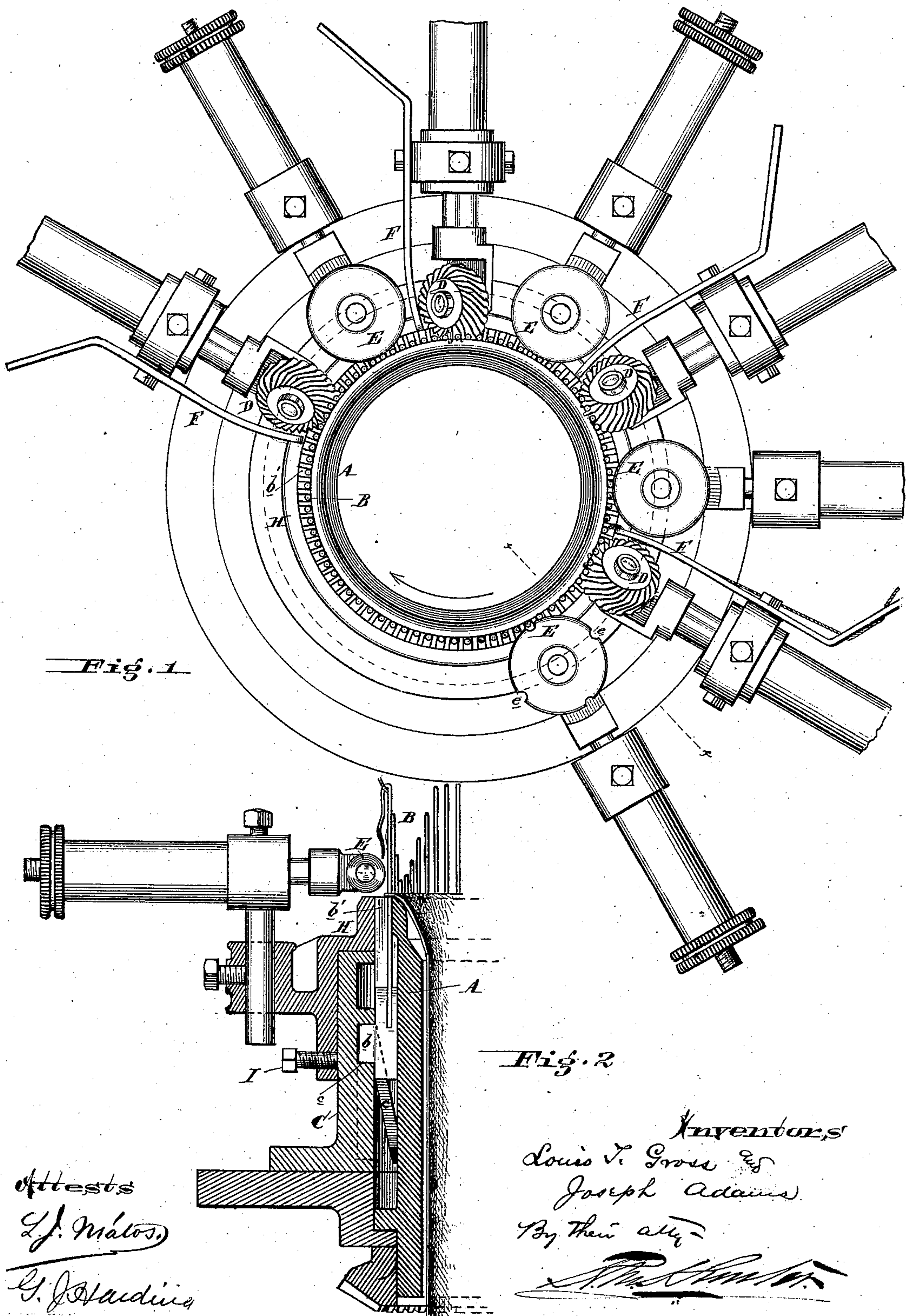


(No Model.)

L. T. GROSS & J. ADAMS.  
KNITTING MACHINE.

No. 294,381.

Patented Mar. 4, 1884.





# UNITED STATES PATENT OFFICE.

LEWIS T. GROSS AND JOSEPH ADAMS, OF PHILADELPHIA, PENNSYLVANIA.

## KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 294,381, dated March 4, 1884.

Application filed May 17, 1882. (No model.)

*To all whom it may concern:*

Be it known that we, LEWIS T. GROSS and JOSEPH ADAMS, both of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Knitting-Machines, of which the following is a specification.

Our invention has reference to circular-knitting machines; and it consists in certain improvements fully set forth in the following specification, shown in the accompanying drawings, and referred to in the appended claims.

The object of our invention is to dispense with both the latch-needles and inner or landing and knocking-over wheels, as the former are always liable to get out of order and break, and are expensive, and the latter make it impossible to make a many-colored knit tube of sufficiently small diameter on a bearded-needle circular-knitting machine, as required by the trade.

In the drawings, Figure 1 is a plan view of a knitting-machine embodying our improvements; and Fig. 2 is a sectional elevation of part of same, showing the most approved form of presser-wheel, in which the axle is horizontal.

A is the needle-head, which may be similar to the circular-knitting machine heads in which latch-needles are used. In the vertical grooves about its circumference are arranged the vertically-reciprocating bearded needles B, the bottom of said needles being provided with the needle-jacks *b*, similar to those upon latch-needles. In our machine a single set of needles is used to knit with, and all work in the same direction, and their bearded ends are entirely exposed and unobstructed from above and through the machine. This distinguishes our machine from that class of machines in which two sets of needles are used working in opposite directions, and in which both sets are entirely obstructed.

C is the usual cam-cylinder, carrying the cam *c*, which actuates the needle-jacks *b* and needle B. The needle-head A rotates within the cam-cylinder C, and thereby causes the needles to reciprocate at the proper interval, and also travel around in a circle.

D are the looper-wheels, which are similar to those now in use, and E are the presser-

wheels, which press the points of the beards of the needles in, so as to allow the loop to pass over the head of the needle. These presser-wheels may be made as shown in Fig. 1, or as shown in Fig. 2, the difference being that their axes are in different positions, and the latter construction allows more sets of looper-wheels D, presser-wheels, and yarn-guides, with the required increased number of needle-cams to be used on a given-sized machine. For imitation ribbed work the presser-wheels E are notched in the usual manner, or tuck-cams may be used to prevent part of the needles being drawn down sufficiently far to allow the loop to pass over their heads, as are commonly used upon the balmoral or latch-needle machines. These looper-wheels and presser-wheels are supported and provided with the usual adjusting devices, as shown. There may be any number of them desired arranged around the outside of the needles B; but there are no wheels within the said needles. By dispensing with said internal wheels we are enabled to make very small tubes with many colors of yarn, as the space formerly required for said wheels is not now necessary, and the diameter may be greatly reduced, the center being unobstructed, and still allow the use of a number of looping-wheels outside, each using a different-colored yarn. The looper-wheels and presser-wheels are supported by the plate H, which, when in position, closes the fronts of grooves *b'*, and when removed carries with it all of the said looper-wheels and presser-wheels, leaving the needles clear. This plate H may be adjusted about the cylinder C, so as to bring all of the presser and looper wheels into proper register with the cams *c* simultaneously, and may be secured in place by one or more set-screws, I, or other suitable device.

F are the usual yarn-guides, and are adapted to feed or guide the yarn to each of the looper-wheels D, which press it up under the beards of the needles.

The operation is as follows: The cam-cylinder C, presser-wheels E, and looper-wheels D being held stationary, and the needle-head A being rotated, and with it the needles B, the yarn is fed by said looper-wheels up under the beards of the needles; and as the needles pass on to the presser-wheels E they are drawn



down by the usual cam, *c*, and the beards, being pressed in the needles, pass down through the loops and draw the threads or yarns with them.

After the loops have passed over the heads the needles are again forced up, and the yarn which they last drew down now forms the loops, and the operation is repeated. By either using tuck-cams, as is common on the latch-needle machines, or the notched presser-wheels, as is common on the bearded-needle machines, or both combined, we can make any of the usual patterns of imitation ribbed goods.

If desired, the machine may be worked with the knitted tube pulled down through the opening within the needles, or it may be pulled up, in the latter case the usual push-back being used, in which case the tube is drawn up through said push-back by means of suitable cords and weights, the push-back keeping the work up to the needles, as is common in knitting-tubes.

We are aware of the patents to Park and Ells, No. 15,492, August 5, 1856, and Clay, No. 40,993, December 22, 1863, and claim nothing therein set forth or claimed.

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

1. In a knitting-machine, the combination of needle-head A, provided with grooves *b'*, bearded needles B, provided with needle-jack *b*, cam-cylinder C, provided with camway *c*,

plate H, presser-wheels E, and looper-wheels D, supported and carried by said plate H, substantially as shown.

2. The combination of a rotating circular needle-bed, a series of bearded needles carried by said needle-bed, a series of cams to reciprocate said needles, said cams being connected together to form a continuous guideway, a series of looper-wheels, a series of presser-wheels, said cams and looper and presser wheels being equal in number, and a single circular and adjustable supporting-plate to which said looper-wheels are secured, whereby the said looper-wheels may be removed or adjusted about said needles without changing their relative position, as shown.

3. The combination of needle-bed A, provided with vertical guide-slots *b'*, bearded needles B, circular plate H, arranged about said needle-bed, but held stationary, and adapted to close the outer openings of slots *b'*, presser-wheels E, and looper-wheels D, secured to said plate H, and adapted to be all removed or adjusted simultaneously about said needle-bed, substantially as shown and described.

In testimony of which invention we hereunto set our hands.

LEWIS T. GROSS.  
JOSEPH ADAMS.

Witnesses:

R. M. HUNTER,  
R. S. CHILD, Jr..