of parts, one along each side of it, and those on the left-hand side are shown as with the yarns unbroken and the action going on, while on the right-hand side the parts are shown with a yarn broken and as shifted by the detector-stopping action.

The framing of the machine consists, as usual, of transverse vertical frames 21, connected by various longitudinal rails, the openings of the frame 21 being omitted in Fig. 1, in order to simplify the drawings. The bobbins 22, off which the yarns to be doubled and twisted are drawn, are set on pins fixed in inclined longitudinal boards 23, attached to the transverse frames 21; and at each side the yarns pass over a guide-rail, 24, and down to the detector mechanism, which is carried on a longitudinal rail, 25. The yarns pass through the curls or guide-eyes of detector-levers 26, and thence up to the feeding-rollers 27 28, and from them downward again to the flier 29 of the twisting and winding spindle 30. The upper feeding-rollers, 28, for a row of spindles are all fixed on one longitudinal shaft, which rotates continuously; but the lower feeding-roller, 27, for each set of yarns is separate from the others, and the feeding action in connection with any one spindle is stopped by lowering the respective lower roller, 27, out of contact with the continuously-rotating upper roller, 28. Each lower feeding-roller, 27, is carried by a lever, 31, which is centered in brackets formed on or fixed to a longitudinal rail, 32, and has a weight, 33; and adjustable rod 34 hung on the end of its inner and longer arm.

Fig. 2 is an enlarged plan of the roller 27, lever 31, and weight 33, and Figs. 3 and 4 are end and side elevations thereof. The part of the lever 31 carrying the roller is made with uncovered bearings to receive the roller-journals, so that the roller can be easily removed and replaced; and the part 35, carrying one journal, is made in the same piece with the part carrying the other journal and with the lever itself, but is shaped to pass under the roller for the purpose of allowing the yarns to be easily placed upon or removed from the roller.

Just before reaching the feeding-roller 27 the yarns pass through a reciprocating guide, 36, which has the necessary traverse motion imparted to it by chains connected with the usual traverse-motion cam. The detector-levers 26 for a set of yarns are centered on a carrier, 37, guided so as to be movable transversely upon a bracket, 38, which is fixed to the longitudinal rail 25.

Fig. 7 is an enlarged plan of the bracket 38, and Figs. 8 and 9 are front and side elevations thereof. Fig. 10 is a plan of the carrier 37, and Figs. 11 and 12 are front and side elevations thereof. The carrier 37 is made with a spindle, 39, at its inner end, which is guided in a hole in a cross-bar, 40, of the bracket 38, and which has a helical spring placed on it, tending to move it outward. The forward part of the carrier 37 rests and moves on the forward part, 41, of the bracket 38, and is guided and secured by a pin fixed thereto and passing through a slot in the carrier. The detector-levers 26 are centered on a wire, 42, passed through cheeks formed on the carrier, and two wires, 43, at the front of the carrier, limit the movements of the detector-levers which pass between them.

On a downwardly-projecting part, at the front of the carrier 37, there is fixed a rectangular plate, 44, of hardened metal, the upper edge of which acts as a catch, which can support by the edge of a similar plate, 45, the weighted stopping-lever 46. This lever 46, which is shown in plan in Fig. 5 and in side elevation in Fig. 6, is centered at the back of the bracket 38, and is made with a short arm, 47, extending from its center inward, so as to be under the bottom end of the rod 34, connected to the roller-lever 31 above, while the forward part of the lever 46 has jointed to it a rod, 48, passing downward to the cord-shifting and brake details. The catch-plates 44 45 can be turned so as to present fresh edges when those in use are worn, and they present considerable breadth of surface, while requiring an extremely small movement to effect their disengagement. This construction of detector-lever, movable carrier, bracket, and catch-plates with the rotating cam-shaft I do not claim in this case, as it is fully described and claimed in an application filed by me April 30, 1880, serial number 8,733.

When a yarn breaks or fails its detector-lever 26 drops, being suitably poised for that purpose, and then a positive force comes into action to shift the stopping details, the front end of the detector-lever getting in the way of a continuously-rotating cam or wiper shaft, 49, (partly covered by a protecting plate,) which pushes the detector-lever inward and with it the carrier 37. The catch-plate 44 of the carrier being thus moved from under that, 45, of the stopping-lever 46, this lever descends, its inner end, 47, rising, and, by means of the rod 34, raising the inner end of the lever 31 and thereby lowering the lower feeding-roller, 27, and stopping the feeding-action.

The twisting and winding spindle 30 is, as usual, supported by a footstep-rail, 50, and by

a bolster-rail, 51, the bobbin 52 being supported on the usual traversing rail, 53. Between the two rails 50 51 the spindle 30 has on it fast and loose pulleys 54 55, the former, which is uppermost, being fixed to the spindle, while the latter has an elongated boss, which projects down into and rests in a lubricating-cup, 56, fixed to the spindle. A brake-lever, 57, which is shown in plan in Fig. 13 and in side elevation in Fig. 14, is centered by its outer forked end in lugs on the rail 51, and its forked part passes on each side of the upwardly-projecting boss of the fast pulley 54. Small blocks 58, of wood, leather, or other suitable material, are fixed in sockets in the inner and under sides of the forked part of the lever 57, to act frictionally on the fast pulley 54, when the lever is allowed to turn down, the lever being made heavy enough to apply the blocks 58 with the requisite force. The brake-lever is formed with a notched part, which passes through a stirrup, 59, adjustably connected to the rod 48, which depends from the stopping-lever 46, and below the stirrup there is attached a fork, 60, which acts on the driving-cord. When the stopping-lever 46 is raised and engaged with the detector-carrier 37 it by the rod 48 holds up the brake-lever 57 and also the fork 60, keeping the former out of action and the driving-cord on the fast pulley 54; but when a yarn breaks or fails, and the stopping-lever 46 is disengaged, the cord is instantly shifted to the loose pulley 55 and the brake applied, these actions taking place simultaneously with the lowering of the lower feeding-roller, 27, as hereinbefore explained.

The cam-shafts 49 and rollers 28 may be driven from some moving part of the machine, as may be found convenient. In the drawings I have illustrated by dotted lines an arrangement of belting and gearing in which the cam-shaft 49 on one side of the machine is driven from the shaft 19 by a belt passing over a pulley on the latter and over a pulley on an intermediate shaft geared to the shaft 49, while the shaft of the roller 28 on the same side is driven by a belt passing over a pulley on the intermediate shaft and over a pulley mounted on an adjustable stud, and having a sleeve geared to the roller-shaft. The roller and cam shafts on the other side of the machine may be driven from the shaft 20 in a similar manner.

I am aware that it is not new to combine detector mechanism with a pair of rollers between which the yarn passes, and one of which is movable and driven by the other, so that when a thread breaks the movable roller is moved from contact with the driving-roller; but the movable roller in such cases has been the upper roller; hence when a thread broke in such a machine the broken end, being on the driving-roll, would lap and be wound around the rotating shaft. In order to avoid this difficulty I mount the lower roll, 27, in bearings in a movable lever, 31, so that when a thread breaks the lower roll falls from contact with

the upper roll, and the movement of this roll with the broken thread, as shown at the right hand of Fig. 1, at once ceases.

I claim as my invention—

5 1. The combination of winding mechanism and detector and stopping devices, substantially as described, with an upper roll, 28, rotating mechanism therefor, a lower roll, 27, driven by contact with the upper roll, a movable lever, 31, carrying the lower roll, and operated by the said detector devices to move the lower roll from contact with the upper one.

15 2. The combination of cam-shaft 49, detector-levers 26, bracket-carrier 37, and lever 46, with a driving-pulley, flier-spindle 30, provided with fast and loose pulleys, and the cord-shifting rod 48, connected at one end to the lever

46, and carrying at the other a stirrup, 60, all substantially as set forth.

3. The combination of cam-shaft 49, detector-levers 26, bracket-carrier 37, and lever 46, with a driving-pulley, flier-spindle 30, fast and loose pulleys, belt-shifting rod 48, connected to lever 46, and weighted brake-lever 57, having a friction-surface adapted to bear on the fast pulley when the cord is shifted therefrom, all substantially as described.

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

JOHN BOYD.

Witnesses:

EDMUND HUNT,
LOCK MOORE.