July 2, 1929. M. C. MILLER 1,719,121

KNITTING MACHINE

Filed Sept. 15, 1926

FIG 2

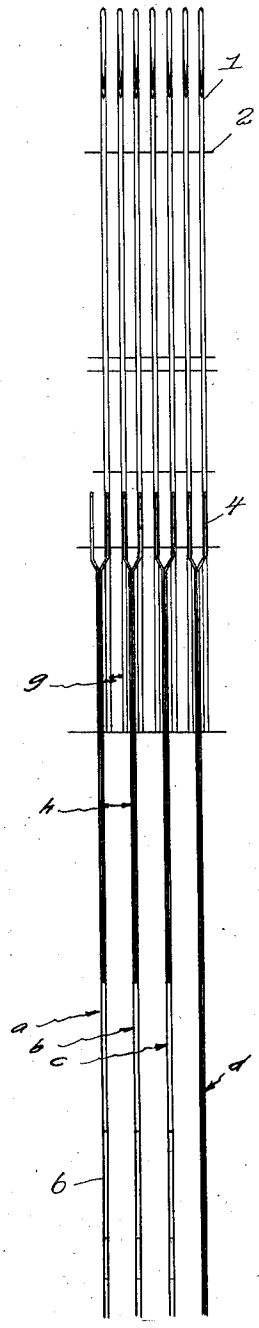
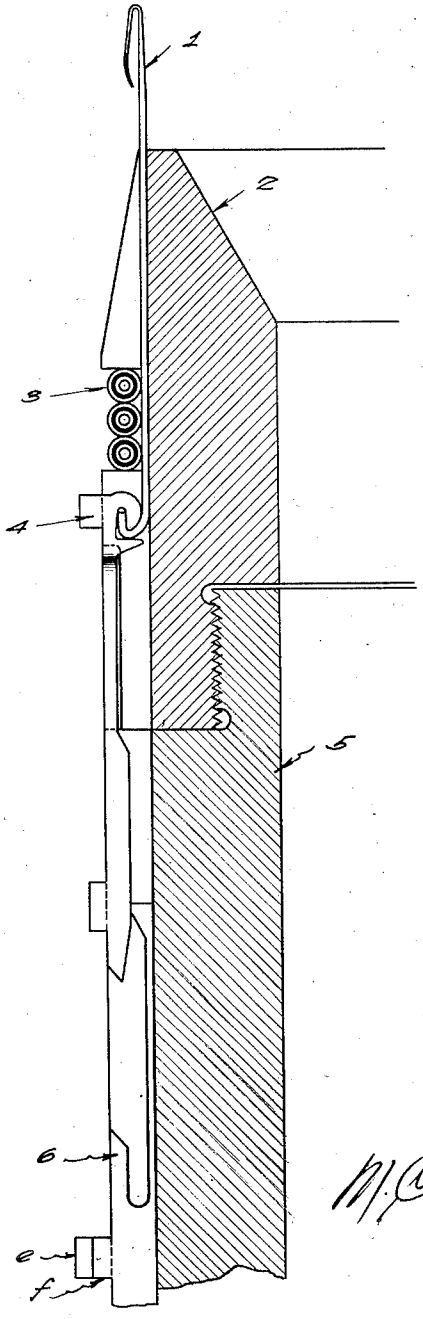


FIG 1



INVENTOR.

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UNITED STATES PATENT OFFICE.

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KNITTING MACHINE.

Application filed September 15, 1926. Serial No. 135,573.

The present invention relates to knitting machines and is herein disclosed as embodied in a circular knitting machine employing spring beard needles.

The object of the invention is to provide novel and improved operating and supporting means for the various knitting elements which will be especially adaptable for use in fine gage machines.

Difficulties have been experienced in the manufacture of the cylinders or beds for fine gage machines due to the fact that the slots for carrying the needles and other operating members must necessarily be very close to each other thus making the dividing walls correspondingly thin. In machines in which the cams operate to move the needles successively, considerable side strain and wear is encountered. It is, therefore, necessary to make that portion of the bed which must take this side strain strong enough to permit these cams to function, thus limiting the amount to which the slot walls may be thinned and consequently limiting the fineness of the gage for which the machines may be built.

It is more specifically the object of the invention to eliminate the difficulties above enumerated in the building of fine gage machines.

With these objects in view, one feature of the invention consists in placing those portions of the operating elements carrying the butts in comparatively coarse gage slots, thereby making it possible to build very fine gage machines and yet have walls of sufficient thickness between the operating elements.

The various features of the invention also consist in the devices, combinations and arrangements of parts hereinafter described and claimed and together with the advantages to be obtained thereby will be readily understood by those skilled in the art from the following description taken in connection with the accompanying drawings.

Referring to the drawings, Fig. 1 is a sectional view in elevation of one embodiment of the invention in a circular knitting machine illustrating only so much of the machine as is necessary to show the connection of the present invention therewith; Fig. 2 is a view in elevation of certain of the parts shown in Fig. 1 including needles, needle slots and needle actuating jacks.

In the machine illustrated by the drawings, the needles are mounted in the usual manner in separate slots in the needle cylinder or bed, where they are held by a series of spring bands. Needle jacks are guided separately at their upper ends in the needle slots and at their lower ends by pairs in comparatively coarse gage slots.

Referring more particularly to the drawings, the needles indicated at 1 are carried on the needle cylinder 2 and are held in place in their slots by the spring bands 3. Attached to the lower ends of the needles are the needle actuating jacks 4. The needle cylinder 2 is mounted on a supporting cylinder 5 which has cut in its periphery a series of comparatively coarse gage slots, half as many in number as the needle slots cut in cylinder 2.

The needle jacks 4 are guided at their upper end separately in the needle slots of cylinder 2 and at their lower ends in the coarser gage slots of the cylinder 5, two in each slot. The butts of the jack 4 are held raised in operative position or are permitted to swing down out of contact with the needle actuating cams by means of jacks 6. This method of rendering inoperative the desired needles by means of swinging jacks is clearly set forth in the inventor's pending application, Serial No. 631,071.

It will be noticed that whereas the upper cylinder 2 is slotted necessarily in accordance with the gage of the machine, a slot being provided for each needle, the lower cylinder 5 has only one slot for each two slots in the upper cylinder 2, thus permitting slot walls of double the thickness in that portion of the needle cylinder which is subjected to the side strain and wear of the needle cams.

A single controller jack 6 may be provided for each pair of needle jacks 4 as illustrated at *a*, *b* and *c* in Fig. 2 so that the needles are controlled in pairs. This is not ordinarily objectionable in fine gage machines but in case it is desired to control the needles separately two jacks 6 of thinner stock may be provided in each slot and provided with long and short butts respectively, as illustrated at *d* in Fig. 2, the long butt being indicated at *e* and the short butt at *f* in Fig. 1.

The invention herein described and illustrated not only permits of a stronger and more durable construction in present fine gage machines through the introducing of thicker slot walls to withstand the side strain of the actuating cams, but also makes it possible to build finer gage machines than heretofore.

While the present invention is illustrated in connection with spring beard needles, it is clearly not limited thereto, but may be utilized with any type of needle and also in conjunction with other knitting elements which must be placed very close together as for instance the sinkers ordinarily found in spring needle machines. Moreover, the invention is not limited to the combination of such knitting elements with operating jacks, as it is perfectly feasible to have the shanks of the knitting elements themselves guided at their lower ends in pairs in the comparatively coarse gage slots of the cylinder 5.

The invention having been described and illustrated and the advantages obtained thereby set forth, what is claimed is:

1. In a knitting machine, the combination of a needle bed, a series of needles, slots formed in the bed for the needles, a separate series of slots, needle actuating elements arranged in pairs guided at one end separately in the needle slots and together in a single slot at their other end.

2. In a knitting machine, the combination of a needle bed, slots in the bed, a series of needles mounted in the slots, and swinging jacks adapted to be withdrawn from contact with the needle actuating cams and arranged in pairs so that the upper ends of the jacks are guided separately in the needle slots, the lower ends being guided together in pairs in single slots.

3. In a knitting machine the combination of a needle bed, a series of fine gage needle slots formed in the bed, a series of comparatively coarse gage slots, half as many in number as the first series, a series of needles mounted in the slots, a corresponding series of jacks for the needles arranged in pairs, each pair being guided at its lower end in a single coarse gage slot, the upper ends being guided in separate fine gage slots, and one element of each pair being provided with a long butt, the other element being provided with a short butt.

4. In a knitting machine the combination of a needle bed, a series of fine gage needle slots formed in the bed, a series of comparatively coarse gage slots, half as many in number as the first series, a series of needles mounted in the slots, and a corresponding series of jacks for the needles arranged in pairs, each pair being guided at its lower end in a single coarse gage slot, the upper ends being guided in separate fine gage slots.

In testimony whereof I have hereunto signed my name to this specification.

MAX C. MILLER.