

No. 870,170.

PATENTED NOV. 5, 1907.

H. HILL.  
WARP KNITTING MACHINE.  
APPLICATION FILED DEC. 17, 1906.

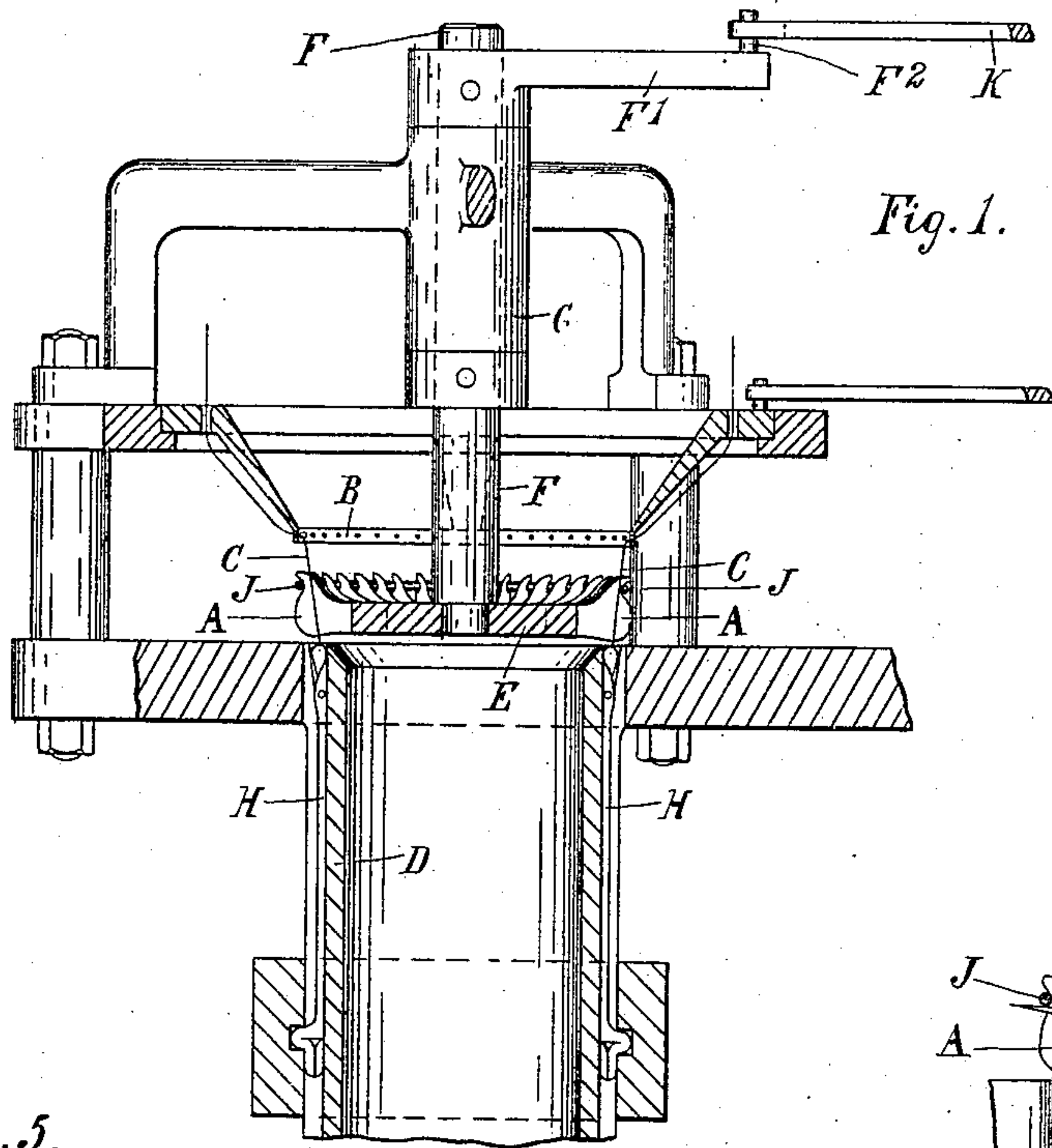


Fig. 1.

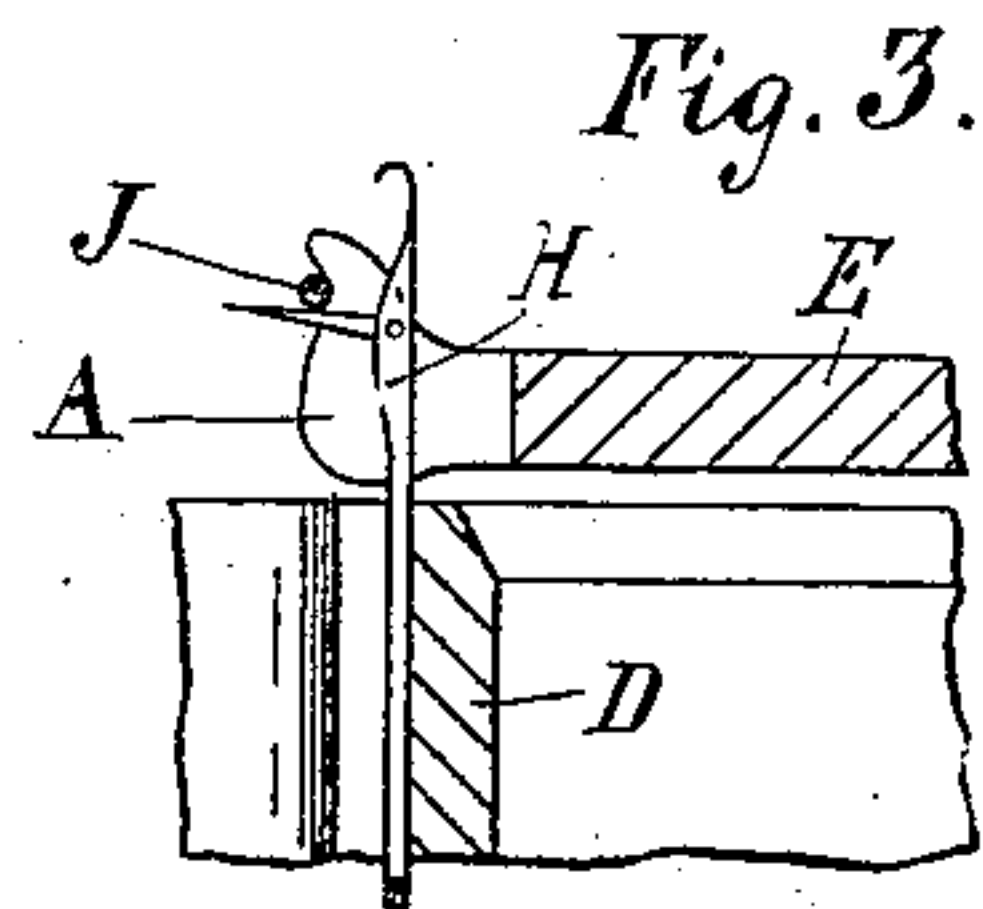


Fig. 3.

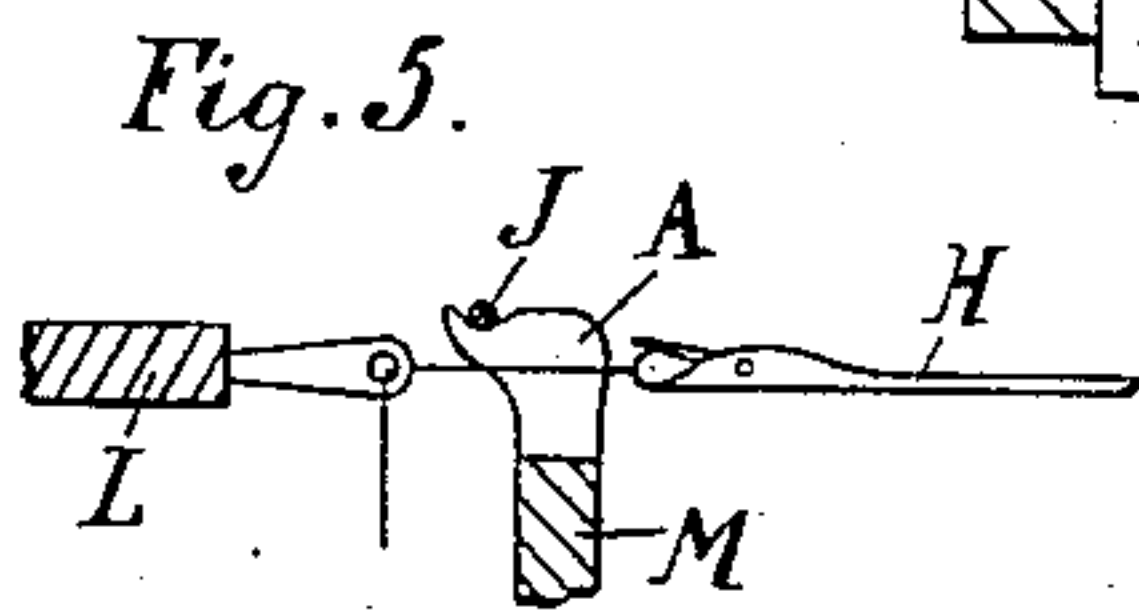


Fig. 5.

Fig. 2.

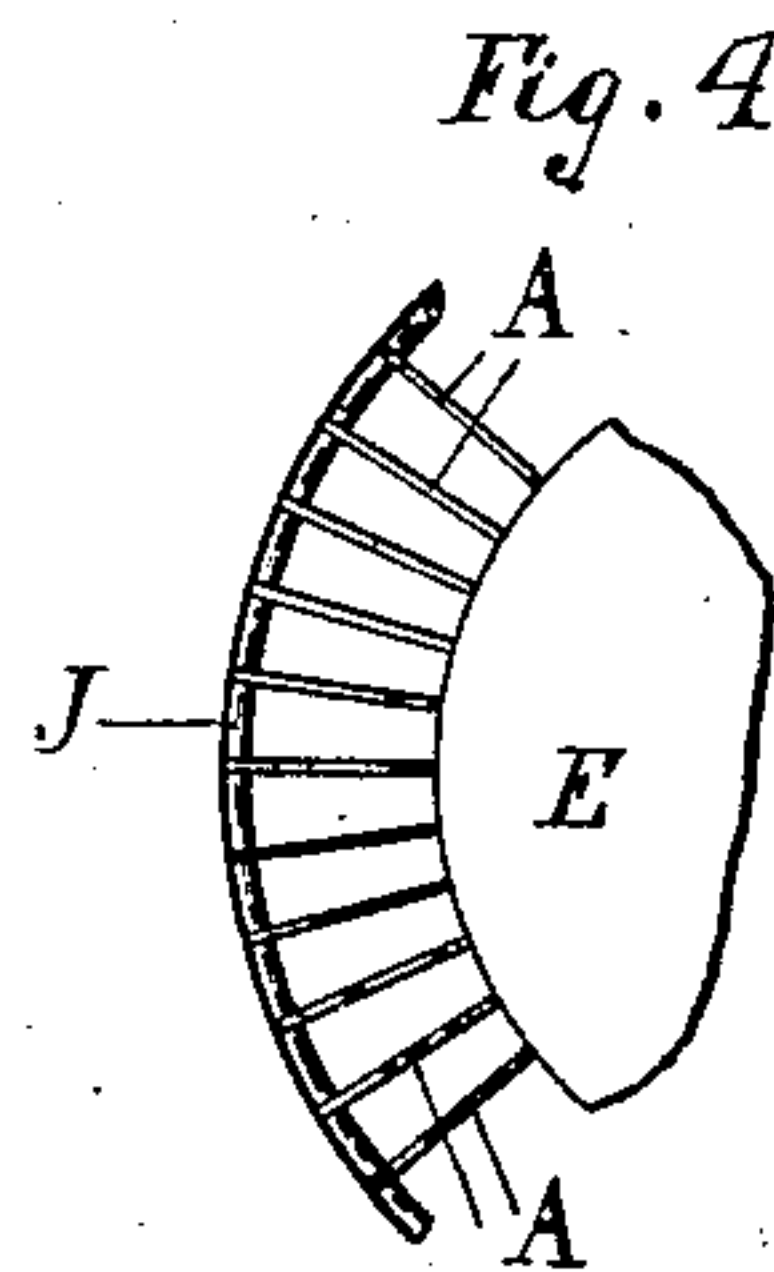
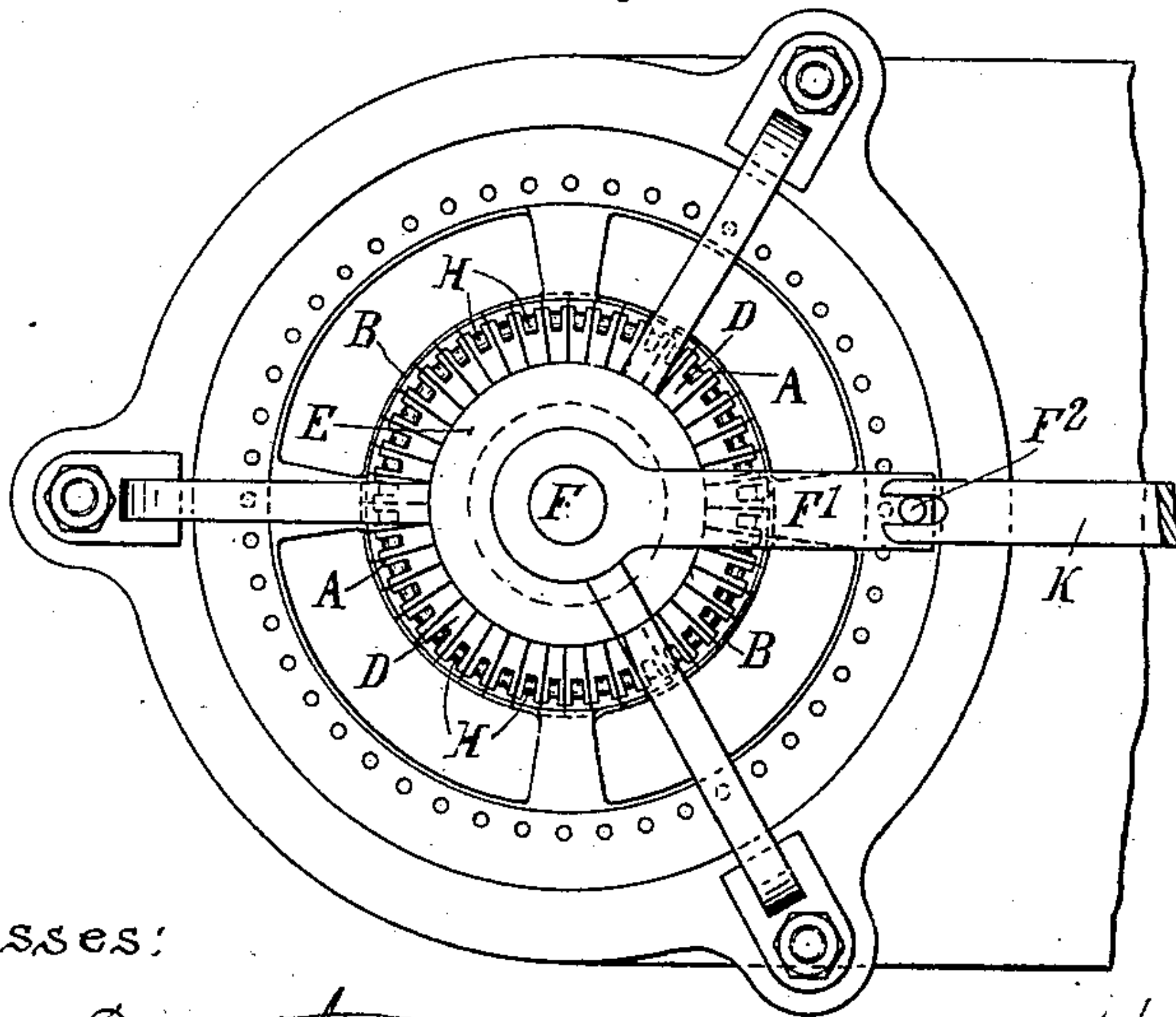


Fig. 4.

Witnesses:

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Henry Hill  
by *Charles M. Hill*  
his Atty.



# UNITED STATES PATENT OFFICE.

HENRY HILL, OF NOTTINGHAM, ENGLAND.

## WARP-KNITTING MACHINE.

No. 870,170.

Specification of Letters Patent.

Patented Nov. 5, 1907.

Application filed December 17, 1906. Serial No. 348,278.

*To all whom it may concern:*

Be it known that I, HENRY HILL, a subject of the King of Great Britain, and resident of Nottingham, England, have invented certain new and useful Improvements in Warp-Knitting Machines, of which the following is a specification.

This invention relates to improvements which are applicable to either circular or straight-bar warp knitting machines and its object is more particularly to adapt such machines so that they will produce simple fabrics with greater facility, and with a more regular mesh than heretofore.

Referring to the drawings, Figure 1. is a sectional elevation, and Fig. 2. a plan showing my invention applied to a circular warp knitting machine. Fig. 3. is a sectional elevation showing the relative positions of the needles, the radial jacks, and needle latch stop, when the needles are raised to clear the loops. Fig. 4. is a plan showing part of the radial jacks and the needle latch stop. Fig. 5. is a sectional elevation showing the disposition of the jacks and needle latch stop in a straight-bar warp knitting machine. Figs. 3 and 4 are drawn to a larger scale than the remaining figures.

Like letters indicate like parts throughout the drawings.

According to this invention jacks A (see Figs. 1 to 4) are employed, but instead of reciprocating them in a direction either at right-angles or parallel to the axis of a circular machine as heretofore, so as to move them in and out of mesh with the threads C, they are retained in one vertical position, that is, immediately above the upper end of the needle trick cylinder D (see Figs. 1 and 3) and are thus always in mesh with the said threads C (see Fig. 1.). In order to permit of the threads C being transferred from one needle to another under these circumstances, the jacks A are reciprocated angularly with the thread guide ring B, so that this operation is performed as readily as if the ends of said jacks A were drawn clear of the threads C each course. This angular movement of the jacks A takes place when the needles H have been withdrawn below the verge of the needle cylinder D and are clear of said jacks.

The jacks A described are attached to a central boss E secured on the lower end of a vertical shaft F, which latter is mounted in a sleeve bearing G (see Fig. 1.) attached to the fixed framing, and they partially fill in the space or gap between the upper end of the needle trick cylinder D and the lower edge of the thread guide ring B.

When disposed and actuated as described, the necessity for withdrawing the jacks A from the threads C is obviated, and this permits of them being employed to carry a stop ring J, (see Figs. 1—3—and—5) which

prevents the latches of the needles H from flying up and covering the needle hooks, when the said needles rise to clear the loops as shown in Fig. 3. an unavoidable action of the latches which has hitherto been a constant source of difficulty, but is entirely obviated by this arrangement.

In order to hold the stop ring J the outer end of each of the jacks A is formed with a notch as shown, which together form an annular recess or groove to admit the ring J.

The jacks A being always in the position shown, constantly hold the work down on the needle trick cylinder D, and they are moved angularly when the needles H are lowered as shown in Fig. 1. clear of the same. The action of the jacks A and thread guide ring B when moved angularly as described serve to carry the threads across from one needle H to the other, so that the latter can take the said threads without difficulty.

The jacks A are preferably reciprocated angularly by an arm F<sup>1</sup> (see Figs. 1 and 2) on the shaft F, and a cam actuated lever K engaging with a pin F<sup>2</sup> at the end of the arm F<sup>1</sup>, being an arrangement similar to that employed for reciprocating the thread guide ring B, but being independent thereof, so that the timing and extent of their angular movement may if desirable be varied relatively to that of the thread guide ring B. For example in transferring the threads C one needle alternately to the left and right by reciprocating the thread guide ring B, the said ring B must move through a space occupied by two needles so as to lay each thread right across the next needle to that on which it last knitted, while the jacks A will only have to move through a space occupied by one needle, that is to say, each jack will have to move from one side of its corresponding needle to the other.

Two or more thread guide rings B may be employed if desirable, but it is obvious that with this arrangement the movement of the whole of the said rings must be in the same direction as the jacks A.

In a straight-bar warp knitting machine, the jacks A (see Fig. 5.) are situated between the bar which carries the needle H and the thread guide bar L, and they are carried by a bar M which may be mounted and reciprocated in a straight line in a similar manner to the thread guide bar L. In this case the notches in the jacks lie in a straight line, and a straight length of wire J to form the needle latch stop is laid in said notches to prevent the needle latches from closing. Instead of a notch however, a hole may be formed in each jack A, and a length of wire threaded through these holes. This arrangement may in some cases be found more convenient for straight bar machines.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a warp knitting machine the combination of the needles, the thread guiding mechanism, and jacks which  
5 are always retained in mesh with the threads and are reciprocated with the thread guiding mechanism, substantially as described.

2. In a warp knitting machine the combination of the needles, the thread guiding mechanism, and jacks which

are always retained in mesh with the threads and are reciprocated with the thread guide mechanism, and needle-latch stop mechanism carried by the jacks, substantially as described. 10

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 15  
HENRY HILL.

Witnesses:

C. H. HICKLING,  
J. B. JAMSON.