

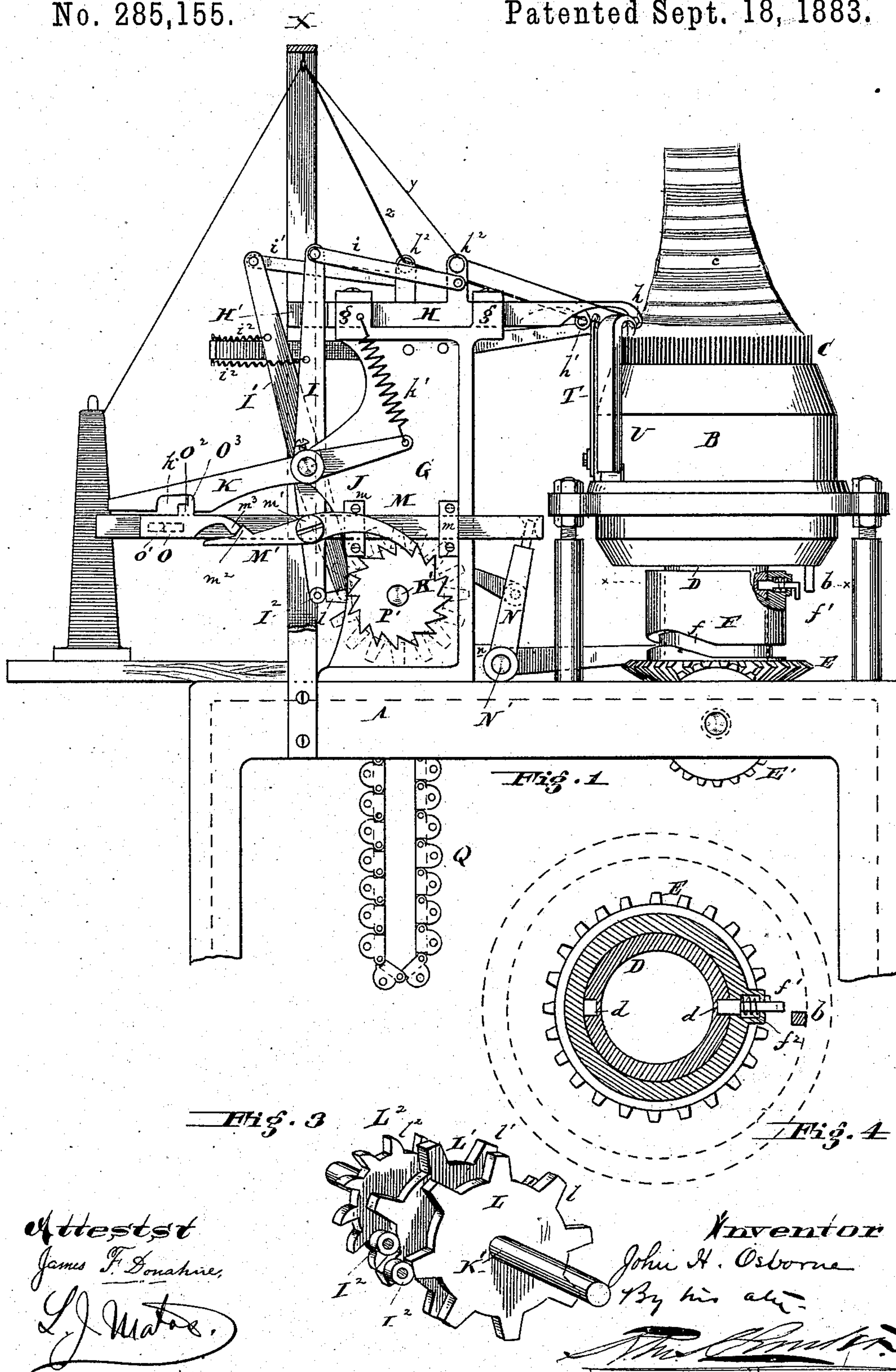
(No Model.)

3 Sheets—Sheet 1.

J. H. OSBORNE.
KNITTING MACHINE.

No. 285,155.

Patented Sept. 18, 1883.



(No Model.)

3 Sheets—Sheet 2.

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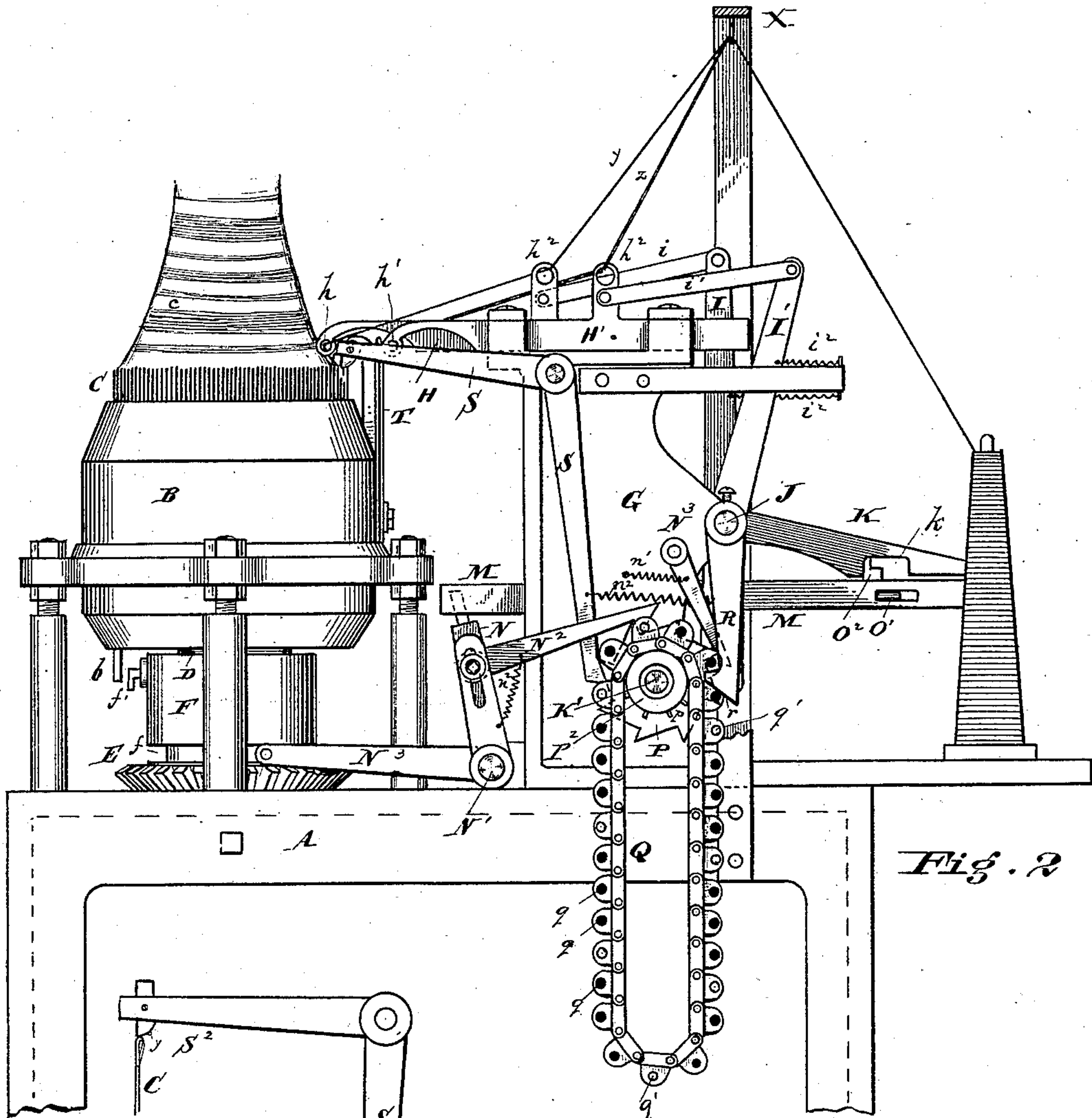


Fig. 2

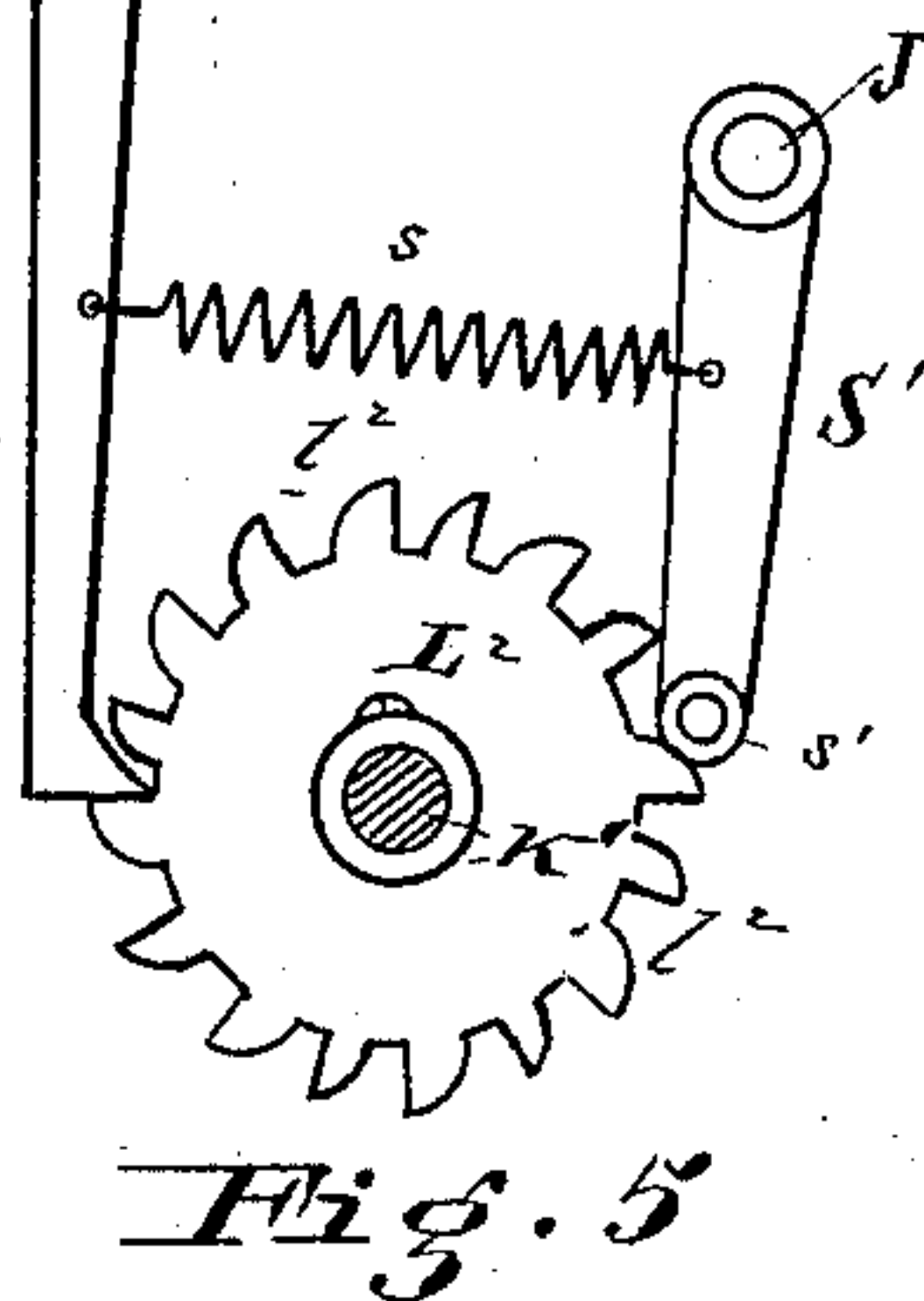


Fig. 5

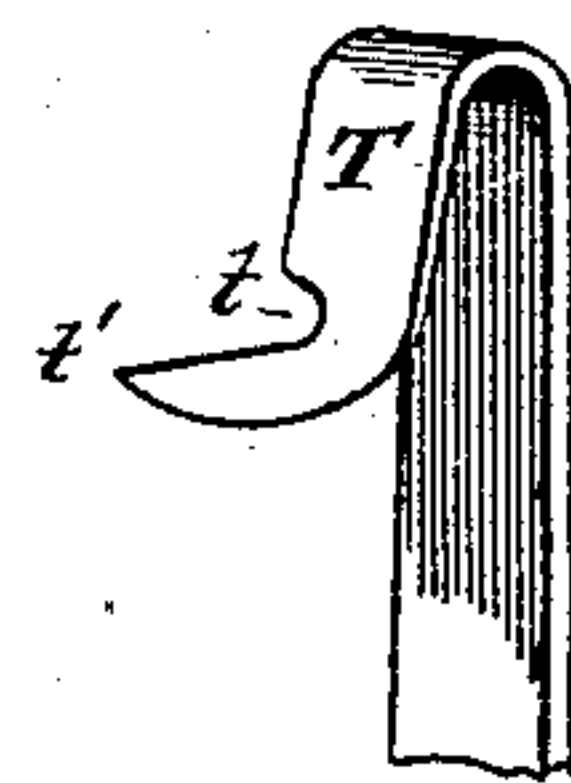


Fig. 6

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(No Model.)

3 Sheets—Sheet 3.

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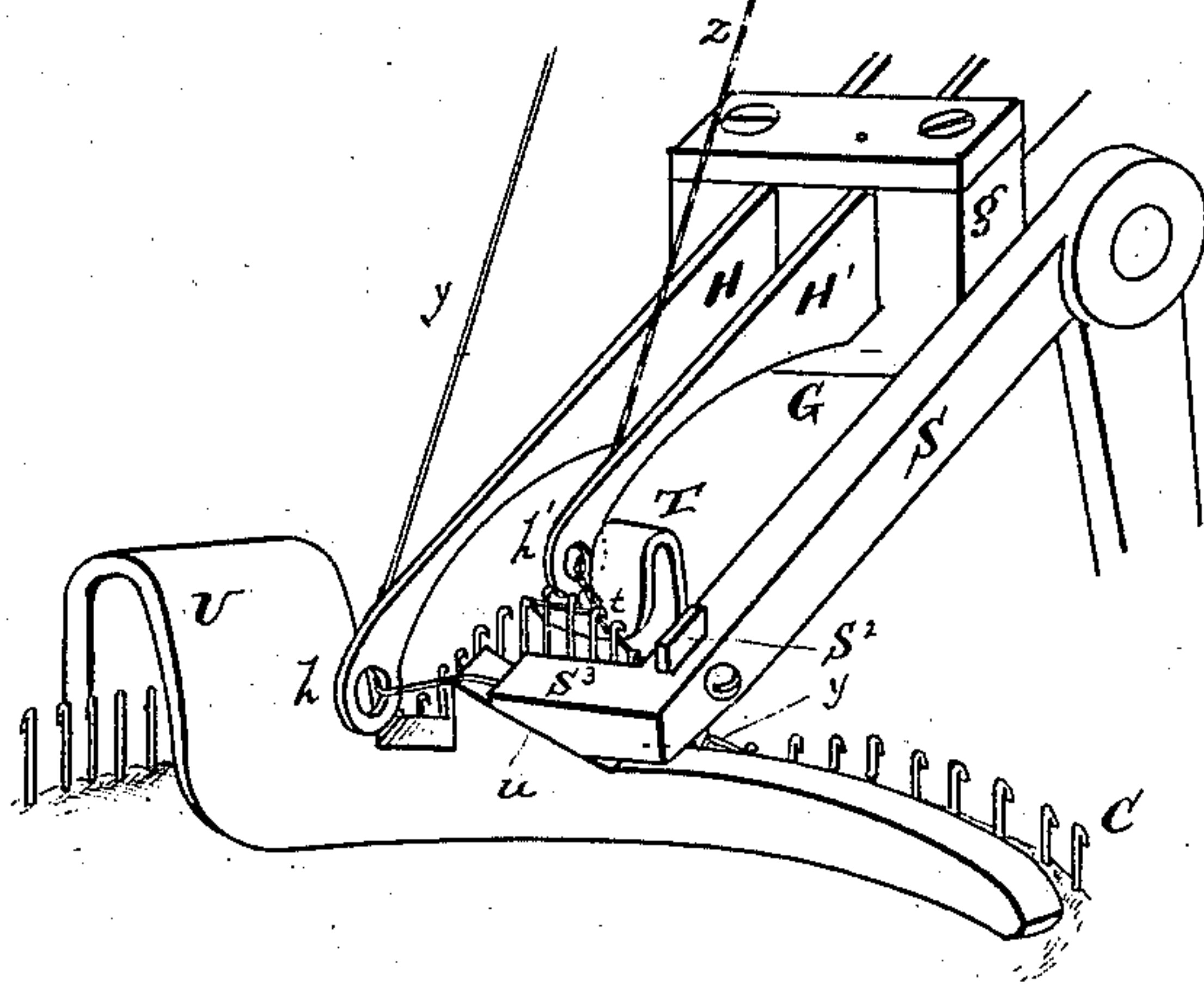


Fig. 7

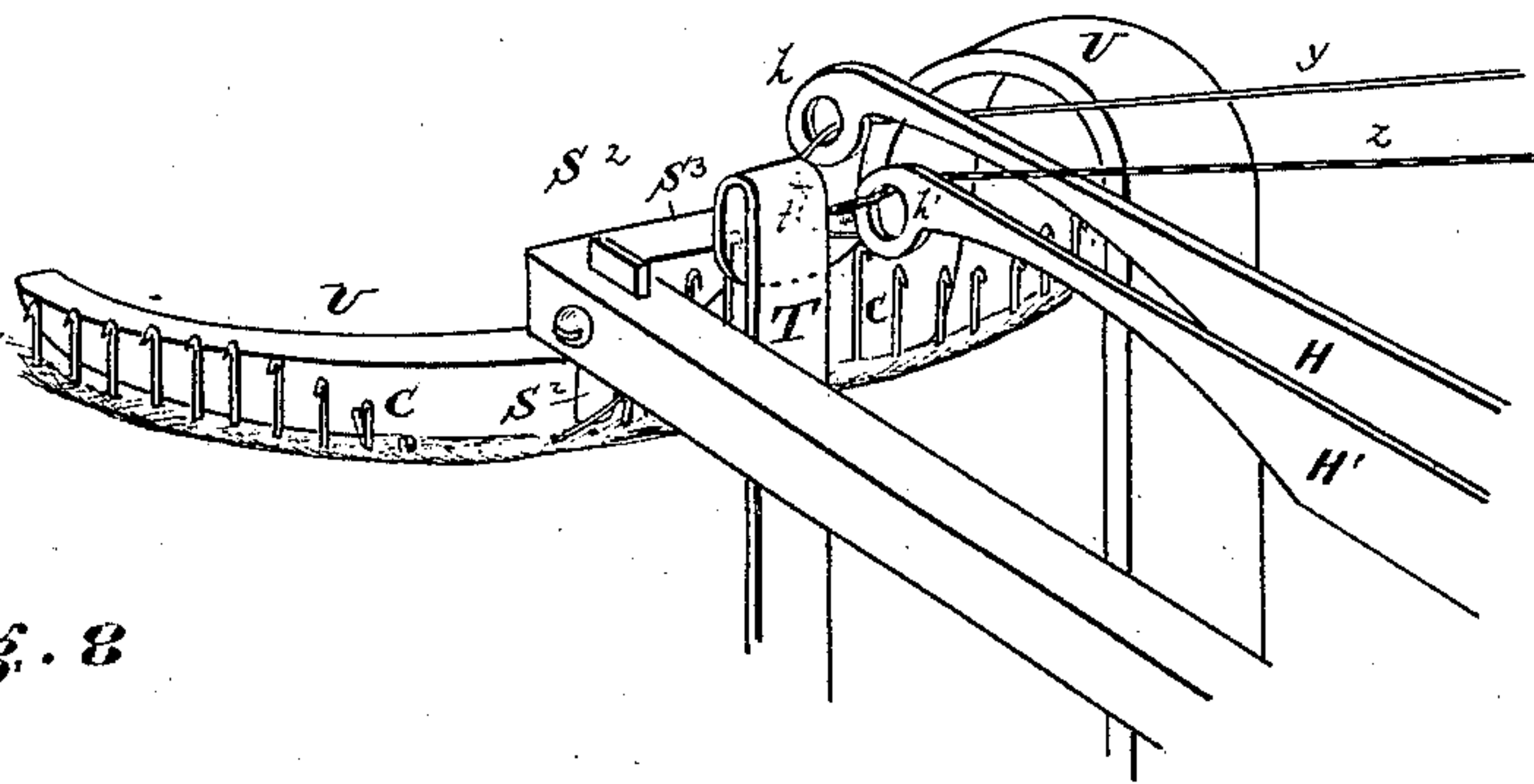


Fig. 8

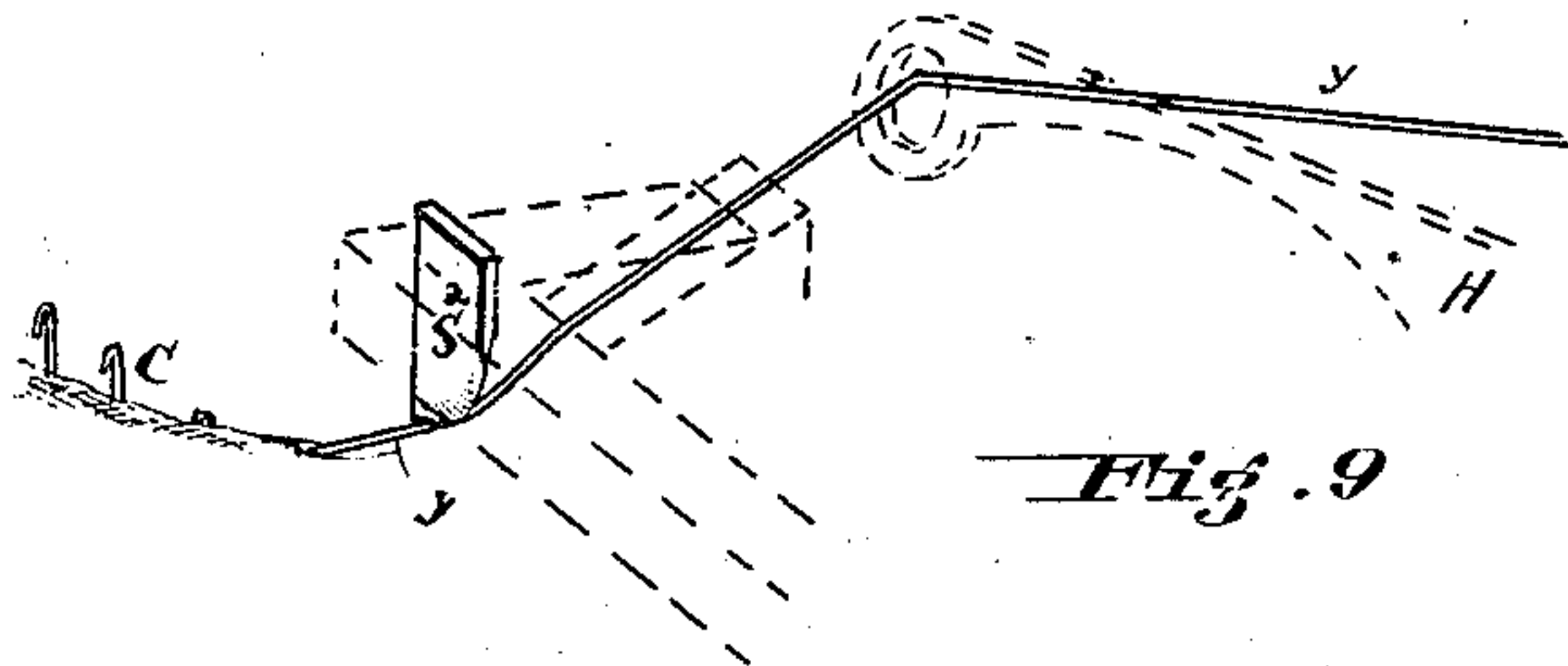


Fig. 9

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[Signature]

UNITED STATES PATENT OFFICE.

JOHN H. OSBORNE, OF PHILADELPHIA, PENNSYLVANIA.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 285,155, dated September 18, 1883.

Application filed April 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. OSBORNE, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Knitting-Machines, of which the following is a specification.

My invention has reference to knitting-machines; and it consists in certain improvements therein, all of which improvements are fully set out in the following specification, shown in the accompanying drawings, and pointed out in the claims.

The object of my invention is to provide knitting-machines adapted to knit hose-tubes of two or more yarns of different colors with improved automatic pattern-governing mechanism to cause the desired colored yarn to be delivered to the needles at the proper time; also to provide mechanism whereby a hose-tube may be knit from which to make cut hose, having the defective spots due to the change of the colored yarns down one side of said tube for a given length, and then change to the side diametrically opposite, and so on alternately, that the hose, when cut, shall have the defective spots alluded to above on the back of the stocking, and also to enable hose to be cut from said tube without waste. This hose-tube forms the subject-matter of a patent granted to me July 11, 1882, No. 260,891, this application relating wholly to the mechanism for producing said improved knit tube.

In the drawings, Figure 1 is a side elevation of my improved knitting-machine. Fig. 2 is also a side elevation of same, but looking from the opposite side thereof. Fig. 3 is a perspective view of the operating toothed wheels for the yarn-carriers. Fig. 4 is a cross-section of part of Fig. 1 on line *x x*. Fig. 5 is a skeleton view, showing the mechanism for clamping the yarn and severing the same. Fig. 6 is a perspective view of the guide for guiding the yarn to the needles. Figs. 7 and 8 are perspective views of part of my machine, to show more clearly the action of the mechanism associated with the needles; and Fig. 9 is a detail view, showing the yarn and its relation to the severing-knife and other adjacent parts.

A is the frame proper.

B is the knitting-machine cylinder, which is supported upon frame A.

C are the knitting-needles, which are carried, in the usual manner, in a head, D, to the bottom of which is secured a bevel-gear wheel, E, which meshes with the driving bevel-gear wheel E'. Encircling the head D, and above wheel E, is the cam-cylinder F, provided with the cam *f*, formed in its outer surface. This cam-cylinder is provided with a spring-catch, which may consist of the bolt or pin *f'*, pressed in toward the head D by spring *f''*, and adapted to catch in holes *d d* in the said head D, and on diametrically-opposite sides thereof. When the pin *f'* is drawn out of hole *d* and the head D slightly turned, the pin rests against the lug *b*, secured to or forming part of the cylinder B, and the cam-cylinder F is held stationary until the head D has made a semi-revolution, when it catches in the other hole *d* and is freed from lug *b*, and consequently rotates with the head D and its needles C. By this means the cam-groove *f* is changed with relation to the needles. By this means the defective spots in the tubular fabric *c*, due to the changing of the yarns, are brought on diametrically-opposite sides.

G is a frame secured to frame A and carrying at the top in bearings or guides *g* the yarn-carriers H H', provided with yarn-guides *h² h²*, and having on their ends yarn loops or holes *h h'*. These carriers H H' are connected by rods *i i'* to levers I I', carrying on their lower ends friction-rollers I². Said levers are loosely pivoted on shaft J, and are drawn back at their upper ends by springs *i²*, and thus pressed at their lower ends against the toothed or cam wheels L L', having teeth *l l'*, which wheels are secured to the shaft K', supported in frame G.

To the end of shaft K' is secured a ratchet-wheel, P', having twice as many teeth as the wheels L and L', respectively. A sliding bar, M, is guided in bearings *m* in frame G, and is reciprocated by a lever or arm, N, secured to a rock-shaft, N', working in bearings *n* and rocked by lever N³, which is operated by cam-groove *f*.

Pivoted at *m'* to bar M is a pawl, M', one end of which works with the ratchet-wheel P, and the other is provided with an inverted-V-shaped lug, *m²*, as shown. Working with the lug *m²* on pawl M' is an arm, *m³*, secured to or forming part of a sliding block, O, guided at

O' in bar M, and provided on top with lug O², having an extension, O³. Working over this lug is a lever, K, provided with a notch, *k*, in which said lug works. This lever K is secured 5 fast to shaft J and kept pressed down at its notched end by a spring, *k'*.

The wheels L and L' have their teeth set alternately, so that when a tooth, *l*, presses out the lower end of lever I the tooth *l'* allows the 10 lower end of lever I' to come in, or vice versa. To the end opposite the ratchet-wheel P', and on shaft K', is a toothed wheel, L², having teeth *l'*, curved on one side and straight on the other, said teeth being in number equal to 15 those on the ratchet-wheel and double the number of those on the wheels L and L', respectively. An arm, S', loosely pivoted to the frame or shaft J and provided on the bottom with a friction-roller, *s'*, presses upon the rounded 20 sides of the teeth *l'*, and forces the straight side of the tooth opposite against the end of a bell-crank lever, S, pivoted to the frame G, and carrying on its horizontal arm a cutter or knife, S², and an inclined clamp, S³. The lower end 25 of lever S and arm S' are pressed toward the toothed wheel L² by spring *s*, and said mechanism, while it operates the clamp and knife, also locks the cam-wheels L L' after a portion of a revolution.

Loosely secured on the end of shaft K', or upon another pin, is a wheel, P², provided with teeth or sprockets *p*, which catch in the chain Q and positively move it. To this wheel P² is secured a ratchet-wheel, P, which is rotated 35 by a pawl, N², operated by rock-shaft N', and kept pressed against the teeth of the ratchet-wheel by a spring, *n*². A pawl, N³, and spring *n'* hold said ratchet-wheel P in a stationary position while the pawl N² is being reciprocated to catch another tooth. There are 40 as many teeth as there are sprocket-teeth *p*. Consequently the movement of each tooth moves the chain one link. The chain Q is composed of a number of links, and each link is provided with a hole, *q*, for the insertion of a 45 pin, *q'*. The pattern is made by varying the number of pins between any two links without pins, as *q'*.

Secured to shaft J is an arm, R, provided at 50 the bottom with an inclined face, *r*, in the path of the chain-pins.

Secured to the cylinder B is the cloth-presser U, which is provided with an inclined clamp-surface, *u*, which corresponds to the part S³ on 55 lever S, and directly opposite to said clamp-surface, and on the other side of the needles C, is the yarn-guide T, which is secured rigidly to the frame or cylinder B at the bottom, and is provided at the top with open guide-notch 60 *t* and inclined prong or foot *t'*. This guide for the yarn insures its being caught by the needles which rise and fall at this place.

The operation is as follows: The machine being set to knit with white and blue yarn, and 65 the said yarns being passed from the bobbins or spools through the guides X *h*², and through the holes *h h'*, respectively, of the yarn-car-

riers H H', and the white yarn *y* being held by the clamp S³ *u* and the blue yarn *z* being caught 70 by the needles C, the machine is set in motion by bevel-wheel E'. The head D and its needles C, as well as the cam-cylinder F, rotate, causing the needles to knit with the blue yarn as they move round with the head, drawing 75 the said blue yarn through the hole *h'* around the guide-notch *t* and under the hooks of the needles, as shown in Fig. 7. At every revolution of the head D the cam-slot *f* rocks arm or shaft N', reciprocating bar M and moving 80 the chain Q one link through the agency of pawl N² and ratchet-wheel P. The pawl M' reciprocates with said bar M, as does also the sliding block O. Now, referring to Fig. 1, as the bar M moves back, the lug or projection O² strikes the rear end of slot or notch *k* in 85 lever K, thereby arresting the movement of the block O and its arm *m*³, and as the pawl M' is still moving back the part *m*² is forced down under arm *m*³, throwing the other end up and clear of the teeth of ratchet-wheel P'. 90 Now, as the bar M moves forward again, the pawl passes over clear of the ratchet-wheel, and without moving the shaft K' or any of the parts secured thereon. Before the bar M reaches the end of its stroke the projection or 95 lug O² strikes the other end of slot *k* and allows the pawl to fall, but too late to catch a tooth. Consequently, so long as the arm or lever K remains stationary or does not rise or rock, the shaft K' cannot turn or rotate, and the yarn-car- 100 riers cannot shift their positions. But, now, suppose the chain Q has been turned until a pin, *q'*, strikes the inclined end *r* of the arm R, the result will be an active operation of every part of the organized machine. The backward move- 105 ment of the arm R causes the lever K to rock, raising its slot *k* just clear of the lug O², but not clear of the extension O³. Now, as the bar M reciprocates, the block O has no effect on the pawl M', and it catches the next tooth of the ratchet-wheel P', and slightly rotates the shaft K', 110 with its cam-wheels L L' and toothed clamp-wheel L², thereby lifting the clamp S³, raising knife S² and reciprocating yarn-carriers H H', throwing the former back and the latter forward, throwing the blue yarn into the clamp and the white yarn into the needles and guide T *t t'*. Upon this action being accomplished the lever or arm S' locks the shaft K' in a steady position. This is not necessary if the 120 cam-wheels L L' are made so as to fit the rollers I². As the pin *q'* of the chain now passes the face *r* the lever K falls back, and the pawl M' is again powerless to put the yarn-changing mechanism into action until another 125 chain-pin comes into play. Now the machine will knit with white yarn *y*. In the act of throwing the white yarn into the needles and the blue yarn out, or vice versa, both yarns, for a short space of time and while several 130 needles are passing, are being knitted together; but just as soon as the blue yarn is thrown out it is caught by the clamp S³ *u*, and as the needles draw the knitted tube around

it is pressed against the knife S^2 and cut. This is shown in Figs. 8 and 9. The pattern may be changed by changing the number of links between those which contain pins. Each link corresponds to a revolution of the needle-head, and consequently one row of stitches. No adjacent links are provided each with a pin, unless it is desired to knit one row of stitches of colored yarn in the tube and then change to another color. By simply increasing the number of yarn-carriers and their operating-levers and cam-wheels any number of colored yarns may be used. After knitting a given length of tube, the pin f' is drawn out and catches against the lug b ; but as soon as the head D has made a semi-revolution it flies into the hole d on the side directly opposite that from which it was drawn and rotates with said head once more. The effect of this is to change the line of defective spots made during the act of changing the colored yarns from one side to the side diametrically opposite for the next given length of tube made, and so on, to the end that when the hose are cut the defective spots will come in the back, and that said hose can be cut from the tube without waste.

In this application I do not claim, specifically, the automatic mechanism by which the yarn-carriers are intermittently reciprocated, as that forms subject-matter of Patent No. 258,593, granted to me May 30, 1882.

I am aware of the patents to Bradley, No. 244,735, of 1881; Slack, No. 190,694, of 1877; and Huse, No. 239,168, of 1881, and claim nothing therein set forth or shown.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the needle-head, needles, yarn-carriers $H H'$, clamp $S^3 u$, knife S^2 , guide T, having notch t , a lever to raise both the clamp-face S^3 and knife S^2 , and mechanism to actuate said lever, substantially as and for the purpose specified.

2. The combination of rotating head D, carrying the needles C, with cam-cylinder F, means to secure said cam-cylinder adjustably to said

needle-head, and mechanism to rotate said head and needles, substantially as and for the purpose specified.

3. The combination of rotating head D, carrying knitting-needles C, and adjustable cam-cylinder F, with two or more reciprocating yarn-carriers, $H H'$, cam-wheels $L L'$, intermediate mechanism by which said cam-wheels reciprocate said yarn-carriers, means actuated by said cam-cylinder F to rotate said cam-wheels, and means to control the time of rotation of said cam-wheels, substantially as and for the purpose specified.

4. The combination, with rotating head D, carrying needles C, of cam-cylinder F, two or more yarn-carriers, $H H'$, two or more cam-wheels, $L L'$, connecting mechanism by which said carriers are actuated by said cam-wheels, lever N^3 , rock-shaft N' , lever or arm N, bar M, pawl M' , sliding block O, lever K, provided with slot k , shaft J, arm R, ratchet-wheels P P', chain Q, and pawl N^2 , substantially as and for the purpose specified.

5. The combination of rotating head D, carrying needles C, with cam-cylinder F, two or more yarn-carriers, $H H'$, two or more cam-wheels, $L L'$, connecting mechanism by which said carriers are actuated by said cam-wheels, lever N^3 , rock-shaft N' , lever or arm N, bar M, pawl M' , ratchet-wheel P', sliding block O, lever K, having slot k , shafts J K', arm R, ratchet-wheel P, chain Q, pawl N^2 , toothed wheel L^2 , lever S, carrying knife S^2 , and clamp-surface S^3 , cloth-presser U, having clamp-surface u , and guide T, having notch t , substantially as and for the purpose specified.

6. The combination of the needle-head, needles, yarn-carriers $H H'$, clamp $S^3 u$, knife S^2 , a lever-holding clamp-face, S^3 , and knife S^2 , and mechanism to actuate said lever, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

JOHN H. OSBORNE.

Witnesses:

R. M. HUNTER,
ERNEST H. HUNTER.