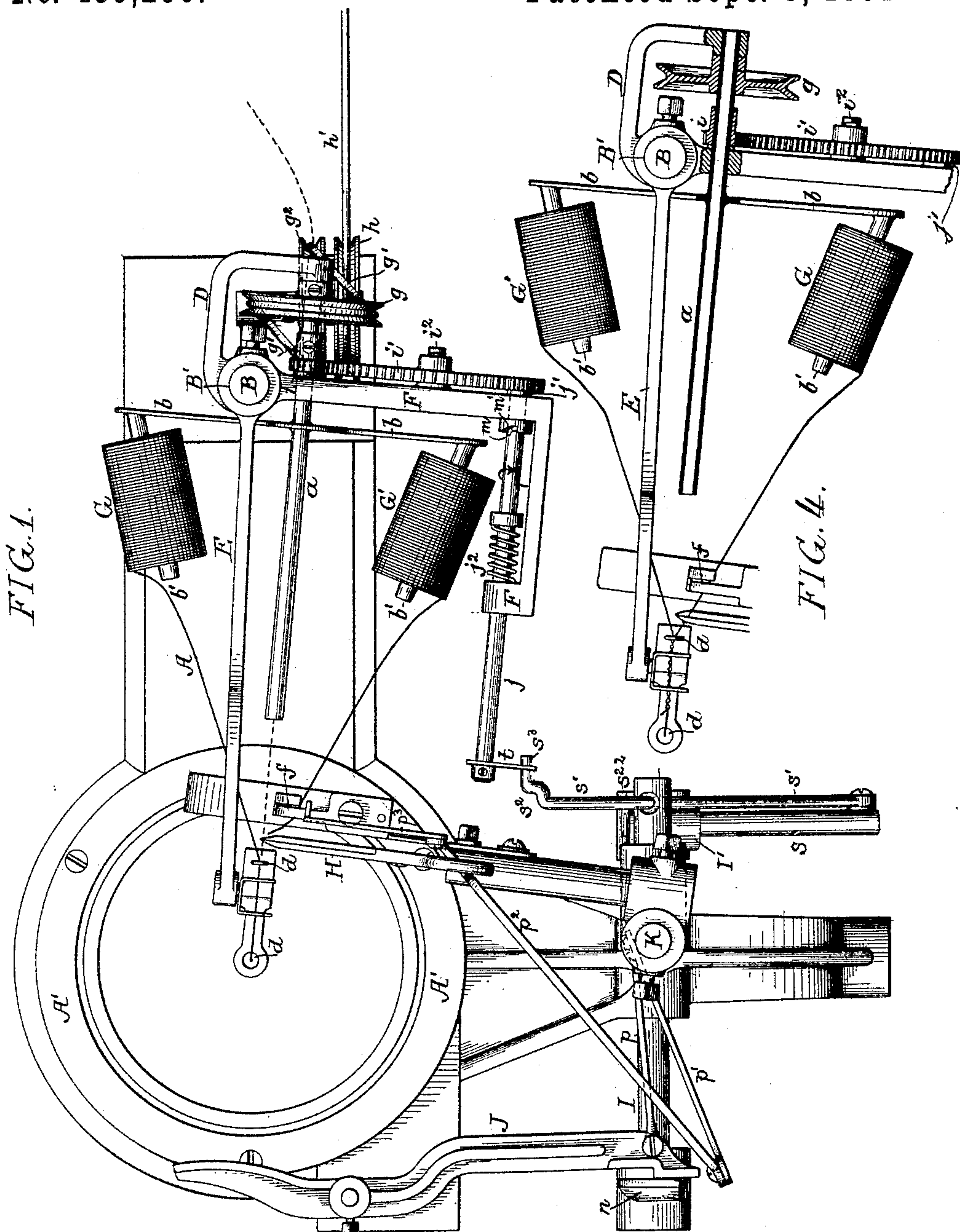


(No Model.)

2 Sheets—Sheet 1.

H. SWINGLEHURST.
THICKENING THREAD MECHANISM FOR KNITTING MACHINES.
No. 459,260. Patented Sept. 8, 1891.



Witnesses:
Hamilton D. Turner
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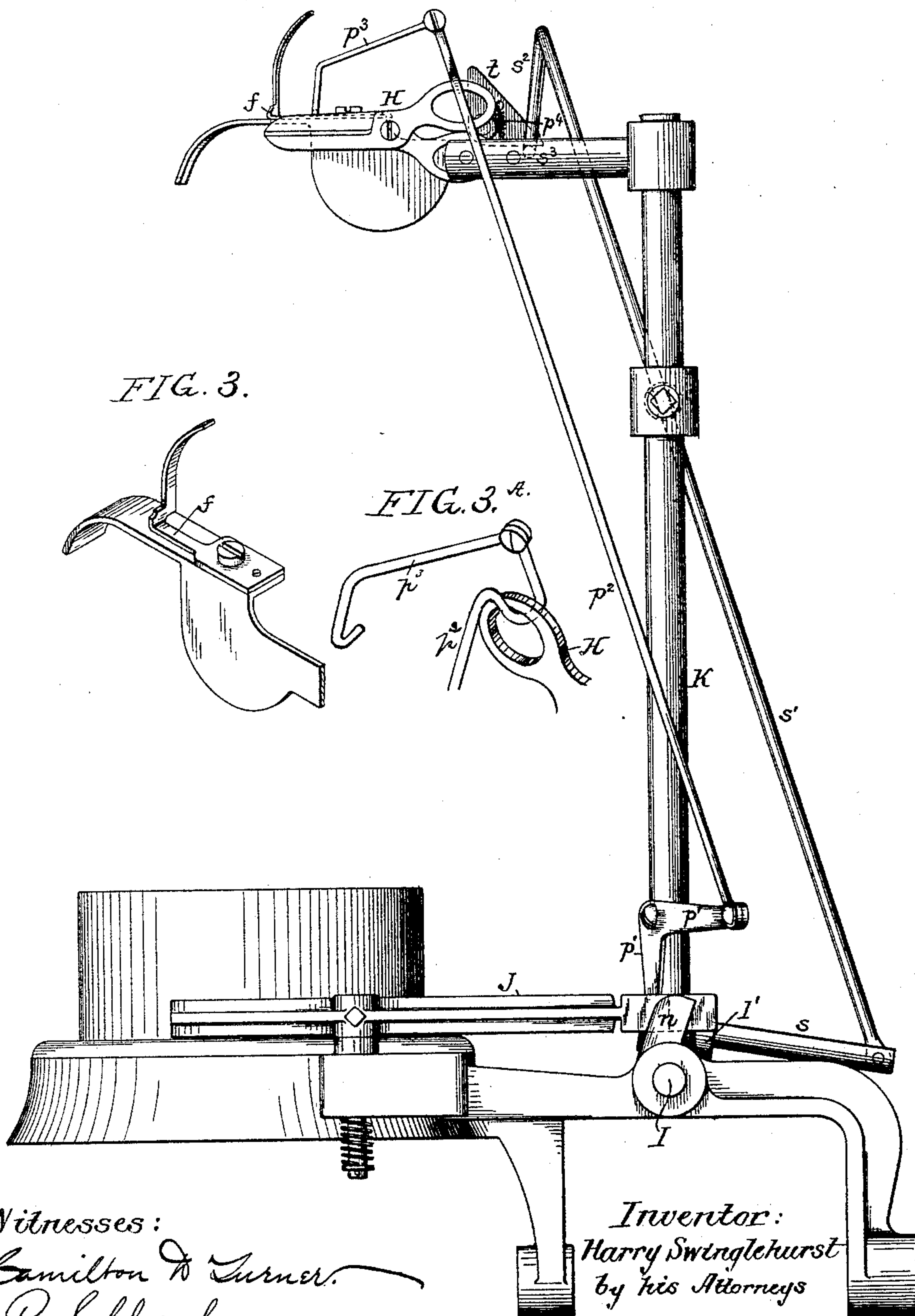
Inventor:
Harry Swinglehurst
by his Attorneys
Howson & Howson

(No Model.)

2 Sheets—Sheet 2.

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FIG. 2



Witnesses:
Hamilton & Turner.
R. Schleicher.

Inventor:
Harry Swinglehurst
by his Attorneys
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UNITED STATES PATENT OFFICE.

HARRY SWINGLEHURST, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
ROBERT PILLING AND RICHARD MADELEY, OF SAME PLACE.

THICKENING-THREAD MECHANISM FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 459,260, dated September 8, 1891.

Application filed April 13, 1891. Serial No. 388,646. (No model.)

To all whom it may concern:

Be it known that I, HARRY SWINGLEHURST, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Thickening-Thread Mechanism for Knitting-Machines, of which the following is a specification.

My invention relates to mechanism for feeding an extra thread to a knitting-machine for the purpose of thickening or re-enforcing the fabric at intervals—for instance, in the pockets or pouches formed upon a knitted tube for the purpose of forming the heels and toes of stockings—one object of my invention being to insure such a connection of the free end of there-enforcing thread with the main knitting-thread as will in all cases result in the proper drawing of said re-enforcing-thread into the machine with the main thread, and a further object being to provide for the use of two threads which serve alternately as main knitting-thread and as re-enforcing thread. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a plan of sufficient of an extra-thread device for knitting-machines to illustrate my invention. Fig. 2 is an end view of part of the device. Figs. 3 and 3^a are perspective views of parts of the same, and Fig. 4 is a diagram illustrating the operation of the device.

A represents an arm or bracket which carries the head A', in which is mounted the cam-cylinder of the machine, as usual, the needle-cylinder not being shown.

From the rear end of the bracket A rises a standard B, on which is an adjustable sleeve B', having projecting arms D E and a frame F.

To bearings in the arm D and frame F is adapted a hollow shaft *a*, on which is a carrier *b*, provided with pins *b'* for the reception of spools, cops, or bobbins G G', which supply the yarn to the needles of the knitting-machines, the threads or strands passing through suitable guide-eyes *d* at the outer end of the arm E, which constitutes what is hereinafter termed the "main knitting-thread guide" of the machine.

When the parts are in the position shown

in Fig. 1, the yarn from the spool G is the main knitting-thread and the yarn from the spool G' is the extra or re-enforcing thread, the latter yarn being held in a spring-clamp *f* and being discontinued some distance beyond the same, wherein the previous operation of the machine it has been cut by the action of a pair of shears H or other cutting or breaking device, such as is commonly used in knitting-machines to which my invention relates.

The hollow shaft *a* of the spool-carrier has a pulley *g*, which receives a belt *g'* from a pulley *g*² on a short counter-shaft below the shaft *a*, said counter-shaft also having another pulley *h*, which receives a driving-belt *h'* from any available pulley of the knitting-machine. The shaft *a* also has a spur-pinion *i*, which meshes with a spur-wheel *i'*, mounted on a stud *i*² on the frame F, and this spur-wheel is normally locked by the engagement of a bolt *j* with a lug *j'* on the face of said wheel, said bolt *j* being free to turn and also to slide longitudinally in bearings in the frame F, and being acted upon by a spring *j*², which tends both to turn the shaft in the direction of the arrow and also to project it toward the wheel *i'*. The belt *g'* slips on the pulley *g*, and thus constantly tends to turn the shaft *a* and its spool-carrier *b*, which tendency is resisted, however, by reason of the locking of the spur-wheel *i'*.

The bolt *j* has a pin *m*, which engages with a cam-block *m'* on the frame F. Hence when said bolt is partially turned in its bearings in a direction the reverse of that indicated by the arrow it will, under the influence of said cam-block, be withdrawn from engagement with the lug on the spur-wheel *i'*, and will therefore permit said wheel to turn, so as to provide for the rotation of the spool-carrier *b*. As the end of the yarn from the spool G' is held by the clip *f*, the effect of this rotation will be to wrap the yarn from the spool G around the yarn from the spool G', as shown in Fig. 4, so that the strand from the spool G, as it is drawn into the machine, will carry with it the strand from the spool G', thereby re-enforcing or thickening the fabric which is being produced. The bolt *j* is preferably so operated as to be released immediately

after being withdrawn, so that it will again engage with the lug j' on the spur-wheel i' when said wheel has made one turn, and if the number of teeth in the wheel i' and pinion i are so proportioned that this one turn of the wheel i' represents an even number of turns of the spool-carrier b the yarn from the spool G will always constitute the main knitting-thread and that from the spool G' the extra or re-enforcing thread, which will be cut off by the shears H after the proper length has been drawn into the machine, it being understood that the shears are opened before the spool-carrier is rotated and the extra thread fed into the machine. If, however, the number of teeth in the wheel i' and pinion i are so proportioned that the spool-carrier stops on a half-turn, the spools G G' change places alternately—that is to say, if during one period of operation the spool G is on the outside and supplies the main knitting-thread, as in Fig. 1, during the next period of operation it will be on the inside, as in Fig. 4, and will supply the extra or re-enforcing thread, the spool G' being then on the outside and supplying the main knitting-thread, so that, supposing the yarns on the spools G G' , respectively, are blue and white and that the blue yarn constituted the main knitting-thread during the formation of the leg of the stocking, both threads will be drawn in during the formation of the heel in blue and white; but when the heel is completed the blue thread will be severed and the white will constitute the main knitting-thread for the formation of the foot, and when the position of the spools is again changed both blue and white will be fed in to form the mixed toe, leaving the blue spool in position to supply the main knitting-thread for the leg of the succeeding stocking. When this is not desired, however, the carrier may have but one spool, which, when in its position of rest, always occupies the position of the spool G' , Fig. 1, the main knitting-thread in this case being drawn through the hollow shaft a of the carrier, as shown by dotted lines in Fig. 1.

Various means may be employed for operating the shears or other thread breaker or cutter and for actuating the locking-bolt j at the proper time, and my invention is not limited to such actuating devices; but in the drawings I have shown certain devices whereby these results can be attained in connection with a machine of the character set forth in another application filed by me and bearing even date herewith, Serial No. 388,647. In this case I represents the shaft of the clutch-operating device, which is actuated at the proper times so as to shift the clutch member from the rotating device of the machine to the reciprocating device of the same, this shaft having a projecting finger n , which is engaged by a trip-lever J on the frame of the machine to hold the clutch in engagement with the reciprocating device. This trip-lever is connected by a rod p to a lever

p' , hung to a standard K , and to said lever p' is connected a rod p^2 , bent at the upper end, as shown in Fig. 3^a, so as to engage with the handle of one of the blades of the shears H . Hence when the trip-lever moves into engagement with the finger n the shears will be opened, and when at the proper time in the operation of the machine said trip-lever is acted upon so as to release the finger n the shears will be closed by the action of a spring p^4 , which connects the bows of the shears and tends to draw them together, and at the same time the projecting finger p^3 at the upper end of the rod p^2 will bear upon the tension-plate f and cause the latter to firmly nip and retain the cut end of the yarn beneath the same. This pressure-finger may in some cases entirely take the place of the shears by imparting such pressure to the friction-plate f as to prevent any movement of the yarn beneath the same, so that said yarn will be broken at some point between the friction-plate and the head of the machine, the yarn, however, being allowed to pass freely beneath the friction-plate again when the finger p^3 is lifted from said plate.

On the shaft i is a head I' , which has an arm s , and to the outer end of the latter is hung the lower end of a rod s' , which passes through an opening in a guide-stud s^{22} , projecting from the standard K , the upper end of said rod s' being bent downward, as at s^2 , and hooked, as at s^3 , so as to project beneath a beveled catch-plate t at the end of the locking-bolt j . When the clutch-operating shaft I therefore is moved, so as to throw the clutch member into engagement with the reciprocating device of the machine, the rod s' is lifted and the hooked end of the same turns the catch-plate t of the locking-bolt until it slips from under the same, this turning movement being sufficient to cause the cam m' to act on the pin m and withdraw the locking-bolt from engagement with the lug on the spur-wheel i' . As soon, however, as the hooked end of the rod s' has slipped from under the plate t the locking-bolt is restored to its original position under the influence of the spring j^2 , so as to be in position to again lock the wheel i' when the same has completed its revolution. On the downward movement of the rod s' the hooked end of the same strikes the upper beveled face of the catch-plate t and is deflected until it can spring beneath said plate and again engage with the same.

It will be evident that as the main knitting-thread and the extra or re-enforcing thread are in my machine twisted together the drawing of said re-enforcing thread into the machine with the main thread is rendered much more certain than when the two threads are simply laid side by side in contact with each other. Hence I regard this twisting device as one of the main features of my invention, the minor feature of advantage being the facility which it affords for employing first one thread and then the other as the main knit-

ting-thread, so as to provide for the formation of stockings with legs and feet of different colors.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination of the main-thread guide of a knitting-machine with a carrier adapted to support a spool carrying an extra or re-enforcing thread, means for rotating said carrier so as to twist together the re-enforcing thread and the main knitting-thread, and a retainer for the free end of said re-enforcing thread, substantially as specified.

2. The combination of the main-thread guide of a knitting-machine, a carrier adapted to support a spool carrying a re-enforcing thread, means for rotating said carrier so as to twist together the re-enforcing thread and the main thread, a retainer for the free end of the re-enforcing thread, and a severing device for said re-enforcing thread, substantially as specified.

3. The combination of the main-thread guide of a knitting-machine with a carrier for two spools, one for the main knitting-thread and the other for the re-enforcing thread, a retainer for the free end of said re-enforcing thread, and means for rotating the carrier so as to twist the threads together, substantially as specified.

4. The combination of the main-thread guide of a knitting-machine with a carrier for two spools, one for the main knitting-thread and the other for a re-enforcing thread, a retainer for the free end of said re-enforcing thread, and means for rotating the carrier so as to twist the threads together, and a stop for arresting the movement of the

carrier after it has made a certain number of full turns and a half-turn, whereby the position of the spools is changed and the threads alternately serve as main knitting-threads and as re-enforcing threads, substantially as specified.

5. The combination of the thread-guide of a knitting-machine, the spool-holder and its shaft, a frictional rotating device for said shaft, a pinion on the shaft, a spur-wheel driven by said pinion, and means for locking said spur-wheel and for releasing the same at intervals, substantially as specified.

6. The combination of the spool-carrier and its shaft, the frictional driving device for said shaft, a pinion on the shaft, a spur-wheel meshing with said pinion, a locking-bolt for said spur-wheel, a cam whereby said locking-bolt is withdrawn longitudinally when partially turned, and means for imparting such partial turning movement to the locking-bolt, substantially as specified.

7. The combination of the main knitting-thread guide of the machine, the carrier adapted to support a spool carrying a re-enforcing thread, means for rotating the carrier so as to twist the threads together, a frictional retainer for the free end of the re-enforcing thread, a finger for pressing upon said retainer and increasing the tension of the same, and means for operating said finger at intervals, substantially as specified.

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

HARRY SWINGLEHURST.

Witnesses:

WILLIAM D. CONNER,
HARRY SMITH.