

(No Model.)

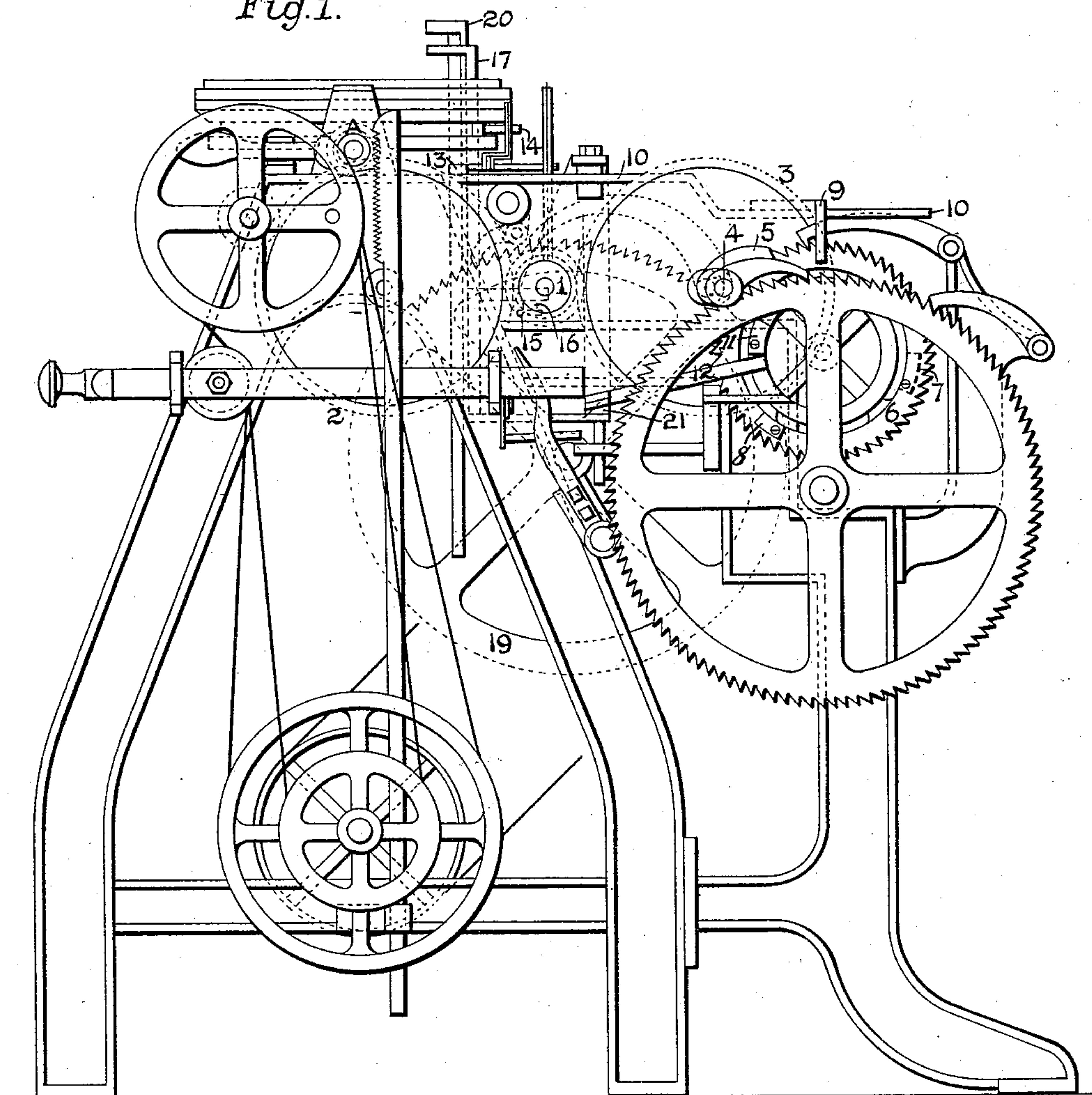
5 Sheets—Sheet 1.

W. S. WARD & H. F. LANCASHIRE.
CIRCULAR KNITTING MACHINE.

No. 488,100.

Patented Dec. 13, 1892.

Fig. 1.



Witnesses:
J. W. Gough
Jno. B. Gough.

William S. Ward - Inventors.
Herbert Francis Lancashire.

(No Model.)

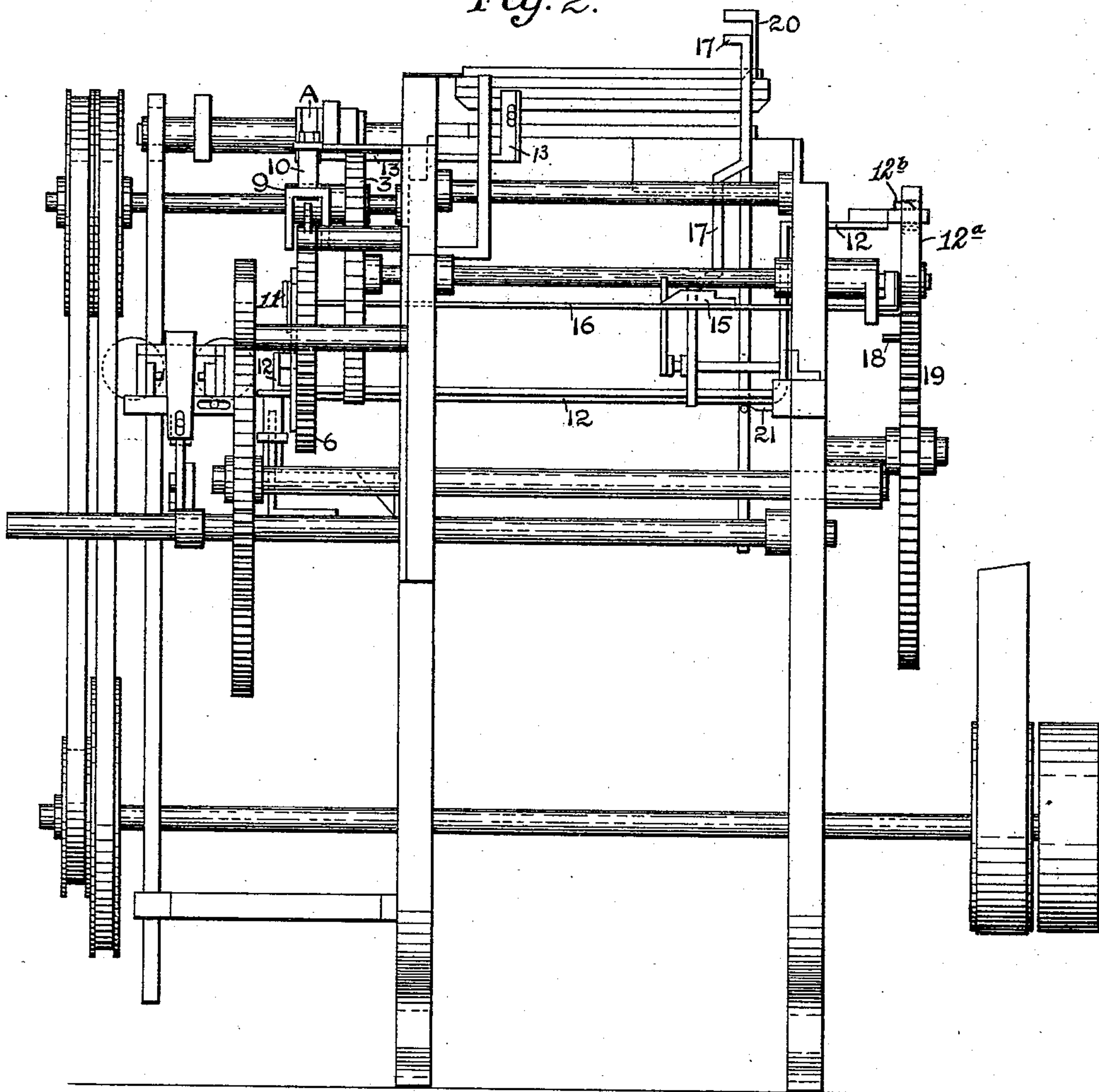
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Fig. 2.



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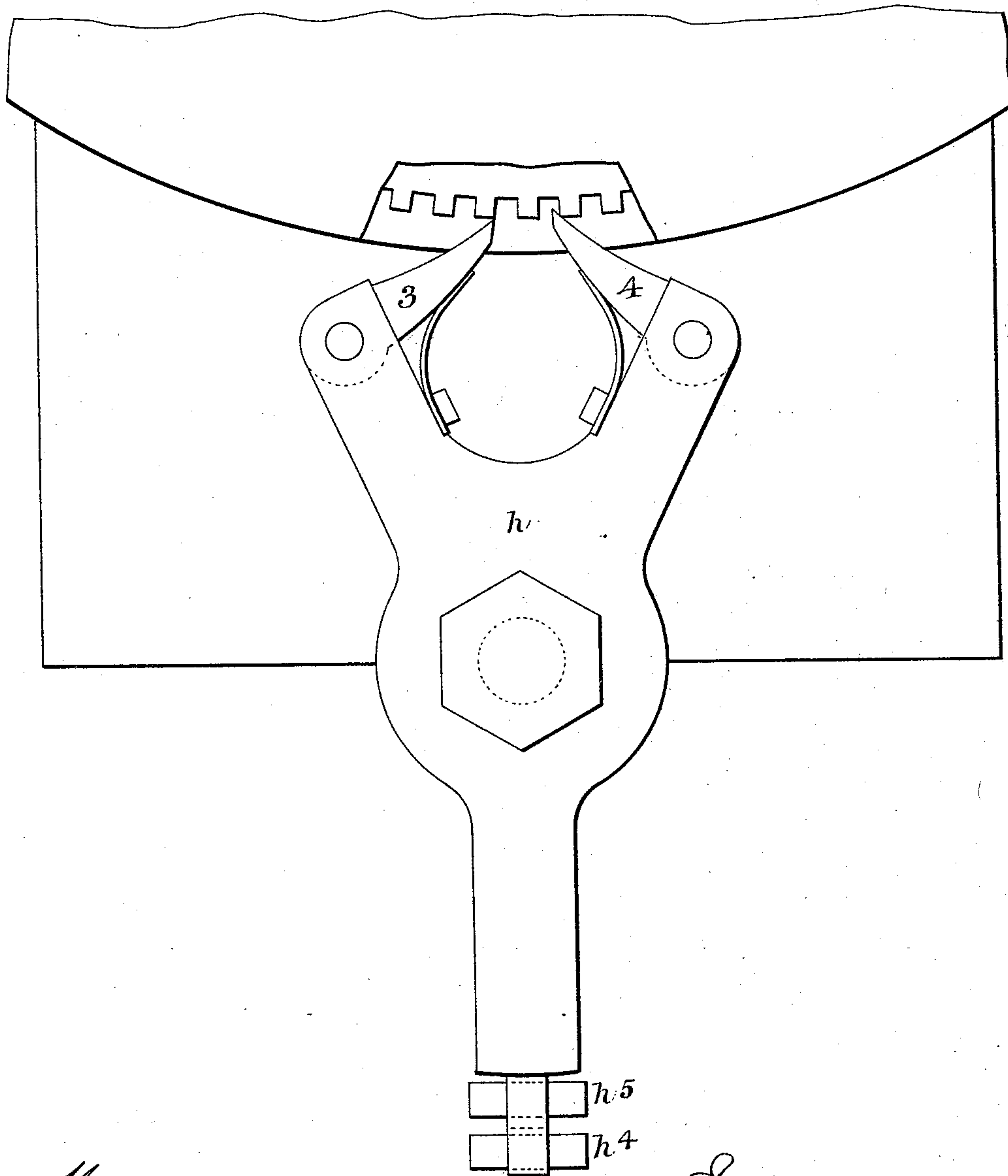
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Fig. 3.



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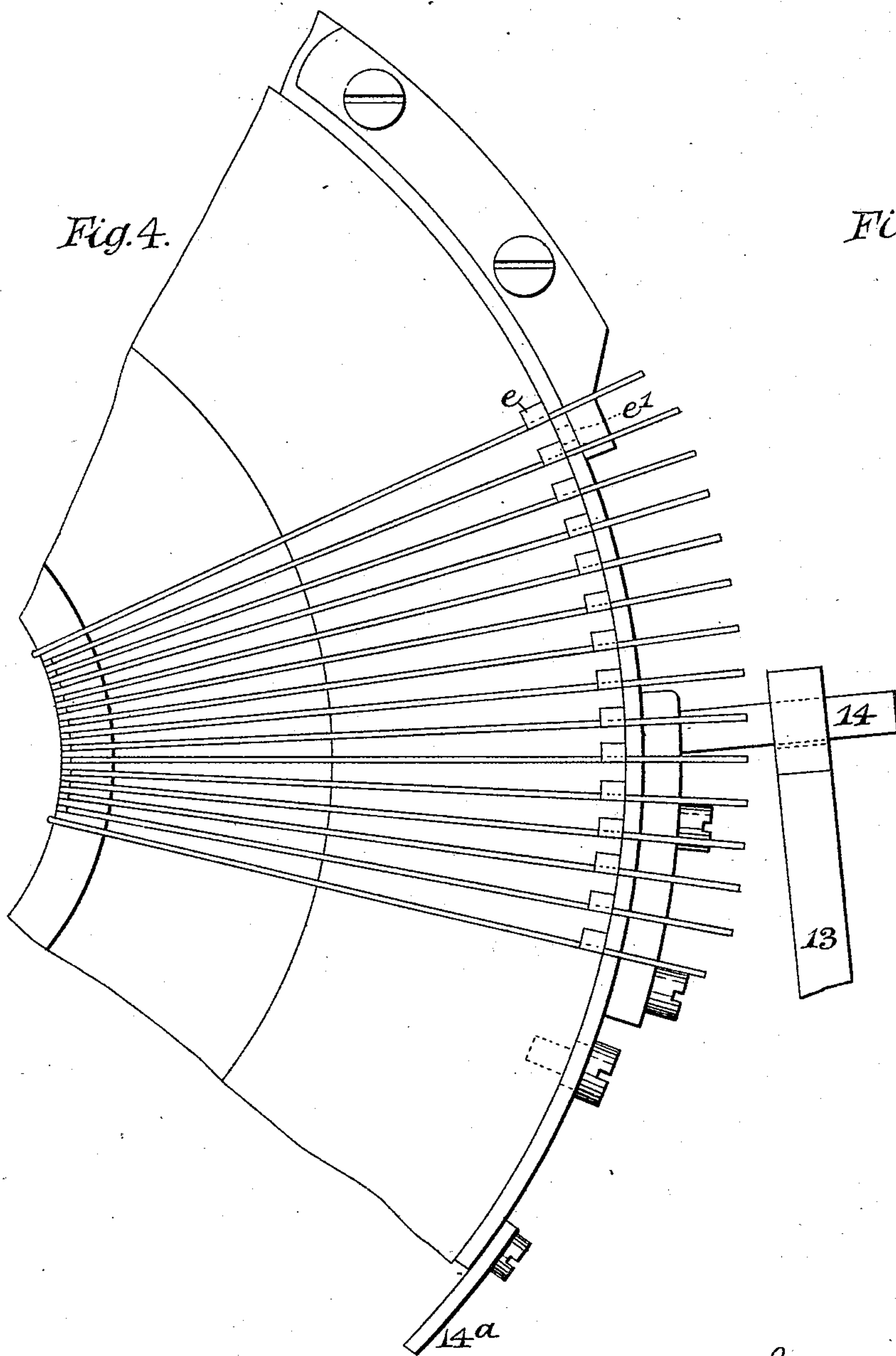
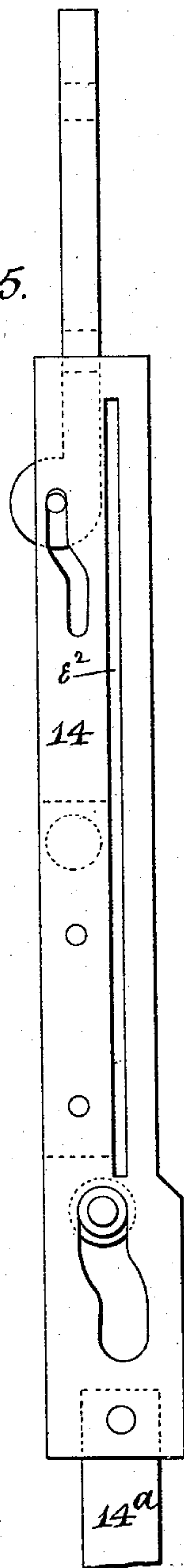


Fig. 5.



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(No Model.)

5 Sheets—Sheet 5.

W. S. WARD & H. F. LANCASHIRE.
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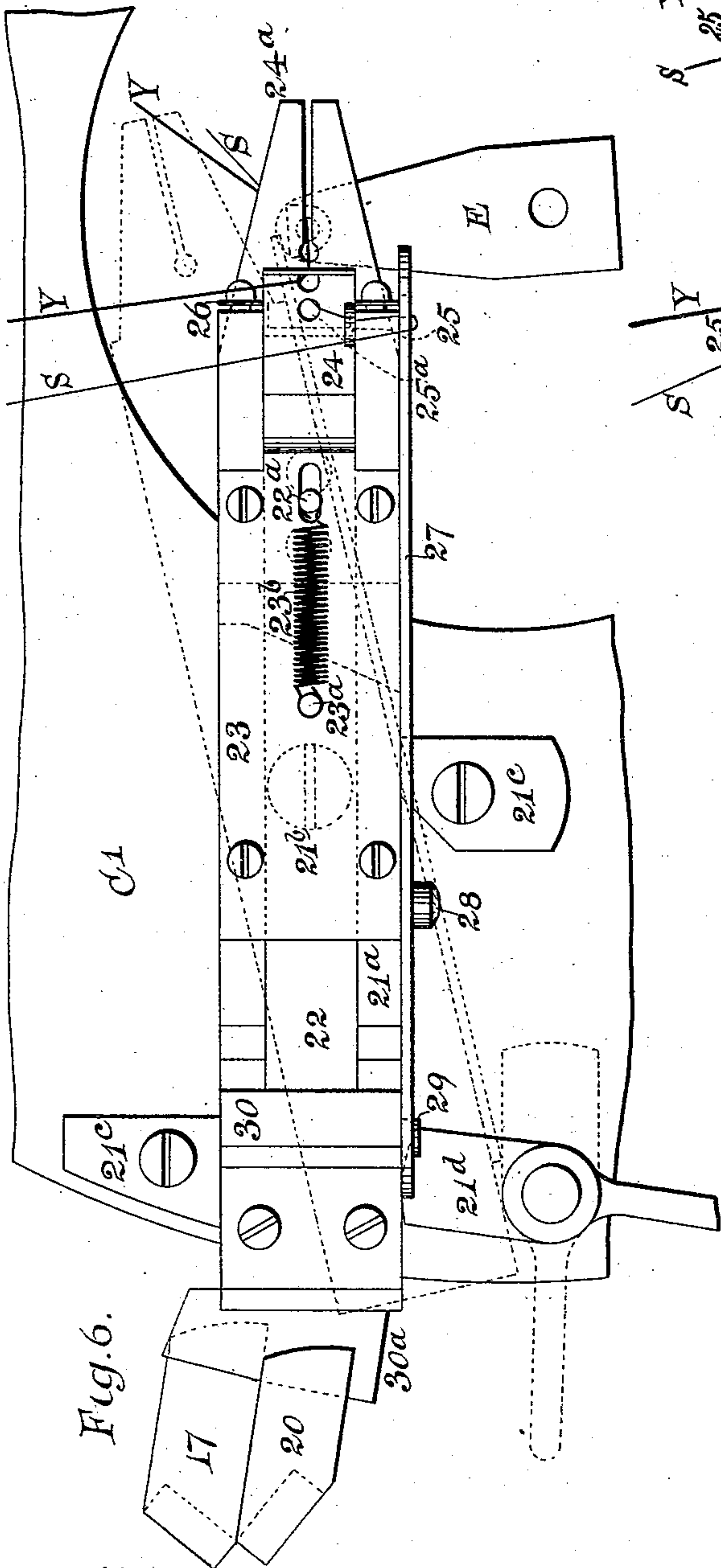


Fig. 6.

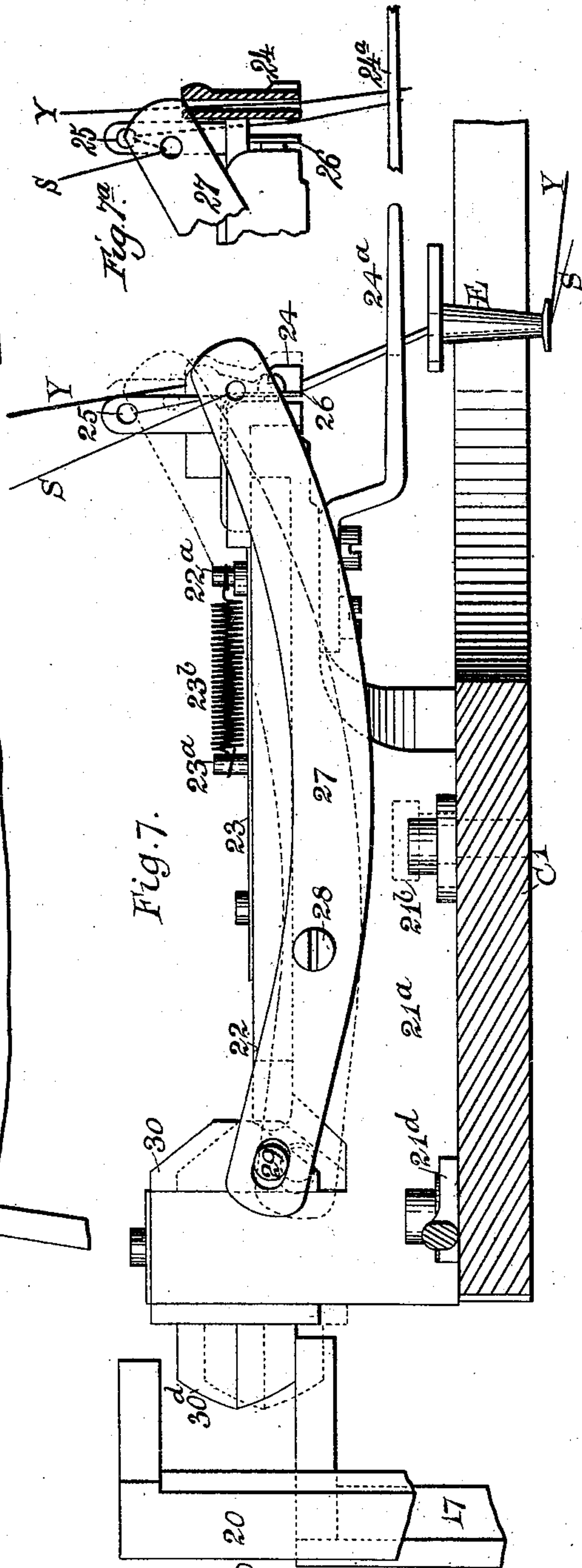


Fig. 7.

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UNITED STATES PATENT OFFICE.

WILLIAM SAMUEL WARD AND HERBERT FRANCIS LANCASHIRE, OF NOTTINGHAM, ASSIGNORS TO ISAAC LOVELL BERRIDGE, OF LEICESTER, ENGLAND.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 488,100, dated December 13, 1892.

Application filed January 29, 1892. Serial No. 419,721. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM SAMUEL WARD, factory manager, and HERBERT FRANCIS LANCASHIRE, manager, both in the employment of James Blount Lewis and Sons, hosiery manufacturers, of Nottingham, England, both subjects of the Queen of Great Britain, and residents of Nottingham, England, have invented certain new and useful
10 Improvements in Circular-Knitting Machines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 shows a side view of a circular-knitting machine known as the "Aiken" machine with our improved apparatus applied thereto. Fig. 2 shows a back view of the machine and improved apparatus. Fig. 3 is a detail view of mechanism for raising and lowering the needles when narrowing the heel and toe in the usual manner. Fig. 4 is a partial plan view of the slide and the link for traversing the same. Fig. 5 is an inner side view of one of said slides. Fig. 6 is a plan,
25 and Fig. 7 a side view, of the parts with which the rods 17 and 20 co-operate. Fig. 7^a is a detail view of the yarn-guide and parts adjacent thereto.

In both views the cylinder carrying the latch-needles and other parts is omitted, sufficient being shown to illustrate our invention. The improved apparatus consists of the following parts:

Instead of operating the reversing clutch-boss A of circular-knitting machines known as the "Aiken" by hand, we employ an intermediate-toothed wheel 1 (shown only at Fig. 1) to connect the usual main driving-wheel 2 of the machine with a third toothed
40 wheel 3 of the same diameter as the main driving-wheel. The third wheel is provided with an eccentric-pin 4, carrying a driver 5, engaging with the ratchet-teeth of a fourth wheel 6, provided with two cams 7 and 8, each
45 of which alternately engages with a forked stud 9, carried by the back end of a rocking lever 10. The front end of the lever carries a stud, which takes into the groove of the reversing clutch-boss A. The cam 7 throws the
50 boss outward while the heel and toe of the hose or half-hose are being made, and the

cam 8 throws the boss inward while making circular work.

The wheel 6 is provided with a third cam 11, which starts the usual narrowing apparatus in the following manner: when the rod is as shown at Fig. 2, its right-hand end, which is provided with a cam-lug 12^b to enter a corresponding recess in the driver 12^a, holds the driver 12^a clear of the narrowing-wheel 19 to
60 prevent it being racked tooth by tooth; but when the cam 11 moves the rod 12 to the left the cam-lug 12^b is moved out of the recess in the driver 12^a and the latter drops and engages with the teeth of the narrowing-wheel
65 19 and racks it round, causing the pins it carries to rock one or the other of the levers *h*⁴ *h*⁵ to vibrate the levers carrying the pawls 3 and 4, (shown at Fig. 3,) which cause the segments to raise and lower the needles when
70 narrowing the heel and toe in the usual way. The rocking lever 10 is also provided with a link 13 for traversing the slide 14, usually employed to lower the needles placed out of work while the narrowings are being made,
75 as shown in Figs. 4 and 5. The pin *e*¹ of each needle-shifter enters the groove *e*² of the slide 14. There are two such slides connected by a strip 14^a, as in the hereinbefore-mentioned
80 Aiken machine, to lower the needles placed out of work while the narrowings are being made.

To prevent the usual splicing-thread from running in when not required, we employ a cam-bit 15, carried by a horizontally-sliding
85 rod 16, the cam-bit raising a vertical rod 17 to retain the thread, the sliding rod being actuated by a stud 18, carried by the usual narrowing-wheel 19 at the left-hand end of the machine, and the sliding lever 12 also
90 carries a cam-bit 21, (shown only at Fig. 2,) which lowers a vertical rod 20 in the usual way to release the splicing-thread, as required when making the heels and toes of hose or half-hose.

The parts with which the rods 17 and 20 co-operate are shown in plan at Fig. 6 and in side view at Fig. 7 and consist of a yarn and splicing-thread guide-bracket 21^a, swiveled
95 by a stud 21^b to the top of the cam-plate C', the bracket when at work being held in the position shown at Fig. 6 by two fixed stops
100

21^c and a movable stop 21^d. This stop when turned to the position shown by the dotted line allows the yarn-guide end to be turned outward to give the attendant easier access to the needles.

The bracket is grooved at the top to receive a sliding bolt 22, held in the groove by a plate 23, slotted at its inner end to allow of the traverse of a stud 22^a, carried by the bolt 22, one end of a coiled spring 23^b being hooked on the stud, the other end being hooked on a stud 23^a, projecting from the plate 23. The inner end of the bracket carries a thin plate 26 and the inner end of the sliding bolt carries a yarn and splicing-thread guide 24 and a splicing-thread guide 25. A splicing-thread-guide plate 27 rocks vertically on a stud 28, secured in the side of the bracket, the guide-plate being slotted near its outer end to engage with a stud 29, projecting from an inclined piece 30, which slides vertically in a slot at the outer end of the bracket 21^a and terminates at the outer end in a wedge-shaped piece 30^a. The upward movement of the pieces 30 and 30^a is effected by the rod 17 being raised by the cam-bit 15 and their downward movement by the rod 20 being lowered by the cam-bit 21.

The yarn and splicing-thread guides operate as follows: The yarn Y is passed from a bobbin or cop to and through the hole nearest the end of the guide 24, then through the slot of a guide-plate 24^a, secured to the under side of the bracket 21^a, down to and through the usual yarn-guide E, carried by the cam-plate C', which feeds the yarn to the needles in the usual way. The splicing-thread S is passed through a hole near the inner end of the guide-plate 27, through the guide 25, and through a hole 25^a, passing down between the yarn-guide 24 and the plate 26 through the slot in the plate 24^a down to and through the usual yarn-guide E with the yarn Y to the needles when required for splicing. The yarn Y and splicing-thread S both run free to the needles together when the guide-plate 27 is held in the position shown by the dotted lines in Fig. 7 and full lines in Fig. 7^a, in which it is held by the lowering of the pieces 30 and 30^a by the rod 20, operated by the cam-bit 21. When the splicing-thread is not required, upon the pieces 30 and 30^a being raised by the rod 17 the outer end of the sliding bolt 22 is held up to the under side of the wedge-piece 30 by the spring 23^b, causing the splicing-thread S to be firmly held between the plate 26 and the lower end of the yarn-guide 24, as shown at Fig. 7, causing the splicing-thread to be broken off at the needles, but allowing the yarn to run free.

In Fig. 7^a we have shown the position of the guide-plate 27 when the yarn-guide 24, which is shown in section, is held clear of the plate 26 by the piece 30 being lowered, leaving the splicing-thread free to run with the yarn Y to the needles when splicing.

By means of apparatus above described, operating in combination with a circular-knitting machine known as the "Aiken" machine, hose or half-hose may be made automatically without stopping the machine.

What we claim is—

1. In a circular-knitting machine, the combination, with a clutch-boss A, of a main driving-wheel 2, a toothed wheel 3, a toothed wheel 1, connecting said wheels 2 and 3, an eccentric-pin 4 on the wheel 3, a driver 5, carried by said pin, a toothed wheel 6, driven by the driver 5, cams 7 and 8, carried by the wheel 6, and a lever 10, one end of which engages the clutch-boss A and the other end of which carries a stud 9, engaging with the cams 7 and 8, substantially as described.

2. In a circular-knitting machine, the combination, with a ratchet-wheel 19, of a driver 12^a, a sliding bar 12, one end of which engages said driver, and a wheel 6, having a cam 11 to engage the other end of the sliding bar 12 to throw the driver in the proper direction to start the ratchet-wheel, substantially as described.

3. In a circular-knitting machine, the combination, with a slide 14, of a wheel 6, carrying a cam, a lever 10, carrying a stud for engaging said cam, and a link 13, carried by said lever 10 for automatically traversing said slide to lower the needles, substantially as described.

4. In a circular-knitting machine, the combination, with a narrowing-wheel, of a stud 18, carried by said wheel, a sliding rod 16, operated by said stud, a cam-bit 15, carried by the sliding rod 16, and a vertical rod 17, raised by said cam-bit 15 to prevent the splicing-thread running in when not required.

5. In a circular-knitting machine, the combination, with a sliding rod 12, of a cam-bit 21, carried thereby, and a vertical rod lowered by said cam-bit, substantially as and for the purpose described.

In testimony whereof we have hereunto signed our names in the presence of two subscribing witnesses.

WILLIAM SAMUEL WARD.
HERBERT FRANCIS LANCASHIRE.

Witnesses:

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JNO. H. GOUGH.