

No. 649,083.

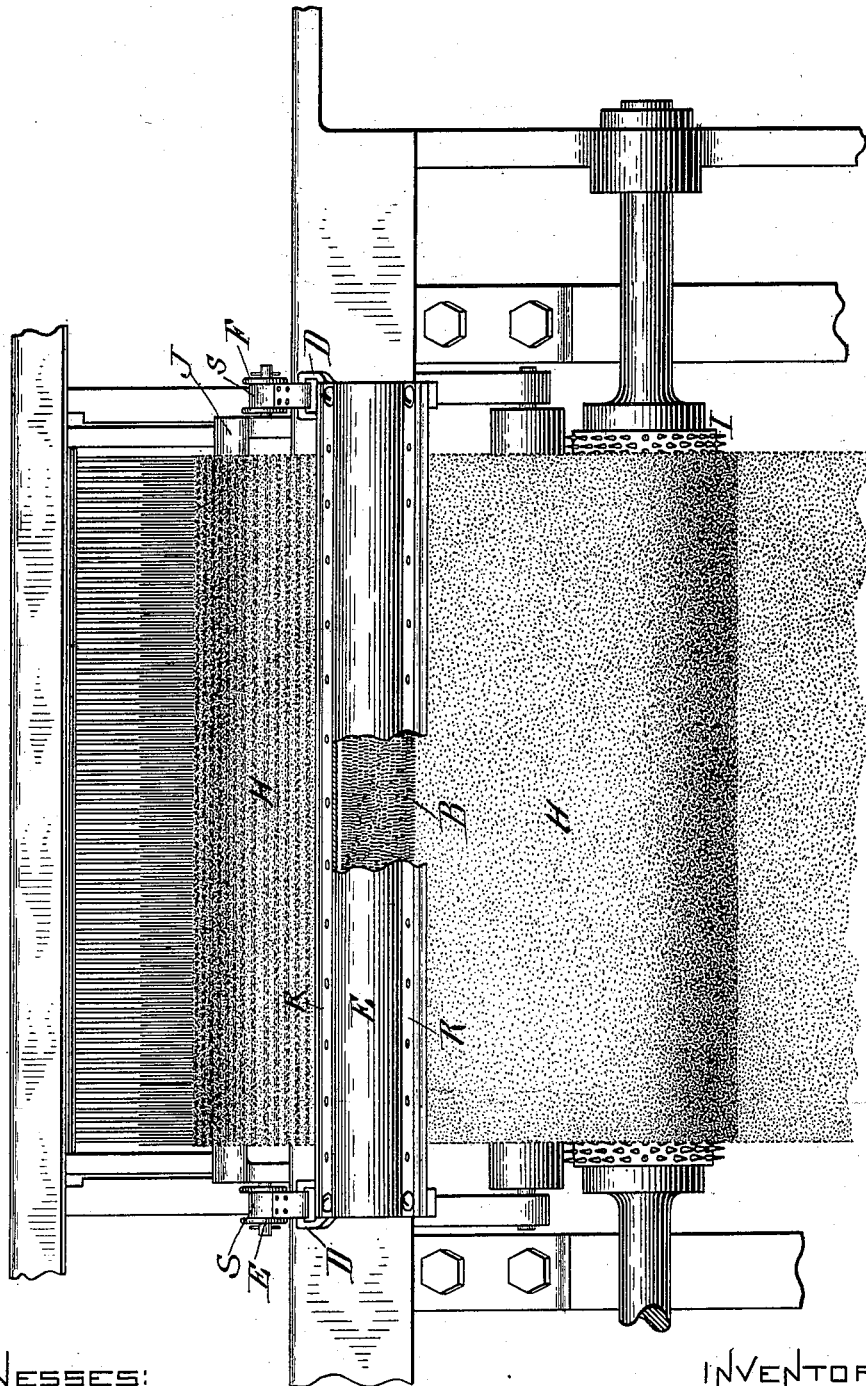
Patented May 8, 1900.

T. J. STEARNS.
PILE SPREADER FOR LOOMS.

(Application filed Dec. 23, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

Robert Cushman
C. F. Groll.

INVENTOR:

Thomas J. Stearns

FIG. 1.

No. 649,083.

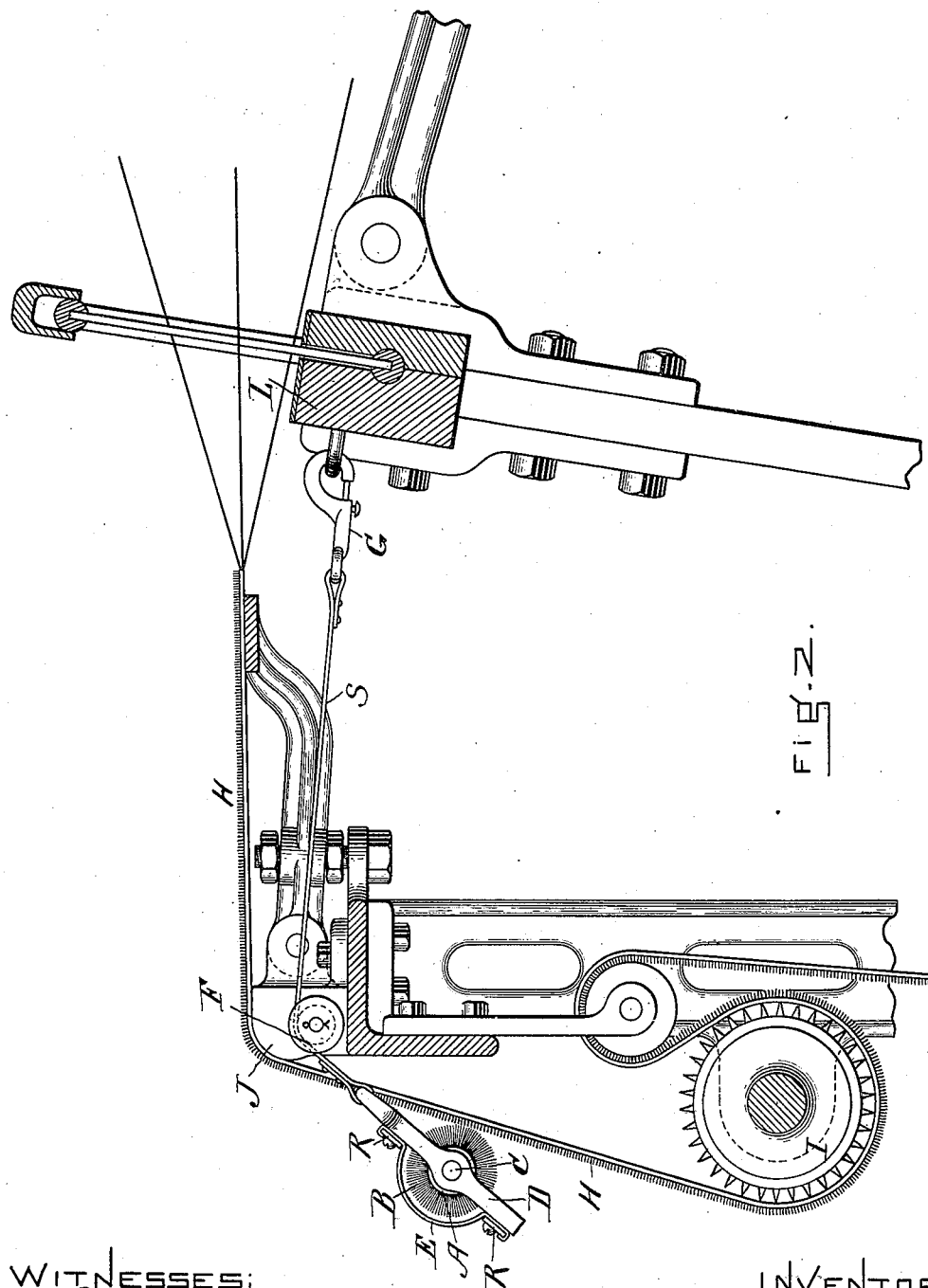
Patented May 8, 1900.

T. J. STEARNS.
PILE SPREADER FOR LOOMS.

(Application filed Dec. 23, 1899.)

(No Model.)

3. Sheets—Sheet 2.



WITNESSES:

Robert Cushman
C. F. Hall

INVENTOR:

Thomas J. Stearns.

No. 649,083.

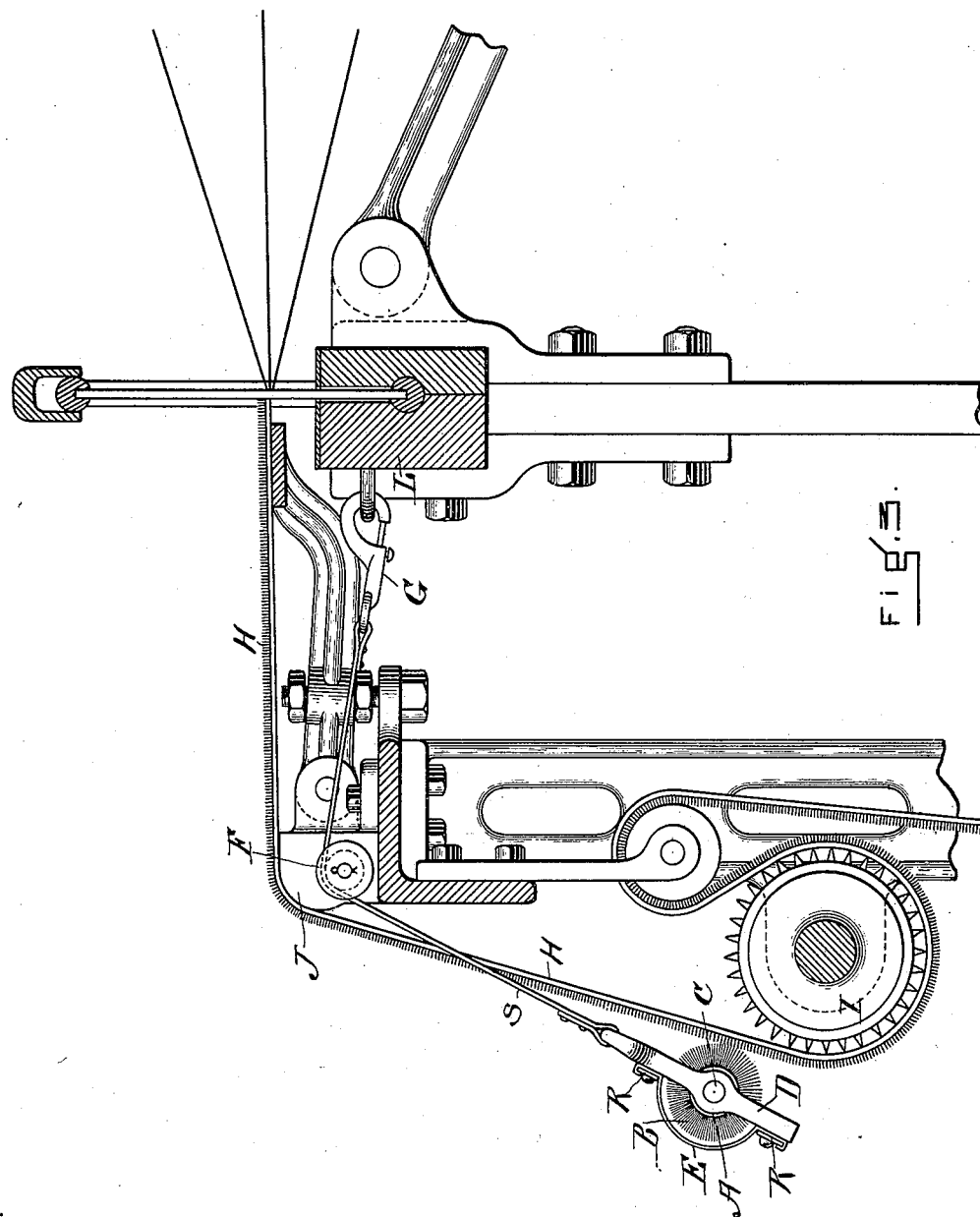
Patented May 8, 1900.

T. J. STEARNS.
PILE SPREADER FOR LOOMS.

(Application filed Dec. 23, 1899.)

(No Model.)

3 Sheets—Sheet 3.



WITNESSES:

Robert Cushman
C. F. Groll

INVENTOR:

Thomas J. Stearns

UNITED STATES PATENT OFFICE.

THOMAS J. STEARNS, OF BOSTON, MASSACHUSETTS.

PILE-SPREADER FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 649,083, dated May 8, 1900.

Application filed December 23, 1899. Serial No. 741,382. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. STEARNS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Pile-Spreaders, of which the following is a specification.

My invention relates to the manufacture of pile fabric; and its object is to provide a machine to spread or swell the pile of any cut or uncut pile fabric. While adapted for use upon any pile fabric, it is especially useful in spreading or swelling the pile of plush or velvet carpets or rugs, and I will limit this specification to a machine designed for that use.

When a velvet or plush carpet comes from the loom, the cut threads of the warp forming the nap or pile stand up in little tufts with spaces between. In order to give the carpet an even and velvet-like appearance and to increase the durability and beauty of the goods, it is desirable to spread or swell the pile and so close up the spaces between the tufts of the threads. Hitherto the pile has been spread, if at all, by the application of steam and to a small extent by brushing. Both methods are inadequate and objectionable. The steam method has a deleterious effect upon the colors of a carpet and wholly or partially destroys the sizing in the back of the carpet. Brushing, if hard enough to spread the pile to any extent, pulls out and tears the pile. Consequently a great amount of carpet is put upon the market with the pile unspread. To spread the pile vastly increases the beauty, the durability, and consequently the value of the carpet.

By the use of my invention, of which an embodiment will presently be described, the pile is evenly spread or swelled without injury to any portion of the fabric.

I operate upon the face of the fabric after it has come from the loom with a spreader consisting of a carrier covered with teeth or needles projecting perpendicularly therefrom, giving the mass of teeth or needles repeated contacts with the face of the cloth. The needles or teeth prick the pile by a movement or pressure substantially normal to the fabric at the point of contact and are withdrawn again without sweeping or combing

and by repeated pricking of the pile spread the pile by wedging apart the threads in the pile tufts. The tufts are thus broomed out into interlacing contact with the threads of adjacent tufts and the cloth put into the desired condition. There is no combing or brushing to tear or pull out the pile, since at the point where the needles prick the face of the cloth the points of the needles and the face of the cloth are relatively at rest, or substantially so, the needle-carrier having only a contact by pressure substantially normal with the cloth. The needles or teeth may be placed upon the carrier in any number and with any degree of closeness to one another desired.

The accompanying drawings show one embodiment of my invention in which I employ a roller for the carrier of the mass of teeth or needles. This roller is given a reciprocating rolling movement over the face of the fabric and a gradual movement of progression over the fabric. The up-and-down or forward-and-back rolling motion of the needle-roller may be transmitted thereto from the swing of the lay of the loom with which the needle-roller may be connected, as will be more fully described.

Figure 1 is a front elevation of my pile-spreader, showing a part of the loom and the fabric issuing therefrom, which may be a carpet or rug. Fig. 2 is an end elevation of my pile-spreader and a part of the loom and the carpet which is being woven. The pile-spreader is in the position in which it is found when the lay of the loom is swung back. Fig. 3 is an end elevation of my pile-spreader and a part of the loom and the carpet which is being woven. The pile-spreader is in the position in which it is found when the lay is swung forward to beat the weft-threads up in the shed.

Like letters indicate like parts in all the figures.

H represents the carpet (or other pile fabric) in the loom. A is the roller or cylinder of my pile-spreader, and B a multiplicity of needles or teeth projecting at right angles to said roll and made of brass, steel, or other suitable material. A suitable frame for carrying the needle-roller is provided by the end pieces D D, which are connected by the rods R R.

The bearing for the axle of the roller is at C. To prevent injury either to the operative or to the needles, the needle-roll is guarded in front by the cover E, which may be of any sheet metal and is secured to the rods R R and arched over the needle-roller. At the upper end of each of the supports D D is attached a strap S or its equivalent, which passes over the roller F and is secured to the lay L in any convenient fashion, as by a common snap-hook or a buckle at G. The carpet H as it is woven passes over the rounded cross-piece J and then downward and forward and around the spiked roller I, whose revolution by the usual device draws the cloth from the loom as fast as it is woven and at the same time holds the cloth in proper tension between J and I to offer the resistance required for the working of the pile-spreader. The pile-spreader is thus suspended from the lay of the loom in contact with the fabric issuing from the loom. With every forward swing of the lay the pile-spreader is suffered to roll down the face of the carpet and with every backward swing of the lay it is rolled upward, the length of travel of the pile-spreader depending upon the length of the swing of the lay at the point where the strap S is attached thereto. As the strip of carpet moves forward and downward only the breadth of one row of pile tufts at each swing of the lay, it is obvious that the number of trips of the pile-spreader over a given point on the face of the carpet may be very large and may be varied almost at pleasure by raising or lowering the point of attachment of the strap S on the lay. The number of the trips should be varied according to the quality of the goods. The weight of the pile-spreader determines the amount of the pressure of the needles and may be varied by varying the material or the construction of the roller A. The amount of pressure required depends upon the quality of the fabric and the length of the pile on which the work is to be done. The pile-spreader may be adapted in length to any width of carpet and is adaptable to any loom.

By giving the roller a rolling movement over the fabric each needle-point travels in a cycloidal path and at the moment of entering the pile moves substantially normally to the plane of the fabric, and thus wedges into the tuft without any appreciable lateral movement, and is withdrawn from the tuft in the same way. The tufts are thus spread or broomed open, but are not subjected to any injurious brushing or tearing action.

While I believe that the most convenient,

effective, and inexpensive manner of using my pile-spreader is that described—namely, as an attachment for the loom—it is obvious that it could be used separately from the loom. The ordinary loom arrangement provides a convenient holder for the fabric under the pile-spreader and mechanism well adapted to actuating the pile-spreader.

What I claim, and desire to secure by Letters Patent, is—

1. A pile-spreader, consisting of a mass of needles, a carrier therefor, and means whereby the needles are reciprocally moved upon and from a pile fabric in a direction substantially normal to the plane of the fabric.

2. A pile-spreader, consisting of a mass of needles, a carrier therefor, and means whereby the needles are reciprocally moved upon and from a pile fabric in a direction substantially normal to the plane of the fabric, combined with a holder for the fabric.

3. In a pile-spreader, the combination of a roller, clothed with radially-projecting needles, and means whereby the roller is rolled upon the surface of a pile fabric.

4. A pile-spreader, containing in combination a roller, clothed with needles, a frame having end bearings for the roller, and means whereby the frame and roller are rolled over the surface of a pile fabric.

5. A pile-spreading attachment for looms, consisting of the combination of a roller clothed with needles, connections between the roller and the loom mechanism whereby the roller is suspended upon the fabric woven by the loom, and given a rolling movement upon the surface of said fabric.

6. A pile-spreading attachment for looms consisting of a roller, clothed with needles, connections between the roller and the lay of the loom, whereby the roller is suspended in contact with the fabric issuing from the loom, and given a reciprocating rolling movement upon the surface of the fabric.

7. A pile-spreader, consisting of a mass of needles and a carrier therefor, and means for pressing the needles into the pile in a direction substantially normal to the plane of the fabric in such manner that the threads in the pile tufts are wedged apart from each other and broomed out into interlacing contact with the threads of adjacent tufts.

Signed by me at Boston, Massachusetts, this 11th day of December, 1899.

THOMAS J. STEARNS.

Witnesses:

ROBERT CUSHMAN,
E. F. GROLL.