H. SCHWARTZ & A. A. GRUNDY.

NEEDLE RETAINING MECHANISM FOR FLAT KNITTING MACHINES.

APPLICATION FILED FEB. 2, 1916.

1,210,108.

Patented Dec. 26, 1916.

2 SHEETS—SHEET 1.

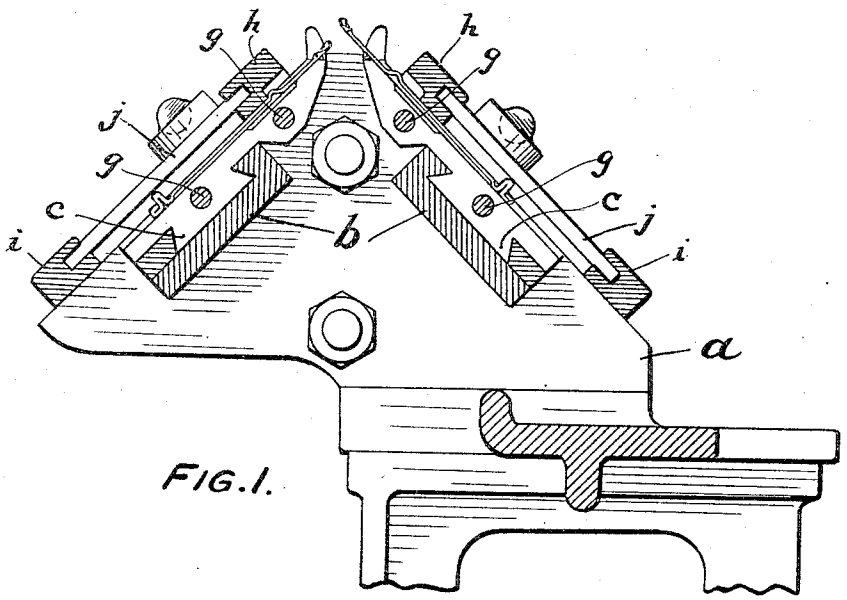



FIG. 1.

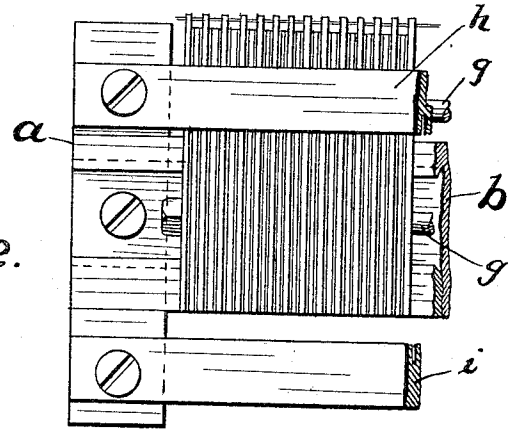



FIG. 2.

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2 SHEETS—SHEET 2.

FIG. 3.

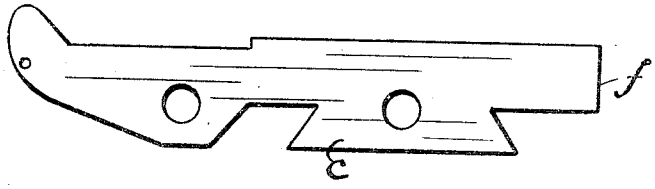



FIG. 4.




FIG. 5.




FIG. 6.

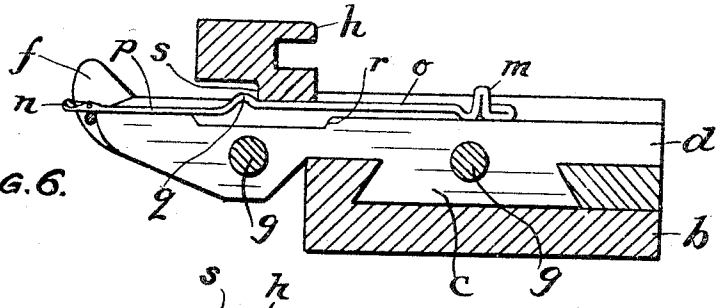
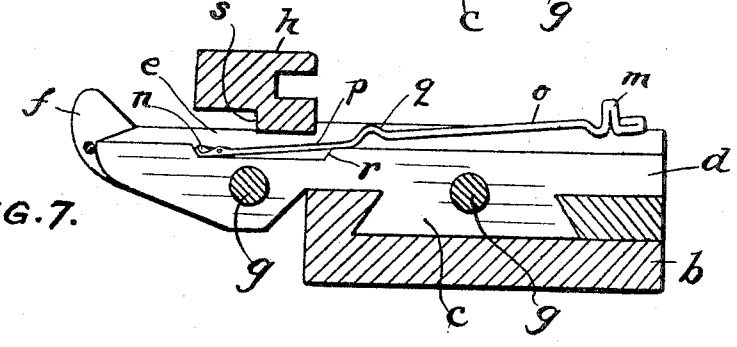



FIG. 7.




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# UNITED STATES PATENT OFFICE.

HERMAN SCHWARTZ, OF PHILADELPHIA, PENNSYLVANIA, AND ALFRED A. GRUNDY, OF BROOKLYN, NEW YORK, ASSIGNORS TO THEMSELVES, AND SAMUEL GRUSHLAW, OF PHILADELPHIA, PENNSYLVANIA.

## NEEDLE-RETAINING MECHANISM FOR FLAT-KNITTING MACHINES.

1,210,108. Specification of Letters Patent. Patented Dec. 26, 1916.

Application filed February 2, 1916. Serial No. 75,822.

*To all whom it may concern:*

Be it known that we, HERMAN SCHWARTZ and ALFRED A. GRUNDY, citizens of the United States, residing at, respectively, Philadelphia, county of Philadelphia, and State of Pennsylvania, and Brooklyn, county of Kings, State of New York, have invented a new and useful Improvement in Needle-Retaining Mechanism for Flat-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.

Our invention relates to flat or straight knitting machines and has for its object to produce a new and simplified construction for securely holding the needles upon their beds and facilitating their removal and replacement.

A preferred embodiment of the invention is shown in the accompanying drawings, in which—

Figure 1 is a cross section through part of a flat knitting machine embodying our invention. Fig. 2 is a partial plan view of one of the needle beds. Figs. 3, 4 and 5 are side views of a sinker plate, a divider plate and a needle rest plate respectively. Figs. 6 and 7 are cross sections through one of the needle beds with the needle in different positions.

The frame *a* of the machine is recessed on opposite sides to receive longitudinally slidable bars *b*, which constitute the supports for the two needle beds. Each bar *b* is provided with a dovetail groove into which extends dovetail flanges *c* on three sets of plates, one set being arranged to form needle rests *d*, another set to form sinker plates *e*, and another set to form divider plates *f*. The plates are strung upon bolts *g*.

*h* is the upper rail and *i* the lower rail on each side of the machine, the rails being grooved to form guide ways for the sliding cam plates *j*. The cam plates are reciprocated longitudinally by mechanism not herein shown and forming no part of our invention. In fact, the parts need not be constructed as hereinbefore described, but the described construction constitutes merely a preferred form to which our invention is applied. For a fuller description thereof, see our application Serial No. 44,871, filed August 11, 1915.

Our improved needle is constructed with the usual butt *m* and latch *n*. Between the butt and latch, extending from a point close to the butt to a point some little distance from the latch, the needle is provided with an offset portion or arch *o* extending above the level of the front part *p* of the shank. The front of the arched portion of the shank is provided with a short hump or bend *q* extending to a still higher level. Beneath the rail *h* the needle base or rest is provided with a depression *r* which extends from about the inner or higher edge of the rail to a short distance beyond its outer or lower edge. The under face of the rail is cut away from its inner edge part way back to form a shoulder *s*.

To remove a needle from its working position it is pulled down or out until the latched end rests over the depression *r*. This outward movement of the needle is permitted notwithstanding the hump *p*, because of the yielding capacity of the arched portion *n* of the needle. When the needle is drawn down to this position, the latched end of the needle drops, or is tilted, into the depression *r*, whereupon the needle may be readily withdrawn.

To insert a needle into its working position, the needle is pushed into an inclined position with its latched end resting in the depression *r*. By pushing on the butt the neeedle is moved into operative position, until the hump *p* rides beyond and snaps in front of the shoulder *s* on the rail *h*. The needle is then held in position by its own resiliency and is further held from dropping out of action by the engagement of the hump *p* against shoulder *s*.

A needle constructed as described and cooperating with a rail and needle rest constructed as described will be held in place by its own resiliency and without the necessity of providing an extraneous securing device such as is customarily used, and therefore simplifies both the construction and the operation of inserting and removing needles.

Having fully described our invention, what we desire to protect by Letters Patent is:

1. In a flat knitting machine, the combination with a needle base having a depression, of a rail above the depression, and a needle having a butt and a resilient offset

portion between its butt and its head adapted to coöperate with the rail to normally hold the needle in active position, said depression permitting the needle, when suitably positioned, to be tilted and withdrawn.

2. In a flat knitting machine, the combination with a needle having an offset portion and a hump in such offset portion, of a device forming a shoulder and adapted to coöperate with the hump to normally hold the needle from moving out of active position, and a needle base having a depression beneath the shoulder to allow the needle to be tilted and then withdrawn.

3. In a flat knitting machine, the combination with a needle base having a depression and a rail above said depression cut away to form an upwardly or inwardly facing shoulder, of a needle provided with a butt, an offset portion between the butt and the head and a hump near the front of the offset portion.

4. In a flat knitting machine, the combination with the needle bed, of a pair of longitudinally extending rails one of which overlies the upper or inner portion of the needle bed and is provided with a shoulder, a reciprocatory cam plate slidable within and between guides in the rails, the needle bed having depressions underlying the upper rail to permit removal and replacement of needles without removing said rail, and a needle having a part thereof adapted to engage said shoulder and thereby held from dropping out of operative position.

5. In a flat knitting machine, the combination with the needle bed, of a pair of longitudinally extending rails one of which overlies the upper or inner portion of the needle bed and is provided with a shoulder, a reciprocatory cam plate slidable within and between guides in the rails, the needle bed having depressions underlying the upper rail to permit removal and replacement of needles without removing said rail, and a needle having a butt and an offset portion between the butt and the head of the rail and a hump near the forward end of said offset portion adapted for engagement with said shoulder.

In testimony of which invention, we have hereunto set our hands, at Philadelphia, on this 28th day of January, 1916.

HERMAN SCHWARTZ.
ALFRED A. GRUNDY.

**Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D C."**