

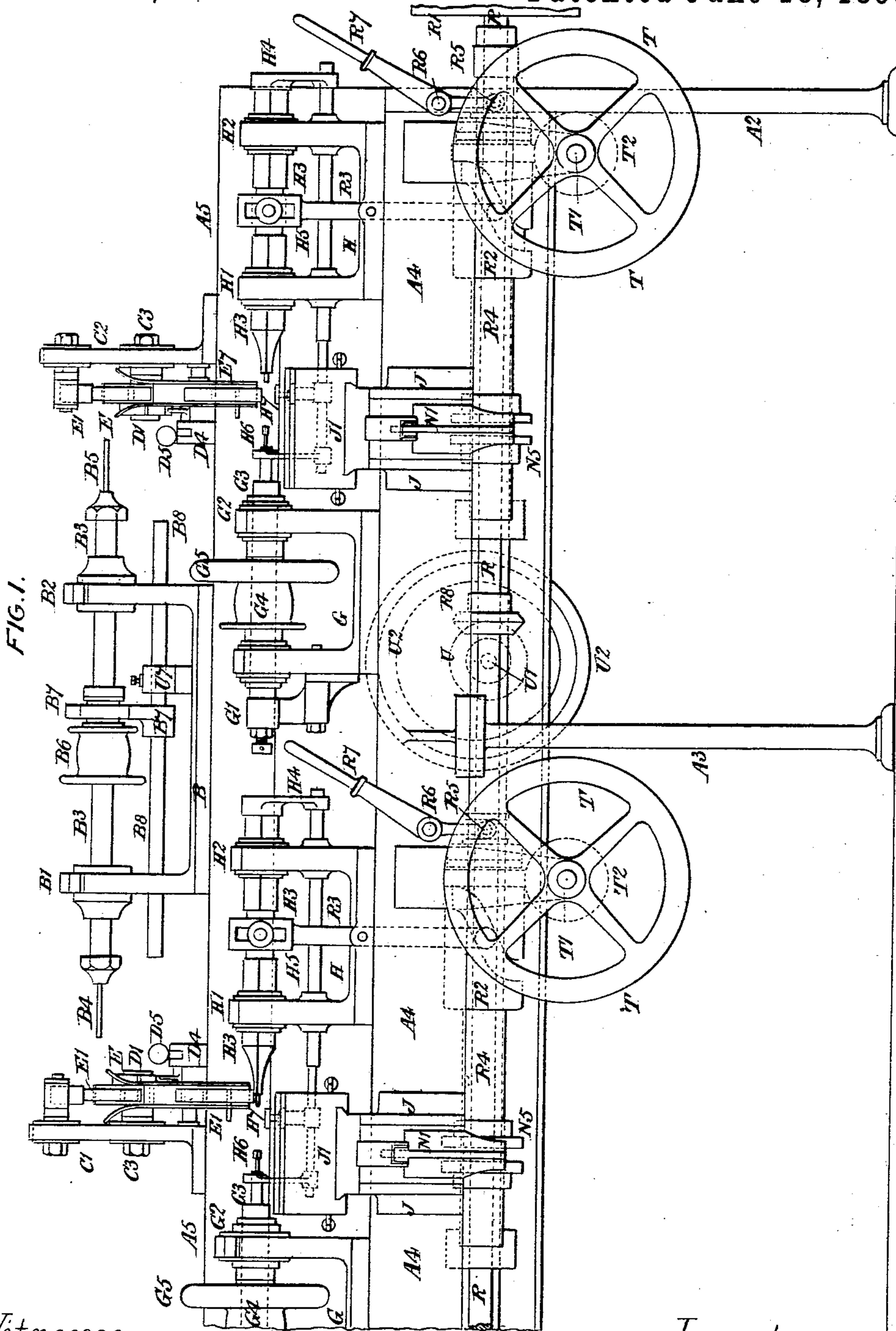
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5 Sheets—Sheet 1.

W. McCROSSAN & J. PAUL.
APPARATUS FOR MAKING SPOOLS OR BOBBINS.

No. 541,379.

Patented June 18, 1895.



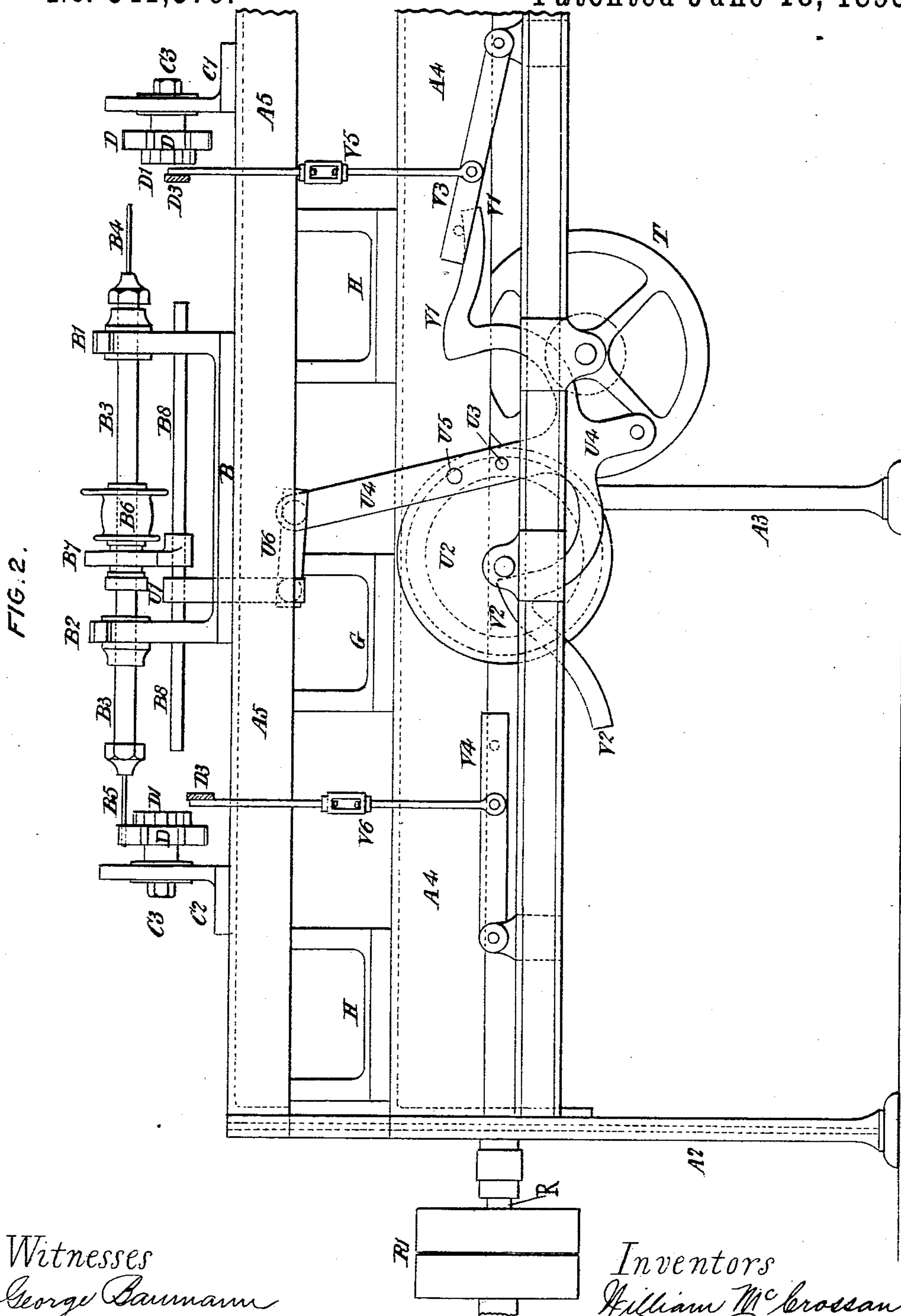
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5 Sheets—Sheet 2.

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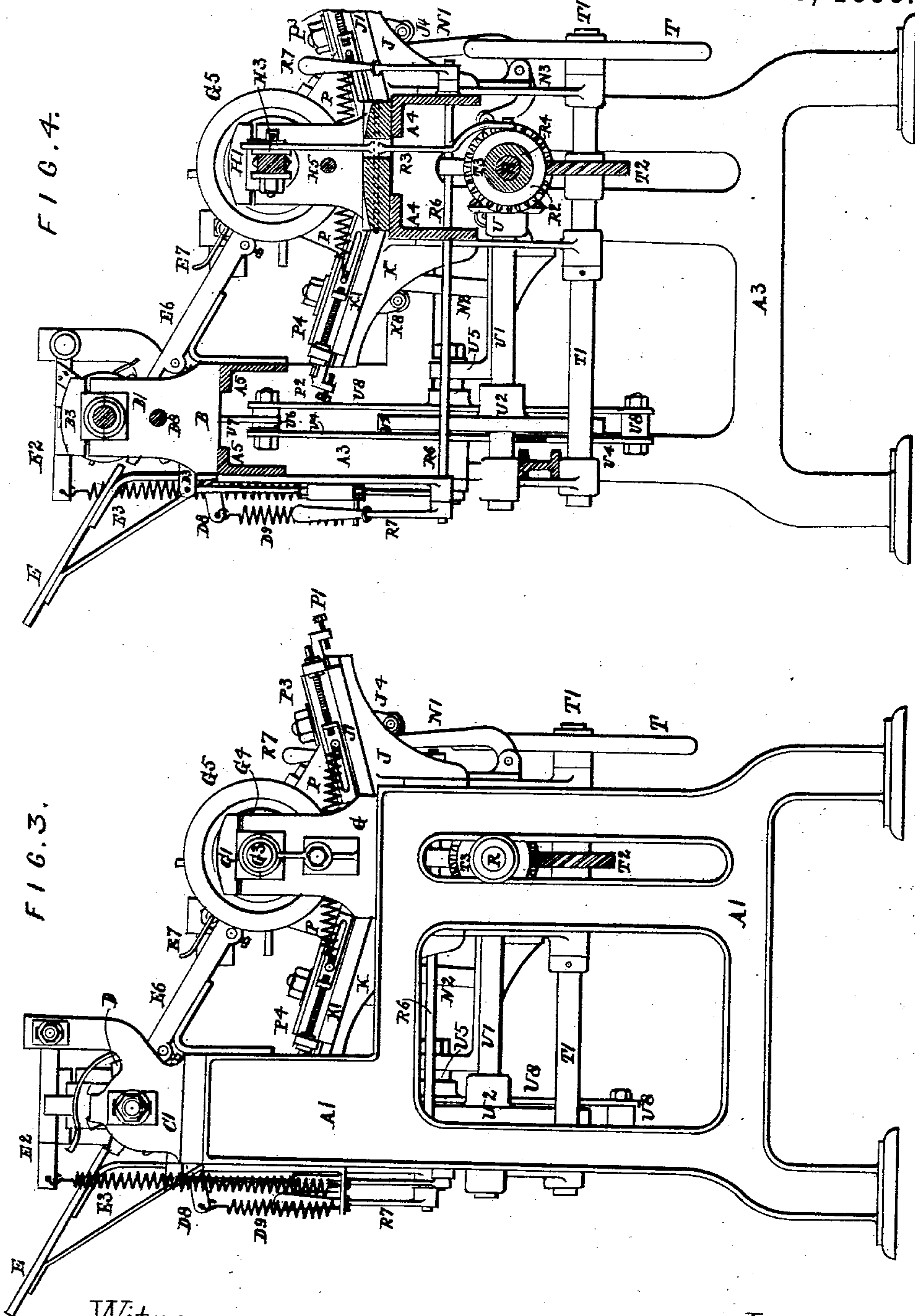
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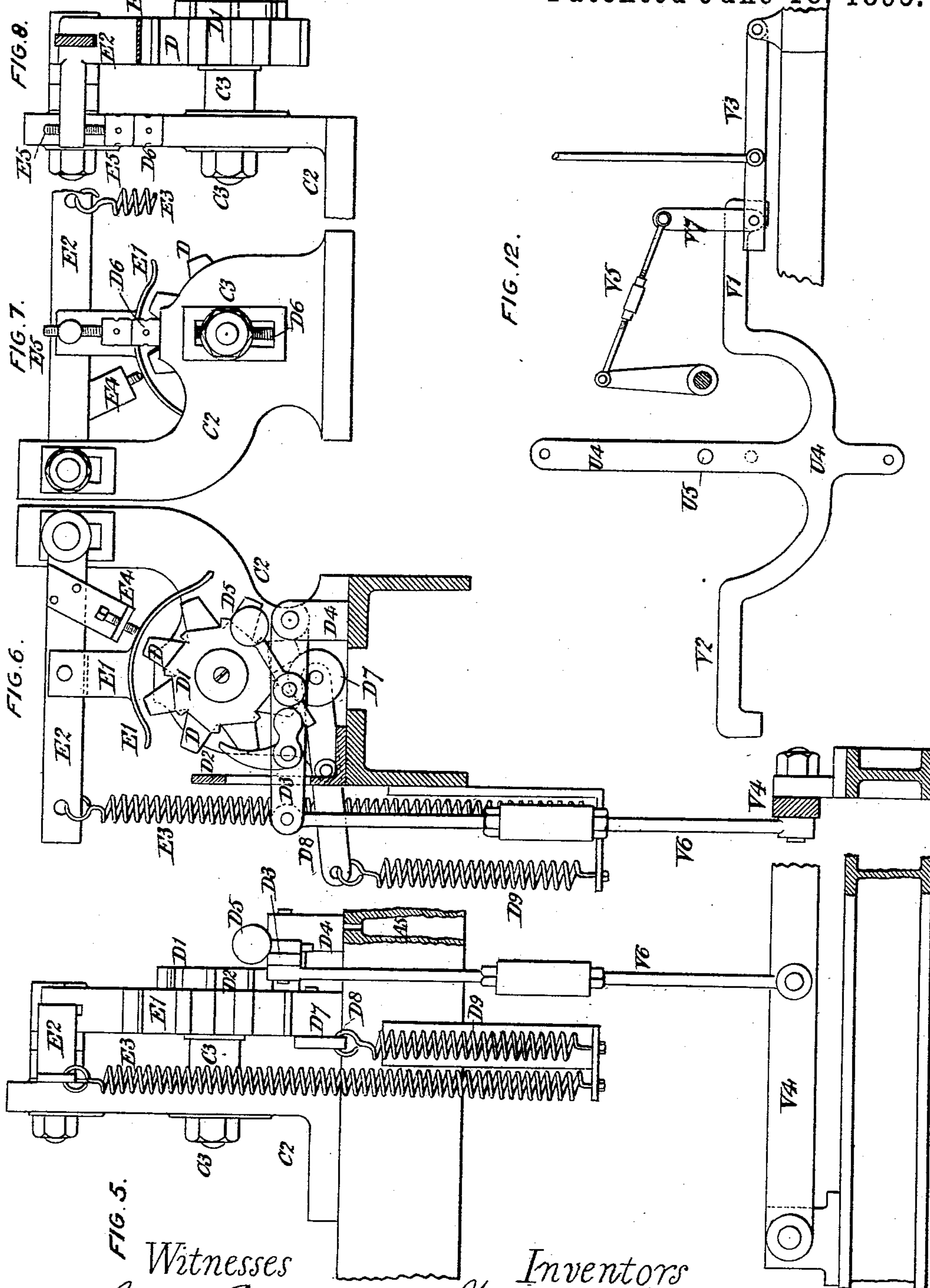
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5 Sheets—Sheet 4.

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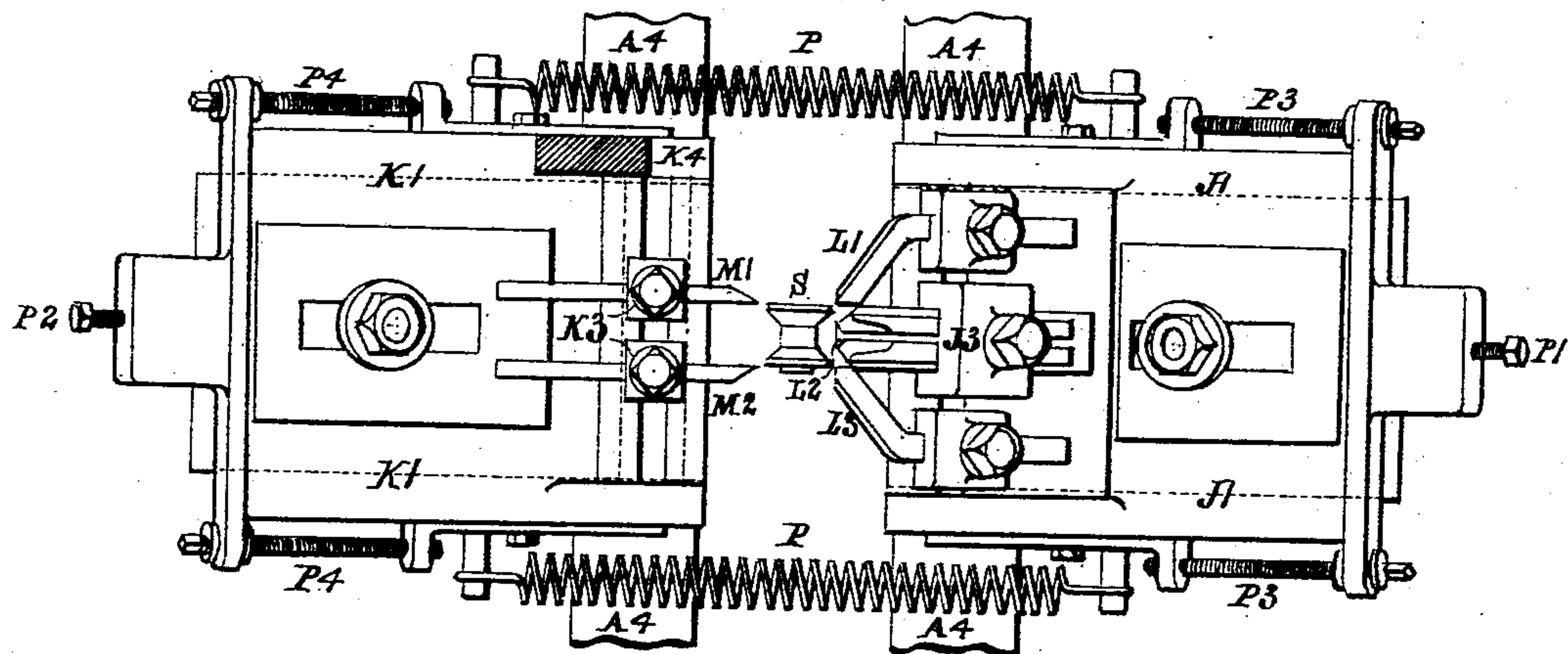
(No Model.)

5 Sheets—Sheet 5.

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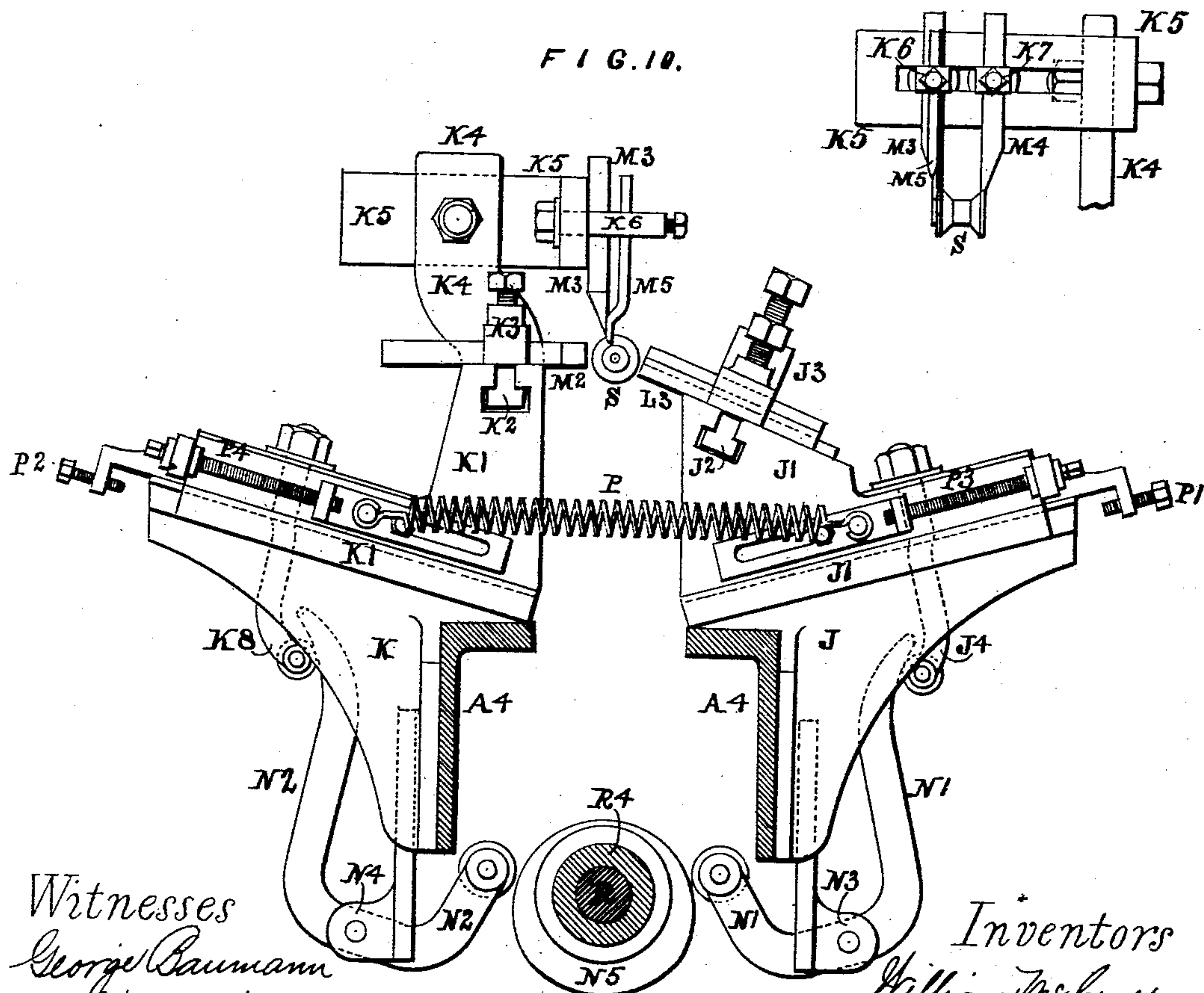
No. 541,379.

F I G. 9. Patented June 18, 1895.



F I G. 11.

F I G. 10.



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UNITED STATES PATENT OFFICE.

WILLIAM McCROSSAN AND JOHN PAUL, OF PAISLEY, SCOTLAND.

APPARATUS FOR MAKING SPOOLS OR BOBBINS.

SPECIFICATION forming part of Letters Patent No. 541,379, dated June 18, 1895.

Application filed December 20, 1893. Serial No. 494,231. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM McCROSSAN and JOHN PAUL, subjects of the Queen of Great Britain and Ireland, and residents of Paisley, in the county of Renfrew, Scotland, have invented certain Improvements in Lathes or Apparatus Used in Making Spools or Bobbins, of which the following is a specification.

This invention has for its object the making of spools or bobbins such as are used for spooling sewing thread or for similar purposes, and it comprises improved machinery, with two main separately operating parts on one framing, working in connection with each other, and having self-acting appliances.

In carrying out our invention the framing is made with a back part which is higher than the front part and which has on it mechanism for boring the wood blanks out of which the spools are to be made. From the boring mechanism the bored blanks are transferred to mechanism which is on the front part of the framing, and which forms the blanks into completely shaped spools.

An example of our improved machinery is delineated on five accompanying sheets of explanatory drawings which are hereinafter referred to in particularly describing the invention.

Figures 1 and 2, on Sheets 1 and 2 of the drawings, are respectively a front and a back elevation. Fig. 3, on Sheet 3, is an end elevation of the machine as viewed from the left hand of Fig. 1, and Fig. 4 is a vertical section as at right angles to Fig. 1. Figs. 5 to 12, on Sheets 4 and 5, are separate views of parts.

In the drawings the same reference letters are used to mark the same or like parts wherever they are repeated.

The framing consists of end frames, A', A², an intermediate standard, A³, and two pairs of horizontal longitudinal rails or frame pieces, A⁴, A⁵, one pair, A⁴, forming a bench or bed at the front of the machine, and the other pair a bench or bed at the back of the machine, the latter being at a higher level than the front bench. At the middle of the higher or back bench there is fixed a casting, B, made with two headstocks, B', B², carrying in suitable bearings, a boring spindle, B³, having fixed in clutches at its ends oppositely directed drills or borers, B⁴, B⁵. The boring spindle, B³, is

made to rotate continuously by means of a belt acting on a pulley, B⁶, fixed on the spindle; and it is moved on end alternately in opposite directions, by means of a bracket ring, B⁷, engaging in a groove in or between collars on the boss of the pulley, the bracket ring, B⁷, being fixed on a rod, B⁸, movable longitudinally in guide eyes in the headstocks, B', B², and actuated as hereinafter described.

Beyond the ends of the boring mechanism just described there are two headstock brackets, C', C², fixed to the back bench, A⁵, and carrying parts concerned in the feeding of the spool blanks, in the holding of them while being bored, and in the transferring of them to the shaping mechanism on the front bench, A⁴. One, C², of these brackets is shown enlarged in Figs. 5 to 8, on Sheet 4, of the drawings, Fig. 5, being a back view, Fig. 6, an inner face view, Fig. 7, an outer face view, and Fig. 8, a front view.

On a stud, C³, there is mounted a star wheel, D, that is, a disk having angular notches formed in its circumference and this wheel is made in one piece with or has fixed to it a ratchet wheel, D', which is acted upon by a pawl, D², jointed on a lever, D³, centered on a small block, D⁴, fixed to the bench. The pawl, D², is in the form of a bell crank and can be turned out of gear as shown in Fig. 6, when not wanted to act on and turn the ratchet wheel, D', being then kept out of gear by a weighted lever, D⁵, centered on the lever, D³.

The spool blanks which consist of cylindrical pieces of wood are put into an inclined chute or channel guide, E, and when the star wheel, D, is turned a step a blank which has from the guide, E, entered a notch in the wheel, is carried around into a position directly above the center of the wheel, in which position the axis of the blank coincides with the axis of the boring spindle, B³. The blank is guided and held in position by a curved guide, E', which is jointed to a lever, E², centered on an arm formed on the bracket, C², and drawn downward by a spring, E³, while an adjusting screw, E⁴, tapped through a piece fixed on the lever is added to act on the guide. The stud, C³, carrying the star wheel, D, is adjustable vertically by a screw, D⁶; and the lever, E², is prevented from depressing the curved guide, E', too far by an inverted screw, E⁵, the head

of which bears on the head of the screw, D⁶. The star wheel, D, is held steady in position while a blank is being bored, by means of a roller, D⁷, on a lever, D⁸, acted on by a spring, D⁹, which spring causes the roller to be pressed up into the notch of the star wheel which is lowest at the time. When the star wheel, D, turns to bring a fresh blank into position, it carries the previously bored one onward and eventually allows it to escape from under the curved guide, E', whereupon it descends down a chute or guide channel, E⁶, to the shaping mechanism on the front bench, A⁴. The movements of the boring mechanism are effected by means of cams or eccentrics as hereinafter explained.

On the front bench, A⁴, there are two sets of identical mechanism to deal with the two streams of bored blanks received from the back bench, A⁵. Each set comprises two castings, G, H, each made with two headstock bearings, G', G², H', H², and carrying one a turning spindle, G³, having on it a driving pulley, G⁴, and handwheel or flywheel, G⁵, and the other a follower spindle, H³, which is square and is movable longitudinally in its bearing. Fixed to the outer end of the follower spindle, H³, by a yoke, H⁴, there is a lower spindle, H⁵, working in guides in the headstocks, H', H², and having fixed at its inner end a small ring bracket, H⁶, which encircles the reduced inner end of the turning spindle, G³; and at a short distance from the bracket, H⁶, there is fixed on the spindle, H⁵, a small bracket, H⁷, which supports each bored blank when it descends by the chute, E⁶, into position for being shaped. The blank which passes under a spring guide, E⁷, at the lower part of its descent, rests on the support, H⁷, which then faces it, and then the small end of the follower spindle, H³, moving (toward the left hand as viewed in Fig. 1) enters one end of the bore of the blank, and moves the blank toward the end of the turning spindle, G³. The extreme reduced end of the turning spindle, G³, is made in a usual manner with angular corners which entering the other end of the bore of the blank make the blank turn with the spindle. After the turning tools, hereinafter described, have operated on the bored blank, the follower spindle, H³, and lower spindle, H⁵, return toward the right hand, and the ring bracket, H⁶, pushes the shaped spool off the turning spindle, G³, and the spool drops down into any convenient receptacle which may be placed to receive it.

The turning tools and their holders and slides, which are to some extent similar to existing apparatus for the same purpose, are shown, enlarged, on Figs. 9, 10, and 11, on Sheet, 5, of the drawings, Fig. 9, being a plan, Fig. 10, a cross-sectional elevation corresponding to Fig. 9, and Fig. 11, a front elevation of some higher parts shown in Fig. 10, but not in Fig. 9. It may here be mentioned that in Fig. 1, the front only of one tool slide, J', is

shown, without the tools and other parts shown in Figs. 9, 10, and 11.

Brackets, J, K, bolted to the bench frames, A⁴, are formed with angular guide edges which are inclined downward toward the middle of the bench (or they might be horizontal) and have fitted on them slides, J', K', formed with T-grooves for the heads of screw bolts, J², K², by which are fixed on the slides tool holders, J³, K³, with cutters or tools, L', L², L³, M', M². The inner slide, K', is also formed with an upwardly extending arm, K⁴, to which is bolted a slotted plate, K⁵, having fixed to it tool holders, K⁶, K⁷, with cutters or tools, M³, M⁴, M⁵. The slides, J', K', have fixed to them and passing through slots in the slides and in the guide brackets J, K, arms, J⁴, K⁸, with anti-friction rollers at their bottom ends by means of which the slides are moved on their guides. The arms, J⁴, K⁸, are acted on by curved levers, N', N², centered on brackets, N³, N⁴, bolted to the bench frames, A⁴, and provided with anti-friction rollers at their inner ends which are acted on each by a rotating cam, N⁵. The slides, J', K', are connected by springs, P, or each slide may be connected by separate springs to the opposite bracket, J, K, the extent of the inward movements being limited by adjustable stop screws, P', P², which, fitted to lugs formed on the slides, encounter the ends of the guide brackets, J, K. The parts to which the springs, P, are connected are also adjustable by means of screws, P³, P⁴.

In Figs. 9, 10, and 11, a spool, S, is shown as completely shaped. When a bored blank is in position for being turned, the front slide, J', moves inward and the cutters, L', L², L³, carried by that slide shape the barrel and coned parts of the spool, and give a first cut to the end faces. The inner slide, K', then moves inward and the cutters M', M², give a finishing cut to the end faces; and the upper cutters, M³, M⁴, shape the edges of the end disks while the cutter, M⁵, finishes the shaping of the boss on one of the end faces.

Having hereinbefore described the construction and operation of the parts immediately acting on the spool blanks, the arrangement and operation of the driving gearing and remaining parts will be the more readily understood.

Extending longitudinally under the front bench, A⁴, there is a first motion shaft, R, having at one end fast and loose pulleys, R', for a driving belt. On this shaft, R, are cams, N⁵, already referred to as for moving the shaping-tool slides, J', K', and there are also on the shaft, R, cylindrical grooved cams, R², which act on levers, R³, centered on the castings, H, and which are connected to and move the follower spindles, H³, the connections being adjustable to suit different sizes of spool. These cams, R², and, N⁵, are fixed on tubular shafts, R⁴, which are loose on the shaft, R, being engaged therewith by means of clutches, R⁵,

moved by forked levers, on shafts, R⁶, having hand levers, R⁷, on them both at the front and at the back of the machine for conveniently putting the parts out of or into gear.

5 When the clutches, R⁵, are disengaged the tubular shafts, R⁴, or either of them can be turned into any required position by means of handwheels, T, on transverse shafts, T', having on them wheels, T², with inclined teeth
10 which gear with similarly toothed wheels, T³, formed on or fixed to the cylindrical cams, R². With these arrangements either of the two sets of parts on the front bench, A⁴, may be worked alone or both sets may be worked at
15 the same time. The first-motion shaft, R, by a bevel wheel, R⁸, gearing with a bevel wheel, U, drives a transverse shaft, U', which has on it beneath the back bench, A⁵, a grooved face cam, U²; and this cam acts through an anti-
20 friction roller at, U³, on a lever, U⁴, centered at, U⁵. The upper end of the lever, U⁴, is connected by a link, U⁶, to an arm, U⁷, fixed on the rod B⁸, hereinbefore described as moving the boring spindle, B³, on end. The lever, U⁴, has
25 fixed to its upper and lower ends a bar, U⁸, having the cam, U², between it and the lever; and the lower end of the lever, U⁴, is made with curved arms, V', V², which act alternately, each on a lever, V³, V⁴. Each lever, V³,
30 V⁴, is connected by a rod, V⁵, V⁶, (made with a right-and-left screw coupling for adjustment as to length) to each lever, D³, hereinbefore described as for acting on the ratchet wheel, D', so as to turn the star wheel, D, of the bor-
35 ing mechanism. The boring spindle, B³, reciprocates longitudinally, and while one end is boring a blank, the star wheel is being turned at the other end to bring a fresh blank into position for being bored.

40 If when operating on only one series of spool blanks it is considered desirable to put out of gear the mechanism for turning the inoperative star wheel, D, provision may be made for doing so by modifying the lever, U⁴,
45 and parts acted on by it, in the manner indicated in Fig. 12, on Sheet 4, of the drawings. The arm, V', instead of acting on a pin fixed in the lever, V³, act on a pin on a link, V⁷, which is jointed to that lever, and which has
50 its upper end connected by an adjustable link, V⁸, to a lever on the transverse shaft, R⁶, hereinbefore referred to as for putting the shaping mechanism on the front bench out of or into gear. The end of the lever arm, V',
55 is made with a downward projection to prevent the pin on the link, V⁷, from getting under the arm when the link is moved to place the pin beyond the end of the arm in putting the parts out of gear.

60 A machine may be made with one half of the parts which act immediately on the spool blanks for dealing with one stream only of

blanks; or a machine may be made with repetitions of the parts so as to deal with three or more streams of blanks.

What we claim is—

1. A machine for making spools or bobbins, having a front bench and a back bench at a higher level, with boring mechanism and a rotary star-wheel to carry the blanks, mounted
70 upon said upper back bench, in combination with turning and shaping mechanism upon the lower front bench and an inclined channel through which the bored blanks pass automatically from the star wheel to the turn-
75 ing and shaping mechanism, substantially as described.

2. In a machine for making spools or bobbins, the combination of boring mechanism, with a feed chute, a star wheel to carry the
80 blanks, devices for turning said wheel intermittently, a spring-pressed curved guide adjacent to the said wheel to guide the spools as the star-wheel rotates and adjusting screws to determine the relation of the guide to the
85 wheel, substantially as described.

3. In a machine for making spools or bobbins, the combination of boring mechanism with a feed chute, a star-wheel to carry the
90 blanks, devices to turn said wheel intermittently, a spring-pressed pivoted lever, a curved guide for the wheel adjustable on said lever and adjusting screws to determine the relation of the guide to the wheel, substantially as described.

4. In a machine for making spools or bobbins, the combination of a feed channel for the bored blanks with turning and shaping devices including a turning spindle and fol-
100 lower spindle and mechanism to move the latter to carry the blank to the turning spindle, and a bracket carried by and moving with the follower spindle to receive each blank from the said channel, substantially as de-
105 scribed.

5. In a machine for making spools or bobbins, the combination of turning tools and means for advancing and retracting the same with a feed channel for the blanks, a rotary turning spindle, a follower spindle and means
110 for reciprocating the latter, a spindle connected and moving with the follower spindle and carrying a bracket to receive each blank from the channel and also a doffing bracket, all substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses:

WILLIAM McCROSSAN.
JOHN PAUL.

Witnesses:

EDMUND HUNT,
DAVID FERGUSON.