

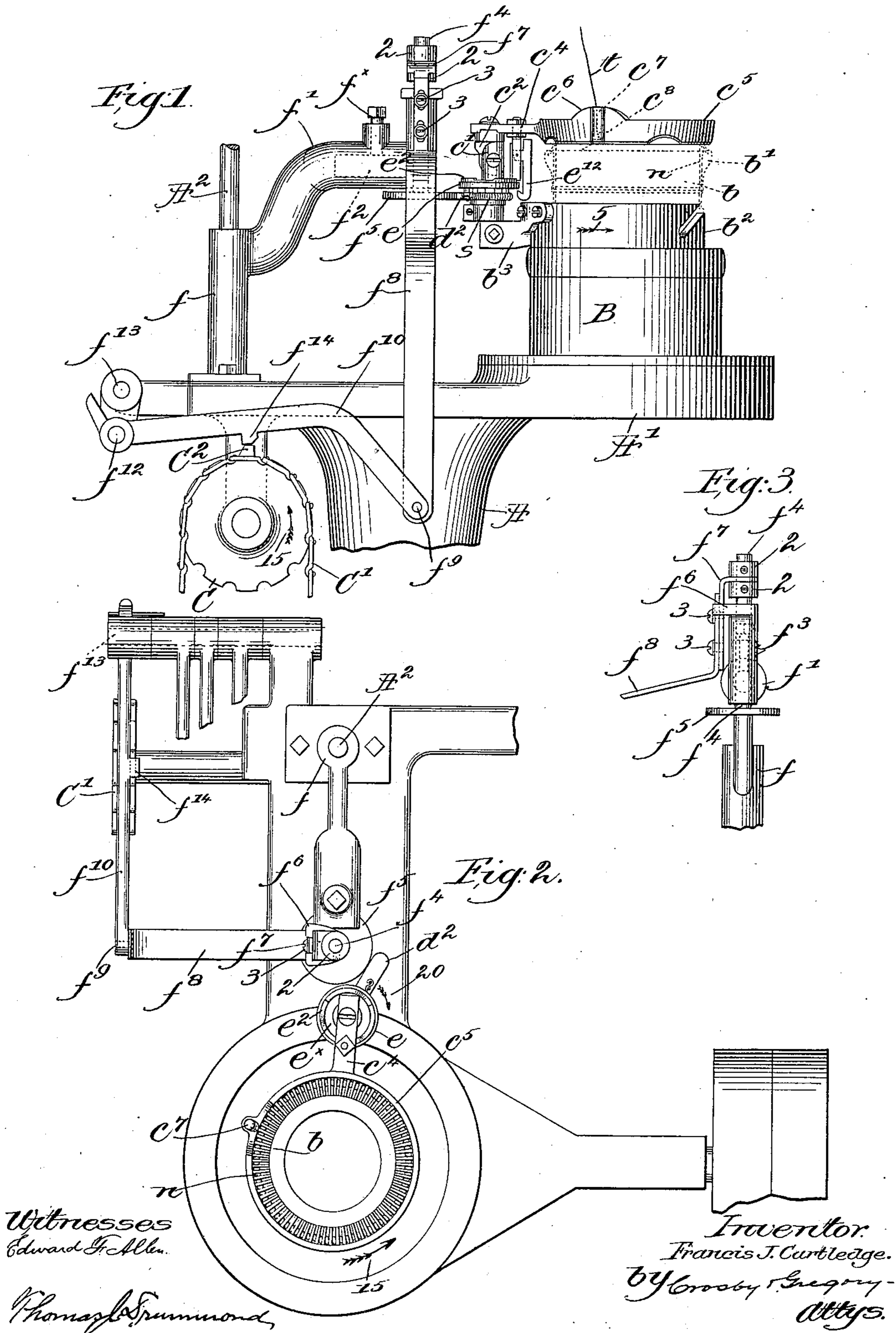
(No Model.)

2 Sheets—Sheet 1.

F. J. CARTLEDGE.
KNITTING MACHINE.

No. 566,965.

Patented Sept. 1, 1896.



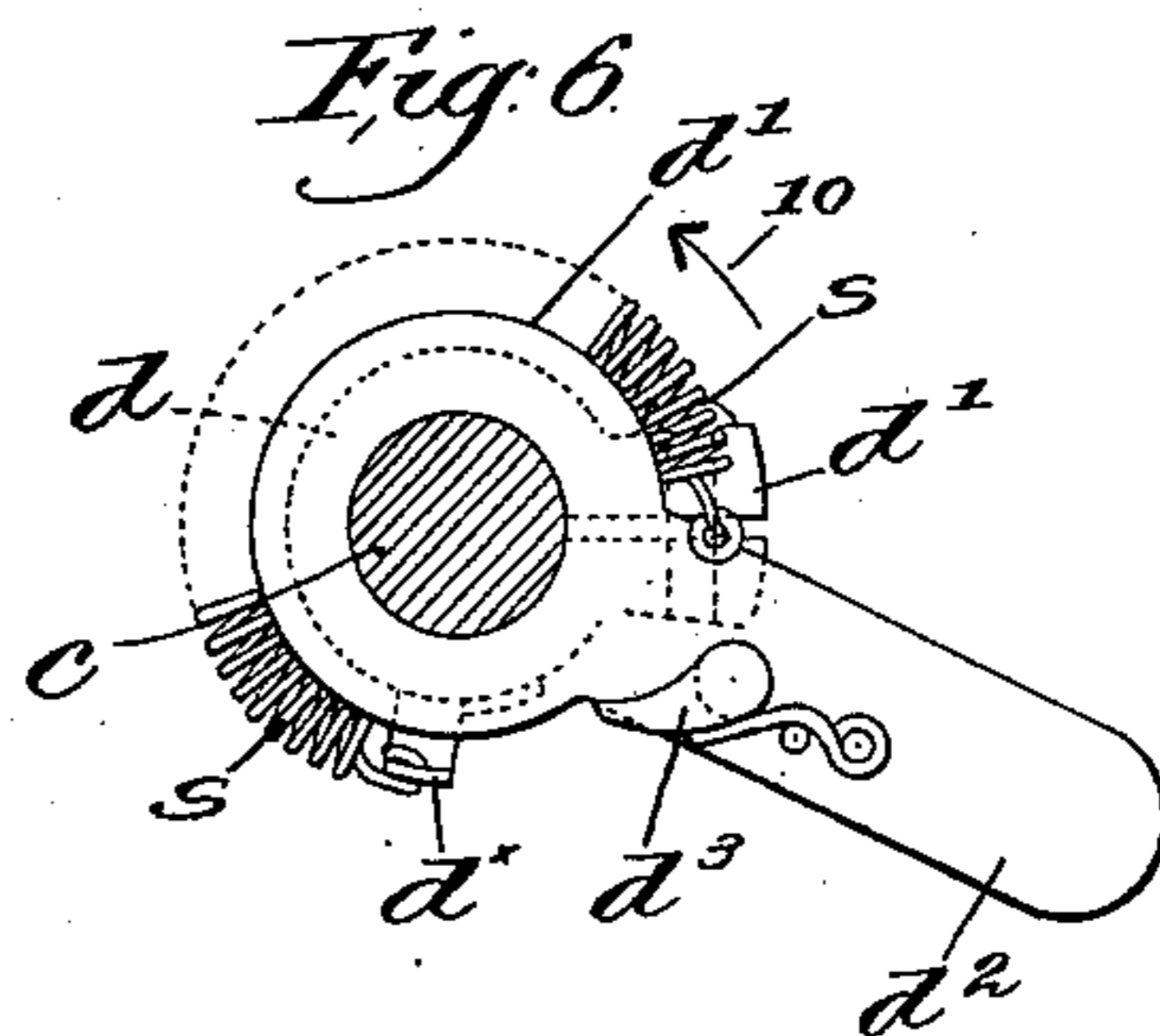
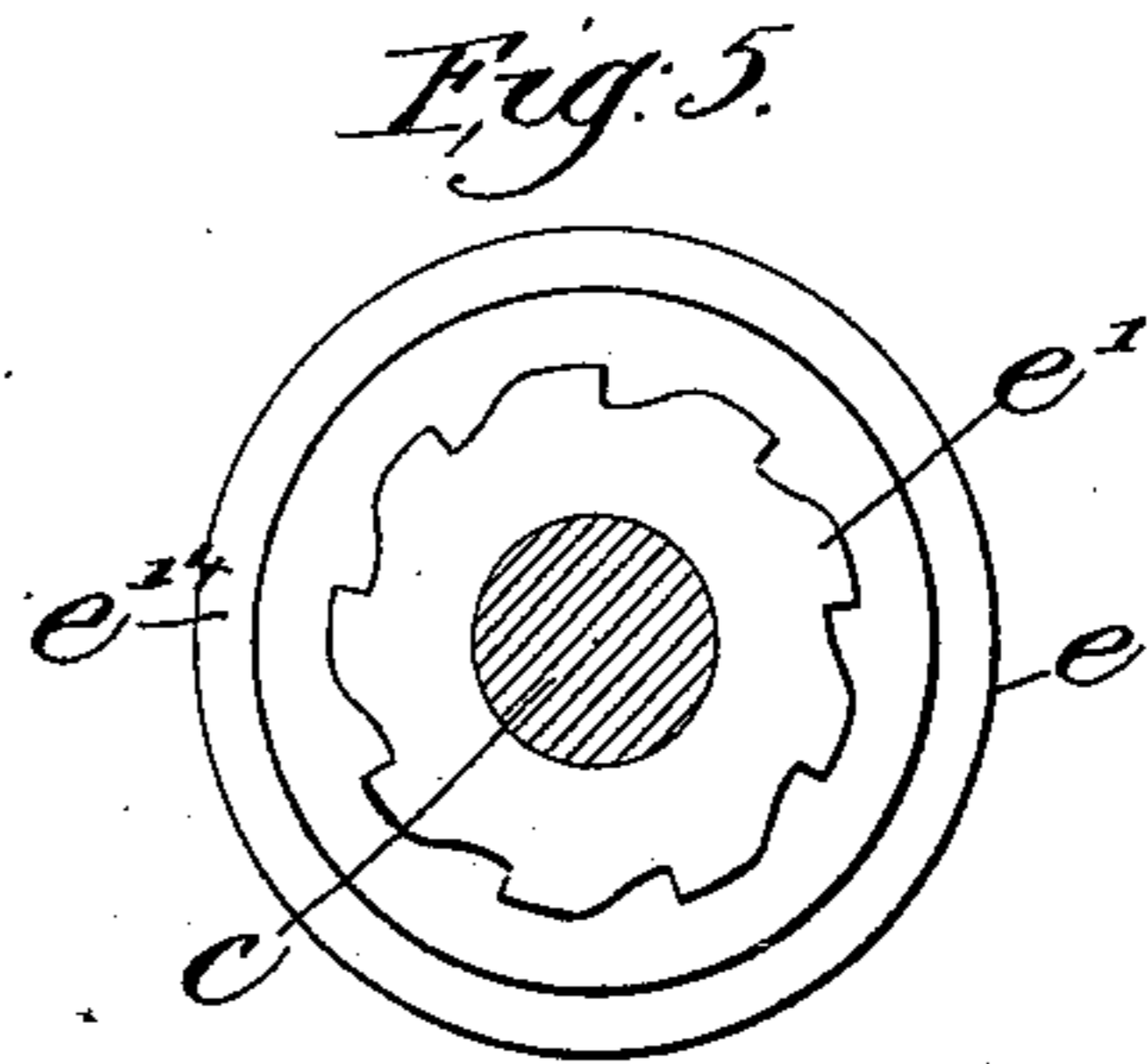
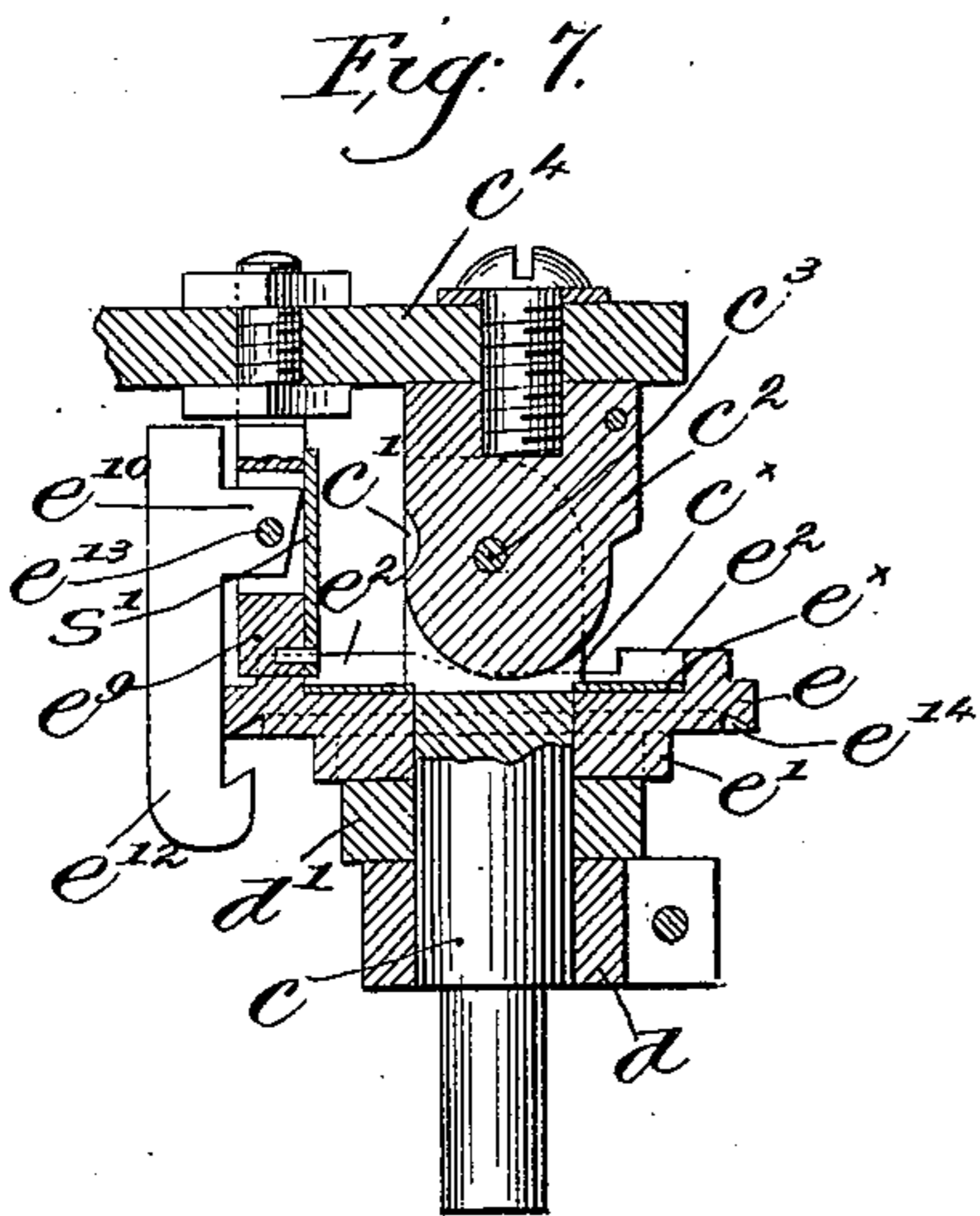
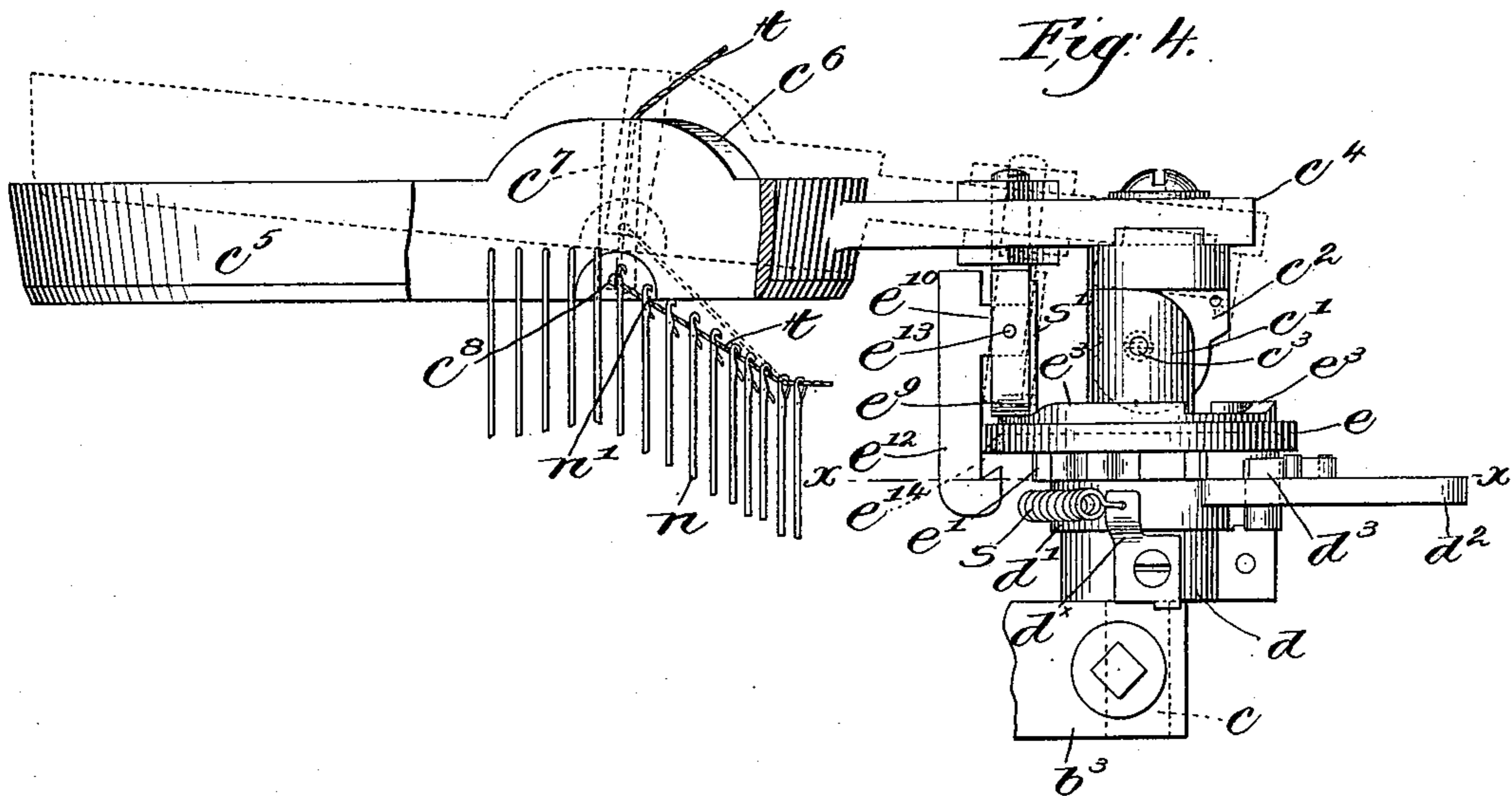
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2 Sheets—Sheet 2.

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KNITTING MACHINE.

No. 566,965.

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Witnesses

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UNITED STATES PATENT OFFICE.

FRANCIS J. CARTLEDGE, OF IPSWICH, MASSACHUSETTS.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 566,965, dated September 1, 1896.

Application filed September 23, 1895. Serial No. 563,315. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS J. CARTLEDGE, of Ipswich, county of Essex, State of Massachusetts, have invented an Improvement in Knitting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In the production of seamless hosiery machines have been devised for knitting a series of stockings one after another from a continuous yarn or thread, and means have been provided for automatically stopping the mechanism when a stocking is topped off, in order to permit its removal before the knitting of the next stocking is begun. The operator is obliged, however, to start the machine for each stocking, and when one attendant is running several machines, as is generally the case, the finishing of a stocking at about the same time on two or more machines stops them and they must remain idle until the attendant can get around to them to start them up.

This invention relates to circular-knitting machines of the general class referred to, and has for its object the production of means whereby the machine can be run continuously, means being provided to automatically withdraw the yarn or thread from engagement by the needles when a stocking is finished or run off and to thereafter throw the yarn or thread onto the needles automatically to begin the knitting of the next stocking.

By means of my invention the stockings are connected one to the other by a length of the yarn or thread, and as the entire operation of the machine is automatic the attendant can run more machines than is now possible and the output of each machine is increased.

In accordance therewith my invention consists in a knitting-machine constructed as will be hereinafter fully described in the specification and particularly pointed out in the claims.

Figure 1 is a side elevation of a sufficient portion of a circular-knitting machine to be understood with my invention applied thereto, the usual yarn or thread tension device being omitted. Fig. 2 is a top or plan view of the apparatus shown in Fig. 1. Fig. 3 is a detached detail view of the actuator for the

thread-controlling mechanism. Fig. 4, on an enlarged scale and partially broken out, shows in full lines the normal position of the thread-guide and in dotted lines the position thereof when the actuator has caused it to be moved to carry the thread out of engagement with the needles. Fig. 5 is an under side view of the ratchet-wheel forming a part of the thread-controlling mechanism, taken above the line xx , Fig. 4. Fig. 6 is a top or plan view of the cooperating pawl and pawl-carrier, taken below the line xx ; and Fig. 7 is a vertical sectional view of the thread-guide-controlling mechanism shown in Fig. 4.

I have herein shown my invention applied to what is commonly known as a "Scott & Williams automatic seamless-hosiery machine," the upper portion of the standard A, head A' , needle-cylinder support B, pattern-wheel C, pattern surface or chain C' , moved thereby, and the rod A^2 , for the tension devices, being shown substantially as in such machines, the actuating devices for the needle cam-cylinder and pattern-wheel forming no part of this invention and being of usual construction in such machines.

In Fig. 1 the needle-cylinder b , latch-needles n , and sinkers b' are indicated only by dotted lines, the needle cam-cylinder b^2 being rotated about the needle-cylinder in the direction of the arrow 5, Figs. 1 and 2, in usual manner to raise and lower the needles. A bracket b^3 is secured to the exterior of cam-cylinder b^2 , projecting outwardly therefrom and supporting rigidly a post or stud c , bifurcated or forked at its upper end at c' to receive therein an ear c^2 , pivoted at c^3 and firmly secured to a projection or arm c^4 of a ring c^5 , which in normal position is held just above the needle bed or cylinder b , the needles rising within the ring at such time, as shown in Fig. 4. The ring is enlarged at c^6 and has made therein a thread or yarn guide c^7 , opening in the inner wall of the ring at c^8 (see full lines, Fig. 4) in the plane of the throats n' of the needles when the ring is in normal position and the needles raised, rotation of the ring with the cam-cylinder carrying the yarn or thread t around and presenting it to the needles one after another when the knitting is in progress.

I have shown a collar d clamped upon the

stud c above the bracket b^3 , and resting on the collar is a pawl-carrier d' , fulcrumed on the stud, the pawl-carrier having a projecting arm d^2 for a purpose to be described. A spiral spring s is attached at one end to the pawl-carrier and carried around the hub thereof to a stand d^x , (shown as secured to the collar d ,) the other end of the spring being attached to the stand, so that the spring tends to turn the pawl-carrier in the direction of the arrow 10, Fig. 6. Above the pawl-carrier I have mounted loosely on the stud c a disk e , provided with ratchet-teeth e' , adapted to be engaged by a spring-controlled pawl d^3 , mounted on the pawl-carrier, while on the upper face of the disk I have formed a series of cams e^2 , three being shown, having each a gradual rise, a dwell, and a quick drop, as clearly shown in Figs. 4 and 7. Movement of the pawl-carrier opposite to the arrow 10 will rotate the disk in the same direction, the spring s returning the pawl-carrier into position to engage other teeth of the ratchet e' , such step-by-step rotation of the disk gradually moving the cams e^2 thereon beneath a given point one after another. A washer e^x , beneath a shoulder c^x of the stud c , acts as a friction-brake on the disk to prevent overrunning, and also prevents the disk e from rising on the stud, as best shown in Fig. 7.

To the arm e^4 of the guide-ring is secured a depending foot e^9 in the path of movement of the cams e^2 and slotted to receive an arm e^{10} of a hooked latch e^{12} , pivoted at e^{13} , its hooked end extending beneath the periphery of the disk e and held against it by a flat spring s' .

When the disk e is in the position shown in Figs. 4 and 7, the foot e^9 rests on the low part of a cam e^2 , but when the disk is rotated, as described, the foot will gradually be raised by the ascending portion of the cam, tipping the ring c^5 on its fulcrum c^3 into dotted-line position, Fig. 4, so that the end c^3 of the thread-eye c^7 will be above the tops of the needles n and they cannot engage the thread or yarn as the ring is rotated with the cam-cylinder. As soon as the disk e has been rotated to permit the foot e^9 to drop off from a cam e^2 the ring will resume its normal position and feed of the thread to the needles will be resumed to begin to knit. The latch e^{12} catches beneath the disk e when the ring is raised and prevents undue lifting thereof, and I prefer to annularly groove the under side of the disk, as at e^{14} , to engage the hook of the latch and prevent displacement thereof.

From the foregoing description it will be obvious that if the ring c^5 is raised when a stocking is completed and to be run off the needles a length of thread will be drawn off and maintained out of engagement with the needles when the stocking has been run off, and when the ring is moved back into normal position knitting will be resumed to begin a new stocking, so that two adjacent

stockings will be separated, but connected by the intervening portion of the thread. This is accomplished automatically by an actuator for the pawl-carrier, governed by the pattern-chain and now to be described.

For convenience I have secured a hollow standard f to the head A' in such manner that the rod A^2 may pass therethrough, the overhanging arm f' of the standard having secured therein by a set-screw f^x the shank f^2 of a sleeve f^3 , in which is mounted a vertically-movable plunger f^4 , having at its lower end a disk-like head f^5 . The offset head f^6 of the sleeve f^3 is slotted to form a guide for a bent arm f^7 , secured to the upper end of the plunger by adjustable collars 2 2, and a link f^8 is adjustably connected by set-screws 3 3 to the bent arm. At its lower end the link is jointed at f^9 to a lever f^{10} , fulcrumed at f^{12} on an ear of a shaft or rod f^{13} , said lever having a toe f^{14} thereon in the path of a lump C^2 on the pattern-chain C' , so that when in the movement of said chain in direction of arrow 15, Fig. 1, the lump is brought beneath the toe f^{14} the lever f^{10} will be raised, as shown in Fig. 1, lifting the plunger and its disk f^5 and bringing the latter into the path of the arm d^2 of the pawl-carrier as the latter moves around the needle-cylinder by the rotation of the needle cam-cylinder b^2 . As the plunger and its head f^5 are fixed relatively to the pawl-carrier, the latter will be partially turned on the stud c against the action of the spring in the direction of arrow 20, Fig. 2, and the ratchet e' will in consequence be partially rotated, so that the disk e will move one of its cams e^2 beneath the foot e^9 , lifting it and the thread-guide to prevent engagement of the thread by the needles, as described.

In the construction herein shown I have so arranged the mechanism that the first revolution of the cam-cylinder b^2 after the disk f^5 has been moved into operative position will lift the guide-ring c^5 , the foot e^9 resting on the dwell of the cam e^2 , and the next revolution will again bring the arm d^2 into engagement with the head f^5 , moving the disk e still farther ahead to permit the foot e^9 to drop off from the cam e^2 , the guide-ring returning to normal position and delivering the thread to the needles to begin the next stocking. By this time the pattern-chain will have moved ahead, carrying the lump C^2 out of engagement with the toe f^{14} , permitting the lever f^{10} to drop, thereby lowering, by the link f^8 , the plunger f^4 and its head f^5 until the latter is carried out of the path of the arm d^2 of the pawl-carrier, remaining lowered and inoperative until the lump C^2 again comes into operative position when a stocking is finished. By controlling the position of the thread-guide the machine can be run continuously and the knitting is automatically stopped temporarily and automatically resumed at the finishing of one stocking and the starting of the next, respectively. The plunger to control the pawl-car-

rier is hereinafter designated as the "actuator," and is governed by the pattern-chain. By means of the set-screws 3 3, the collars 2 2, and the set-screw f^x the actuator can be adjusted to a nicety and wear can be compensated for thereby.

In Figs. 2 and 4 I have shown only a portion of the needles n to avoid confusion, and the thread-tension and second-thread devices have been omitted, as forming no part of my invention. As the stockings pass down through the needle-cylinder, connected by the thread, they can be hung on a suitable hook from time to time and removed when a desired number have been knit. By causing one or more revolutions of the cam-cylinder and thread-guide between the finishing of one and the starting of the next stocking a sufficient length of intervening thread is also insured.

I claim—

1. In a circular seamless knitting machine, the needle-cylinder and its needles, a cam-cylinder, a thread-guide movable with said cylinder and having a delivery-opening normally in the plane of the throats of the raised needles, and intermittingly-rotated cam bodily movable with said guide, connections between it and the guide to at times raise the delivery-opening thereof above the tops of the needles, a ratchet and a spring-pawl to rotate the cam step by step, a relatively-fixed actuator for the pawl, and a pattern-surface to move the actuator into the path of and to positively move the pawl at predetermined times, substantially as described.

2. In a circular-knitting machine, the needle-cylinder and its needles, a cam-cylinder, a thread-guide and its support carried by said cylinder and normally in the plane of the throats of the raised needles, to deliver yarn or thread thereto, a foot depending from said thread-guide support, a disk intermittingly rotatable in a horizontal plane and provided with a cam on its upper side, to coöperate with said foot and control the movement of the thread-guide, a pawl and ratchet to rotate

said disk intermittingly, a spring to retract the pawl, and an actuator to move it positively to rotate the cam-disk, and means, controlled by a pattern-surface, to move the actuator into position to operate the pawl and ratchet as the cam-cylinder is rotated, substantially as described.

3. In a knitting-machine, a rotatable needle cam-cylinder, a thread-guide movable therewith, a disk carried by said cylinder and provided with a cam to move the thread-guide out of or into operative position, a pawl and ratchet to rotate said disk intermittingly and a retracting-spring for the pawl, combined with an actuator for the pawl, fixed relatively thereto and normally inoperative, and a pattern-surface to move said actuator into the path of and to operate the pawl when a stocking is finished and to be run off the needles, to rotate said disk and bring the cam into position to move the thread-guide into inoperative position, substantially as described.

4. In a circular-knitting machine, the needle-cylinder and its needles, an upright stud, means to move it around the needle-cylinder, a thread-guide pivoted on said stud and having a depending foot, a disk rotatable on the stud, provided with ratchet-teeth and having a cam on its upper side, a coöperating pawl and its carrier mounted on the stud, and a retracting-spring for said carrier, combined with an actuator for and normally out of the path of the pawl, a pattern-surface, and connections between it and the actuator, to at times move the latter into the path of and move the pawl-carrier positively, to bring the cam on said disk beneath the foot on the thread-guide and move said guide into inoperative position, substantially as described.

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

FRANCIS J. CARTLEDGE.

Witnesses:

JOHN C. EDWARDS,
AUGUSTA E. DEAN.