(No Model.) 2 Sheets—Sheet 1.

L. N. D. WILLIAMS.

EXTRA THREAD FEEDING DEVICE FOR KNITTING MACHINES.

No. 491,327. Patented Feb. 7, 1893.

FIG. 1.

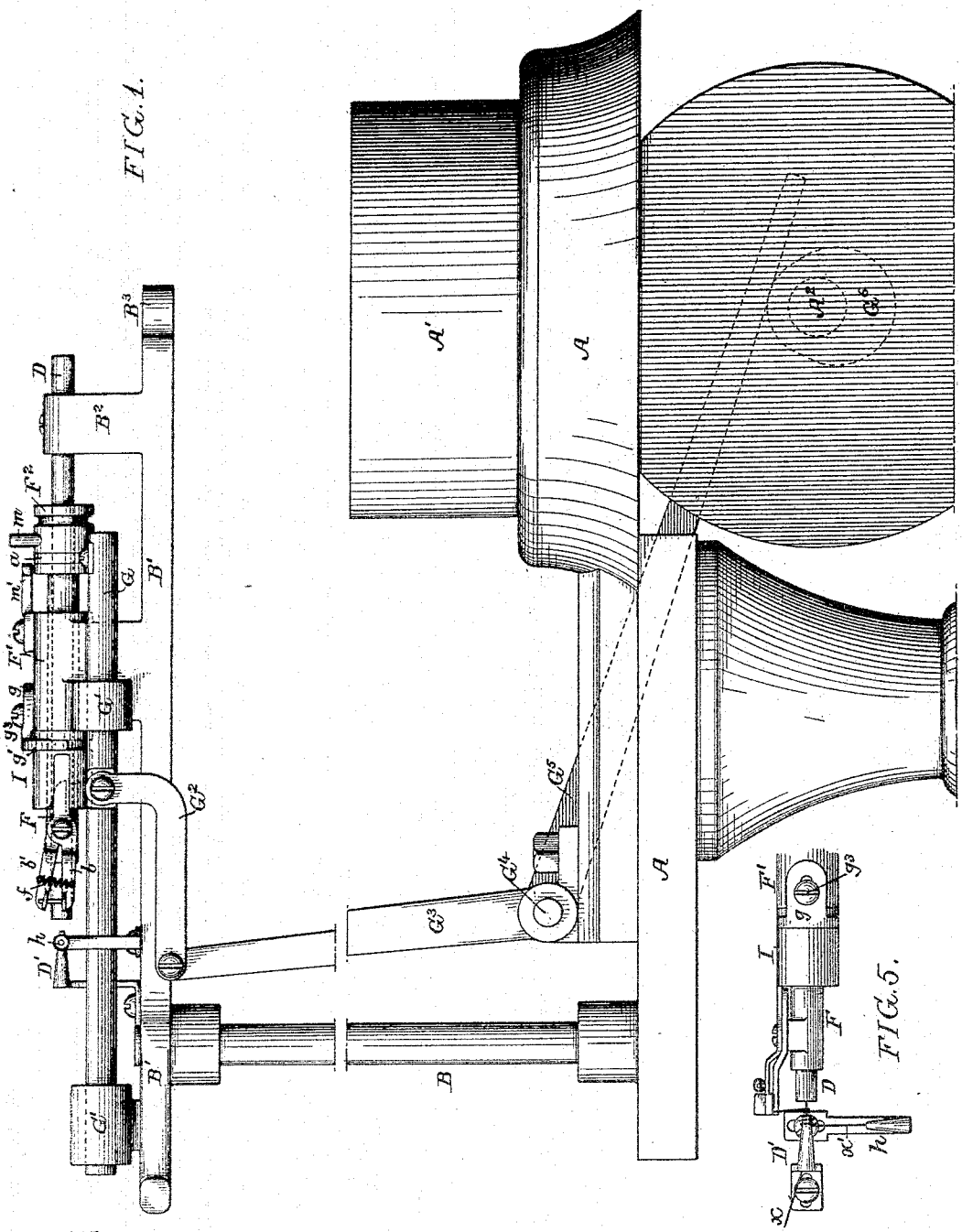

FIG. 5.

Witnesses:
Hamilton D. Turner
Alex. Barkoff

Inventor:
Louis N. D. Williams
by his Attorneys
Howson & Howson

(No Model.) 2 Sheets—Sheet 2.

L. N. D. WILLIAMS.

EXTRA THREAD FEEDING DEVICE FOR KNITTING MACHINES.

No. 491,327. Patented Feb. 7, 1893.

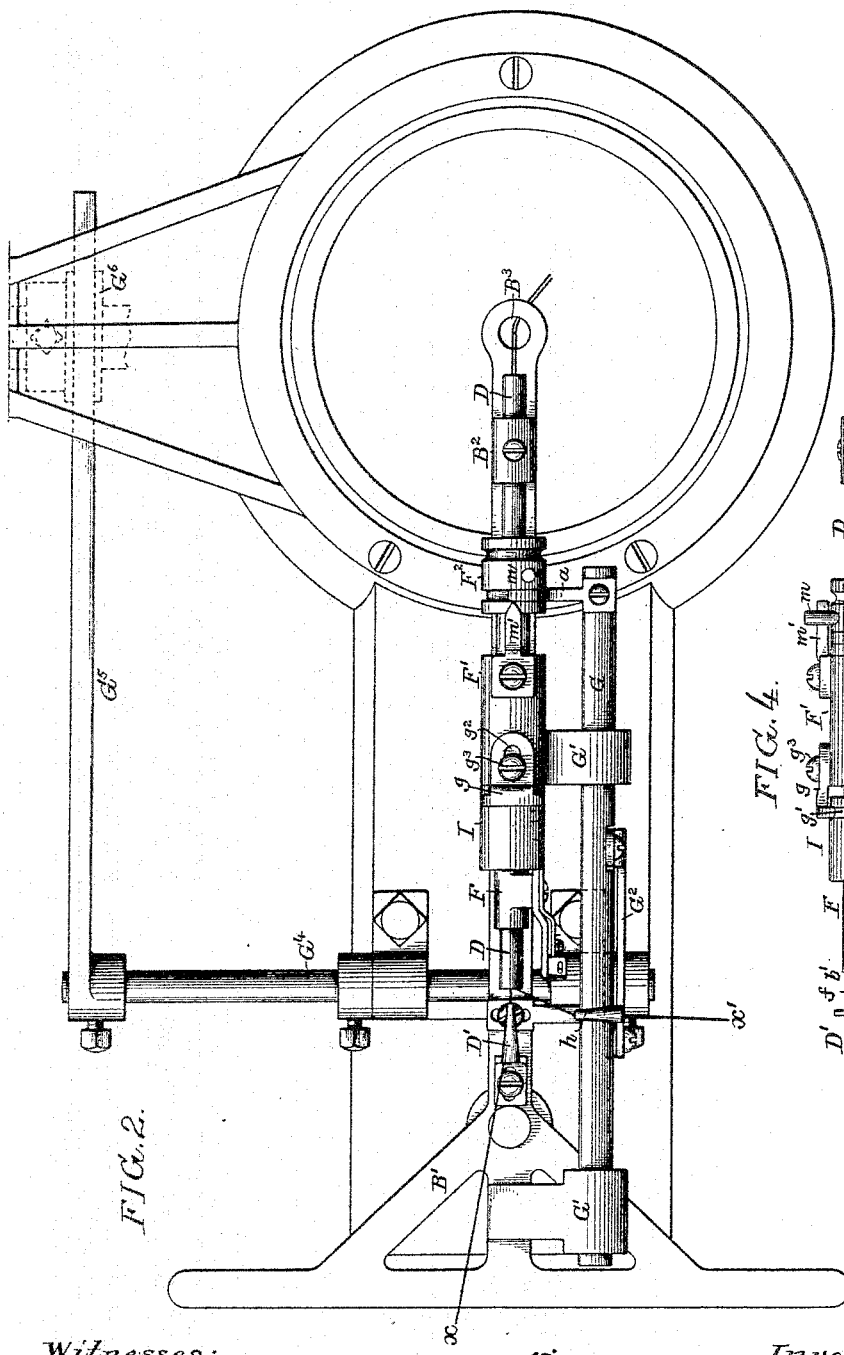

FIG. 2.

FIG. 4.

FIG. 3.

Witnesses:
Hamilton D. Turner
Alex. Barkoff

Inventor:
Louis N.D. Williams
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

LOUIS N. D. WILLIAMS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO ROBERT W. SCOTT, OF SAME PLACE.

EXTRA-THREAD-FEEDING DEVICE FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 491,327, dated February 7, 1893.

Application filed November 2, 1892. Serial No. 450,772. (No model.)

To all whom it may concern:

Be it known that I, LOUIS N. D. WILLIAMS, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Extra-Thread-Feeding Devices for Knitting-Machines, of which the following is a specification.

The object of my invention is to provide simple and efficient mechanism for introducing a thickening or reinforcing thread into a knitted tube at any required point, and, if desired, throughout any fractional portion of a course, and this object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1, represents a side view of a reinforcing thread device for knitting machines constructed in accordance with my invention; Fig. 2, is a plan view of the same; and Figs. 3, 4 and 5, are views illustrating features of construction or operation of parts of the device.

A represents part of the fixed frame or head of the knitting machine, and A′ the cam cylinder of the same which is rotated as usual by bevel gearing from a shaft A^2 beneath the head.

Projecting upward from the frame A is a rod or bar B which carries at the upper end a frame or plate B′ and to a suitable stud or projection B^2 on said frame is adapted and secured a tubular guide D for the main knitting thread *x* which is drawn into the outer end of said tubular guide and passes downward from the inner end of the same through the eye B^3 of the bar B′ and thence to the thread guide of the machine. Before the main knitting thread enters the tubular guide D, however, it is by preference passed through a short tube D′ carried by a bracket on the bar B′ the purpose of this construction being explained hereinafter.

Throughout a considerable portion of its length the tubular guide D is contained within a tubular sleeve F which is free to slide in a bearing F′ on the bar B′, this tubular shaft or sleeve having at its inner end a pulley F^2 grooved for the reception of a belt from any convenient wheel or pulley of the machine and also grooved for the reception of a fork *a* projecting from a rod G which is guided in lugs G′ and is connected by a link G^2 to an arm G^3 on a rock shaft G^4 which has another arm G^5 acted upon by a cam G^6 on the shaft A^2 so that for each rotation of said shaft A^2 there will be a back and forth movement of the rod G with appropriate dwell at each end of the movement.

Upon the forward end of the tubular shaft or sleeve F is mounted a pair of clamping levers *b b′* one of which has a shear blade *d* (Fig. 3), a spring *f* serving to close the movable blade of the clamp and the shears when such closure is permitted. Mounted on the tubular shaft or sleeve F, and rotating therewith, is a slotted collar I which is grooved for the reception of the forked front end *g′* of a slide *g*, the latter being mounted upon the top of the bearing F′ and having a slot g^2 for the reception of a securing bolt g^3 so that limited movement of said slide on the bearing is permitted.

When the hollow shaft F is moved inward or toward the center of the knitting machine the upper wall of the slot in the collar I acts upon the inner end of the movable clamp arm after the manner of a cam so as to open the clamp and shears as shown in Fig. 1, and when the shaft F is moved outward the collar I follows it for a certain distance determined by the length of the slot g^2 so as to permit the clamp and shears to remain open until they are in position to engage the reinforcing thread *x′* which is delivered through the lateral guide eye or tube *h*, further forward movement of the collar I being then prevented so that the inner end of the clamp arm is withdrawn from the slot of the collar, and said clamp and shears are permitted to close so as sever the reinforcing thread and clamp the loose end of the same, as shown in Fig. 4.

During the outward movement of the shaft F the latter is rotated by means of the belt adapted to the pulley F^2 but before said shaft reaches the limit of its forward movement and before the open clamp reaches the thread *x′* such rotation is arrested by means of a suitable stop, that shown in the present instance consisting of a pin *m* projecting from the pulley F^2 and adapted to come into contact with a stop-finger *m′* projecting from the top of the bearing F′. Shortly after the in-

ward movement of the shaft F commences, therefore, the pin *m* will be again released from engagement with the stop finger, and rotation of the shaft and consequently of the clamp carried thereby will be resumed, hence the end of the reinforcing thread held in the clamp will be carried round and round the main knitting thread so as to be caught thereby and carried forward into the machine as soon as the clamp and shears have been opened by the action of the slotted collar I, on the continued inward movement of the shaft F.

The purpose of employing the tube D′ is to provide for the formation of the first few twists or coils of the reinforcing thread upon said tube as shown in Fig. 5, instead of upon the main knitting thread which is continually traveling forward, a sufficient number of twists being then applied to said knitting thread to insure the carrying in of the reinforcing thread thereby, the twists which were applied to the tube D′ being pulled from the same and delivered onto the main knitting thread so as to increase the hold of the supplementary thread thereon.

It will, of course, be understood that the pins *m m′* are so located that the clamp *b b′* will make one or more turns around the guide D′ before the clamp is opened to release the reinforcing thread.

By varying the character of the cam G^6 the reinforcing thread can be applied throughout any desired extent in each course of the knitting, and by throwing the cam out of action or moving the arm G^5 out of the path of the cam the insertion of the reinforcing thread may be stopped for any desired length of time.

When it is considered sufficient to rely upon the pull upon the reinforcing thread, after the closing of the clamp, to break said thread, the shears may be omitted, but the use of said shears is always to be preferred.

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

1. The combination in a reinforcing thread device for knitting machines, of the guides for the main and reinforcing threads, with a clamp for the reinforcing thread, and with means for rotating said clamp around the main knitting thread, substantially as specified.

2. The combination in a reinforcing thread device for knitting machines, of the guides for the main and reinforcing threads with a clamp for the reinforcing thread, and with means for imparting both a longitudinal reciprocating motion and a rotating motion around the main knitting thread to said clamp, substantially as specified.

3. The combination in a reinforcing thread device for knitting machines, of the guides for the main and reinforcing threads, with a clamp for the reinforcing thread, and means for rotating said clamp around the main knitting thread, a portion of the main knitting thread guide being so located in respect to said clamp that the first turn or turns of the reinforcing thread will be formed upon said guide instead of upon the main thread, substantially as specified.

4. The combination in a reinforcing thread device for knitting machines, of a tubular guide for the main knitting thread, a tubular shaft surrounding said tubular guide, and carrying a clamp for the supplementary thread, and means for rotating and for longitudinally reciprocating said tubular shaft, substantially as specified.

5. The combination in a reinforcing thread device for knitting machines, of the guides for the main and reinforcing threads with a clamp for the reinforcing thread, and means for reciprocating said clamp and for rotating it around the main knitting thread, and a stop for arresting the rotative movement when the clamp is in its forward position, substantially as specified.

6. The combination in a reinforcing thread device for knitting machines of the guides for the main and reinforcing threads, with a clamp for the reinforcing thread, means for reciprocating said clamp and for rotating it around the main knitting thread, and means for causing the opening of the clamp as it approaches one limit of its reciprocating motion and the closing of said clamp as it approaches the other limit of said motion, substantially as specified.

7. The combination in a reinforcing thread device for knitting machines, of the guides for the main and reinforcing threads, with a clamp for said reinforcing thread, means for reciprocating said clamp, and for rotating it around the main knitting thread, and a cam slide acting upon the clamp to open the same, said cam slide having a limited longitudinal movement with the clamp, substantially as specified.

8. The combination in a reinforcing thread device for knitting machines, of the guides for the main and reinforcing threads, with a combined clamp and shears for said reinforcing thread, and means for rotating the same around the main knitting thread, substantially as specified.

9. The combination in a reinforcing thread device for knitting machines, of the guides for the main and reinforcing threads, with a combined clamp and shears for said reinforcing thread, means for rotating and reciprocating said clamp, and shears and provision for opening and closing the same, substantially as specified.

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

LOUIS N. D. WILLIAMS.

Witnesses:
FRANK BECHTOLD,
JOSEPH H. KLEIN.