

(No Model.)

4 Sheets—Sheet 1.

W. DIEBEL.

NEEDLE PICKING DEVICE FOR CIRCULAR KNITTING MACHINES.

No. 491,089.

Patented Feb. 7, 1893.

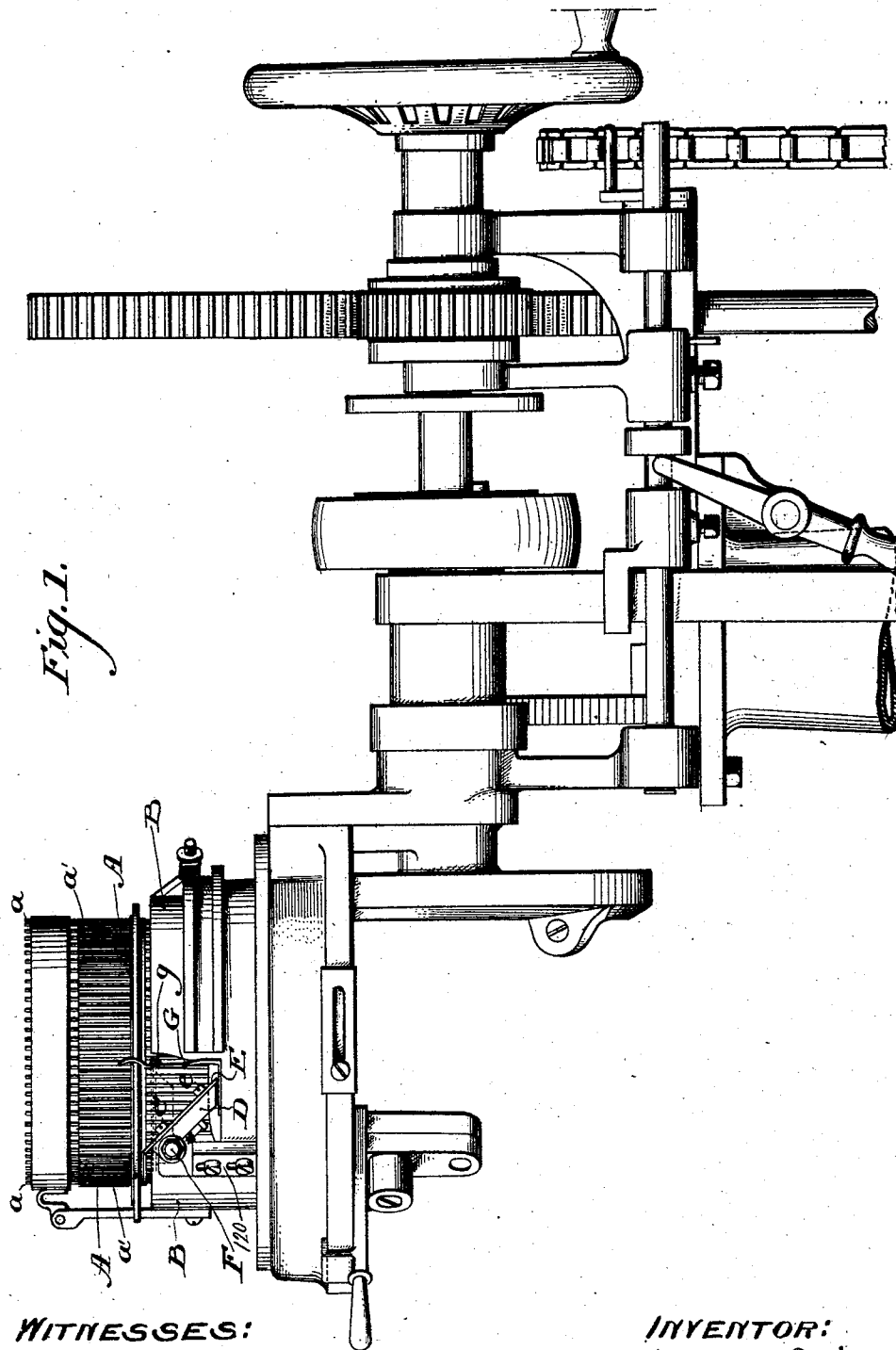


Fig. 1.

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G. J. Hardin

(No Model.)

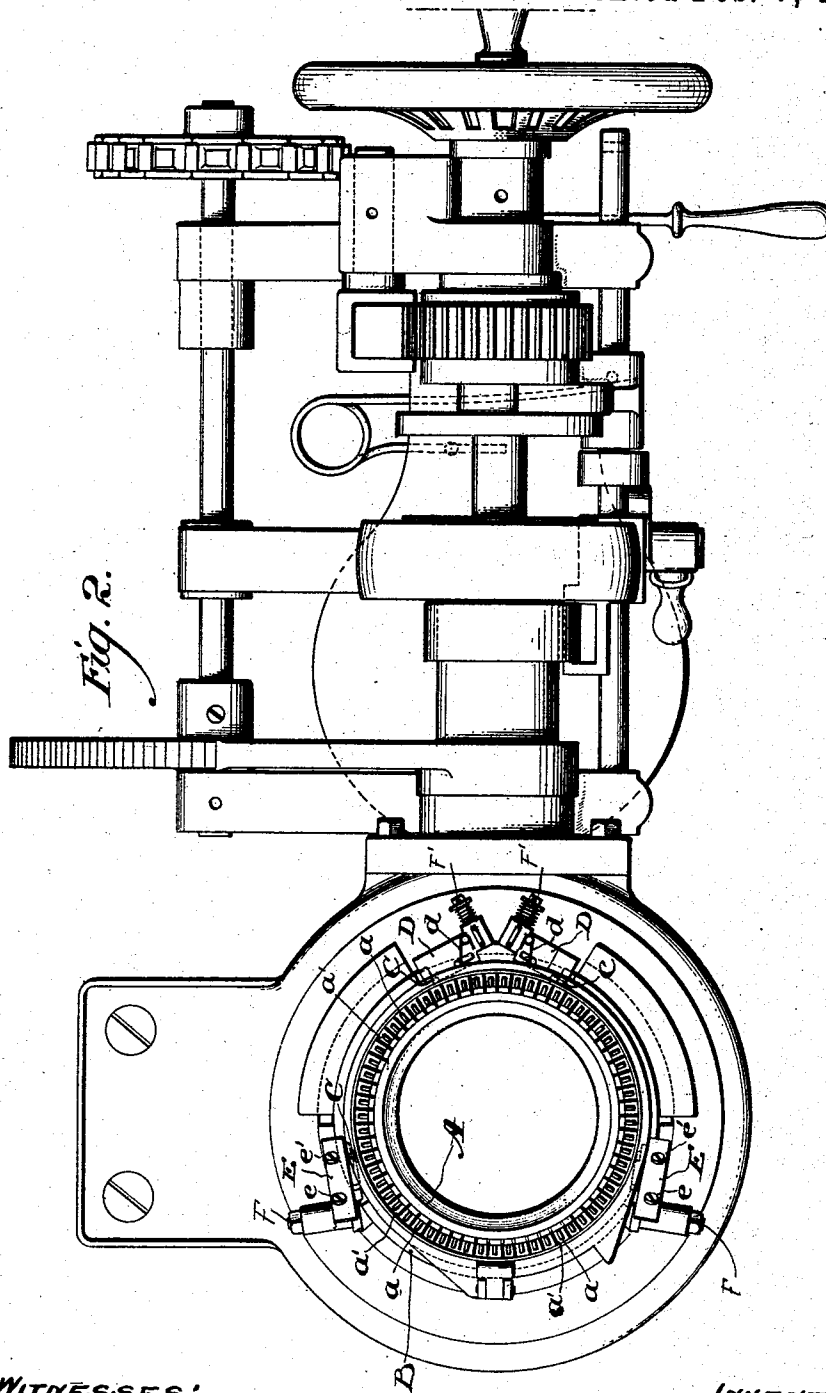
4 Sheets—Sheet 2.

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Fig. 3.

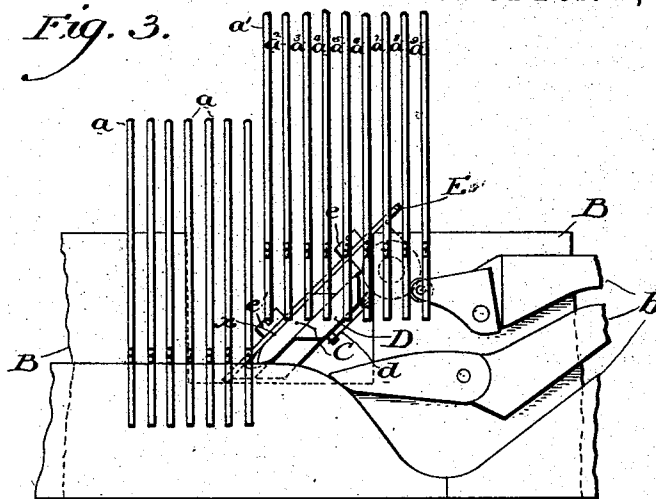


Fig. 4.

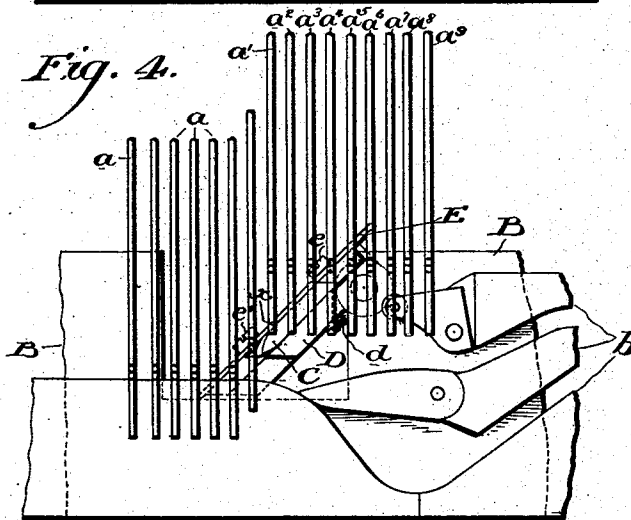
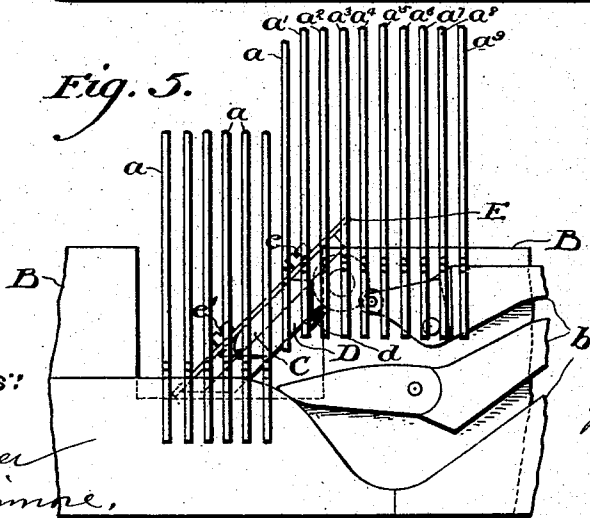


Fig. 5.



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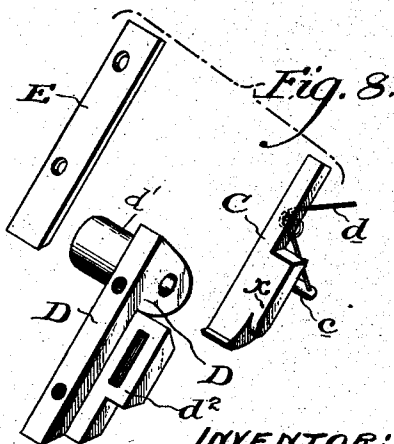
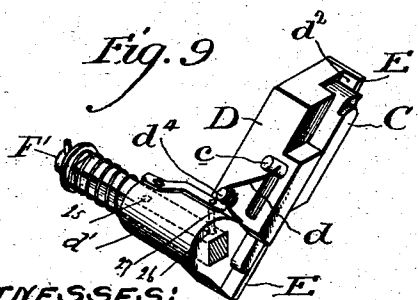
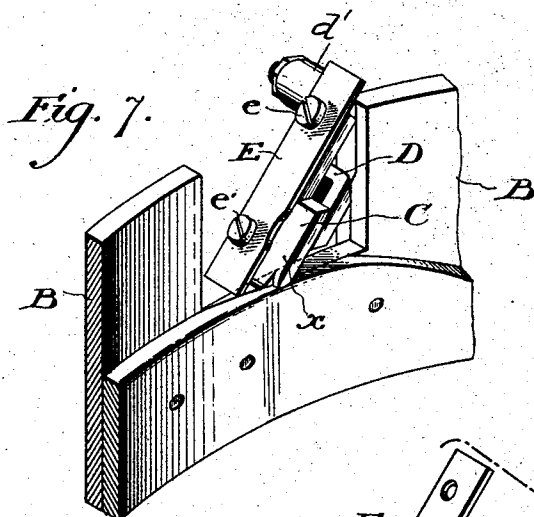
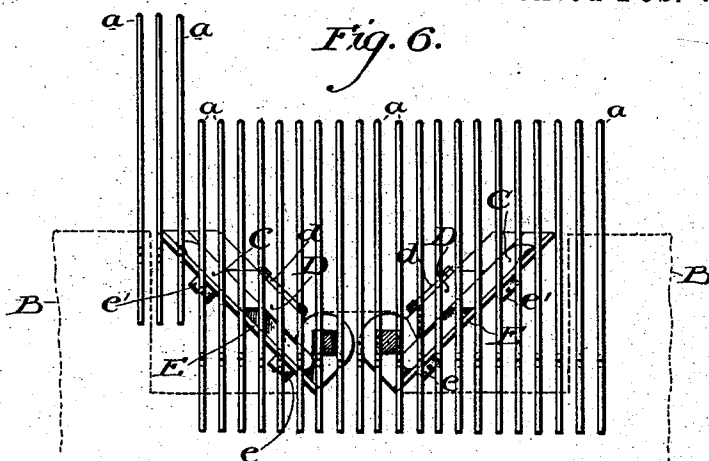
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UNITED STATES PATENT OFFICE.

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NEEDLE-PICKING DEVICE FOR CIRCULAR-KNITTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 491,089, dated February 7, 1893.

Application filed September 9, 1891. Serial No. 405,162. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM DIEBEL, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Needle-Picking Devices for Circular-Knitting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention particularly relates to mechanism for throwing the needles in and out of action when the knitting cylinder is reciprocated in forming fashioned work, as the heel and toe of a stocking, or to what is termed the needle picking mechanism.

I will describe a machine embodying my improvement in the preferred form.

In the drawings—Figure 1 is a side elevation of a portion of an automatic machine with needle picking devices applied thereto. Fig. 2 is a plan of same. Fig. 3 is a diagrammatic view showing the needle picking mechanism about to act upon one of the needles to lift it. Fig. 4 is a diagrammatic view showing the needle picking mechanism acting upon a needle, which is partly lifted. Fig. 5 shows the needle elevated and about to pass upon the upper needle cam. Fig. 6 is a diagrammatic view of the needle picker in use for lowering needles. Fig. 7 is a perspective view of part of the cam cylinder and needle picker mechanism in position for lifting needles. Fig. 8 is a detached perspective view of the needle picker shown in Fig. 7. Fig. 9 is a detached perspective view of the needle picker in position to lower needles.

A is the needle cylinder; a the needles which rest in grooves a' in the needle cylinder.

B is the knitting cylinder provided with knitting cams b . The knitting cylinder is rotated during the formation of the tubular fabric by hand or by any desired mechanism. When it is desired to form the heel or toe of the stocking the knitting cylinder is reciprocated and alternately one needle on each side is elevated out of action until the desired number are so elevated out of action and the goods narrowed, when the needles elevated are alternately one on each side thrown into

action until those elevated out of action are again put in action. I use for this purpose an improved piece of mechanism which I term a needle picker, which is shown in detail in Figs. 3, 4, 5, 6, 7, 8 and 9, and consists essentially of a cam C provided with the pin c which projects through a slot in the cam plate D. A spring wire d bears against the pin c , its other end being coiled around a pin d' on the cam plate (Fig. 9). The cam plate D has the hollow arm or bearing d' .

E is a guide plate secured to the cam plate by screws e, e' , the cam plate having an inset or overhanging portion d^2 , the cam C resting between the cam plate D and guide plate E. The hollow arm or bearing d' of the cam plate D is placed upon a pin or projection F upon a bracket 120, one cam plate and cam on each side of the knitting cams, the cam plate and its appurtenances being adapted to turn on the pin.

G is a leaf spring provided with a notch g , and the cam plate, cam and appurtenances are held up by the spring when not in use, the end of guide plate E resting in said notch and when the plate E is released from the notch, the picker falls and assumes an operative position. The end of the cam C is notched as shown.

The needle picker is mounted upon a bracket 120, which bracket is provided with slots and screws passing through the same into the cam cylinder, by which means the said bracket may be adjusted up and down upon the cam cylinder.

I will first describe my needle picker as used to elevate the needles, in which case the needle picker is in the position shown in Fig. 7, one on each side of the needle cams and in advance of the movement of the needle cams. In knitting a heel or toe, one-half of the needles are thrown out of action, as shown in Fig. 3 by needles $a, a', a^2, a^3, a^4, a^5, a^6, a^7, a^8, a^9$. When the knitting cylinder is reciprocated, the needle picker cam strikes the first needle, which is not elevated, and the needle is caught by the toe on the end of the cam C, which holds the needle, and the further movement causes the cam C to slide upward, carrying the butt of the needle with it. This movement of the cam C prevents the toe at

the end of said cam from catching or striking against the next needle (Fig. 4). When the cam has traveled the extent of its movement in the cam plate, the further movement of the cam cylinder causes the needle to travel up the face *x* of the cam C, up which it is carried a height sufficient that when the cam C is passing beyond the needle, said needle will be in line with the upper plate of knitting cam *b*, up which it is carried out of the path of the knitting cams (Fig. 5). The return movement of the knitting cylinder brings the cam C back to initial position and the other cam C on opposite side of knitting cylinder acts upon the corresponding needle in the other side of the cylinder in the same manner as just described. This is continued, alternately lifting out of action one needle on each side of the cylinder until the goods are narrowed down the desired extent, when the needle pickers as arranged for narrowing are thrown out of action and the needle pickers arranged for depressing are put into action. These latter needle pickers are essentially the same as used for elevating, except that their position is reversed (see Figs. 6 and 9). These needle pickers for depressing are attached to the cam cylinder by being mounted upon brackets 120, in the manner shown in Fig. 1, in connection with the pickers for elevating needles, so as to reciprocate with the cam cylinder, as shown in Figs. 2 and 3. But the pickers for depressing the needles slide in and out of operative position upon square pins *F'*, as shown in Fig. 9, and in each projection *F'* are detents 25 and 26 adapted to receive a spring pressed pin 27 secured to arm *d'*.

The operation is as follows: When the cylinder is reciprocated the jaw of the cam of the needle picker catches the butt of the first elevated needle it strikes and the further movement causes the cam to slide down, drawing with it the needle, until the cam C has reached the limit of its sliding movement, when the butt of the needle slides along the

face of the cam, after which the cam returns by the aid of the spring *d* to its original position. The corresponding needle on the other side of the cylinder is operated upon by a corresponding cam in a corresponding manner, when the knitting cylinder moves in the other direction. This is continued; alternately depressing a needle into action on each side of the knitting cam until the work is widened out sufficiently.

Having now fully described my invention, what I claim and desire to protect by Letters Patent, is—

1. In a circular knitting machine, a needle picker consisting of a cam adapted to engage the needle and a plate in which said cam is adapted to slide.

2. In a circular knitting machine, a needle picker consisting of a cam adapted at the end to engage the needle and be operated thereby, a plate in which said cam is adapted to slide and a spring adapted to be rendered active when said cam slides.

3. In a circular knitting machine, a needle picker consisting of a cam adapted at the end to engage the needle and be operated thereby and a plate in which said cam is adapted to slide, said plate being provided with a bearing.

4. In a knitting machine, a needle picker consisting of a cam as C, a plate as D, to which said cam is connected, said plate being provided with a bearing as *d'*.

5. In a knitting machine, a needle picker consisting of a cam as C, a plate as D, an orifice in said plate, a pin connected to said cam and passing through said orifice, a spring attached to the plate and bearing on said pin and a guide plate as E connected to said cam plate.

In testimony of which invention I have hereunto set my hand.

WM. DIEBEL.

Witnesses:

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H. C. DINMORE.