F. H. STOEHREL.

DROP STITCH MECHANISM FOR KNITTING MACHINES.

APPLICATION FILED MAY 12, 1909.

1,008,751. Patented Nov. 14, 1911.

2 SHEETS—SHEET 1.

Fig. 2.

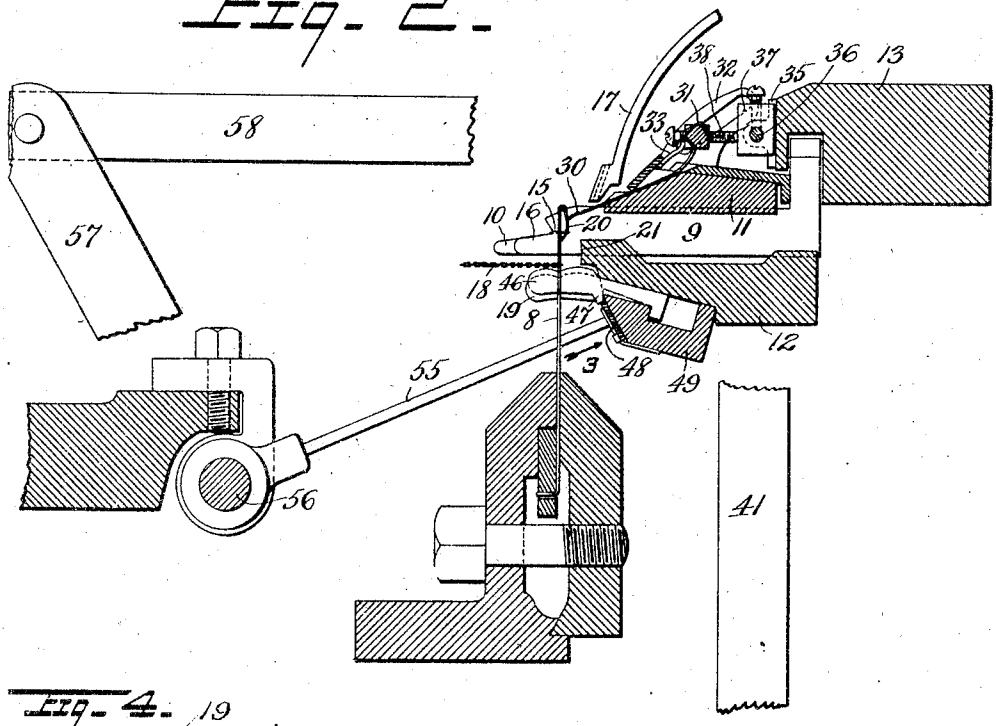
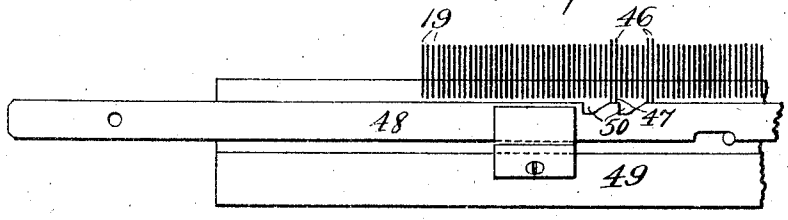


Fig. 4.

Fig. 5.

Fig. 3.



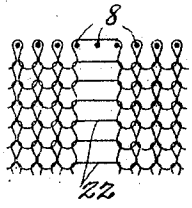


Fig. 1.

Witnesses

D. M. Stewart

C. G. Gaul

Friedrich H. Stoehrel,

Inventor

By

M. G. Stewart

Attorney

F. H. STOEHREL.

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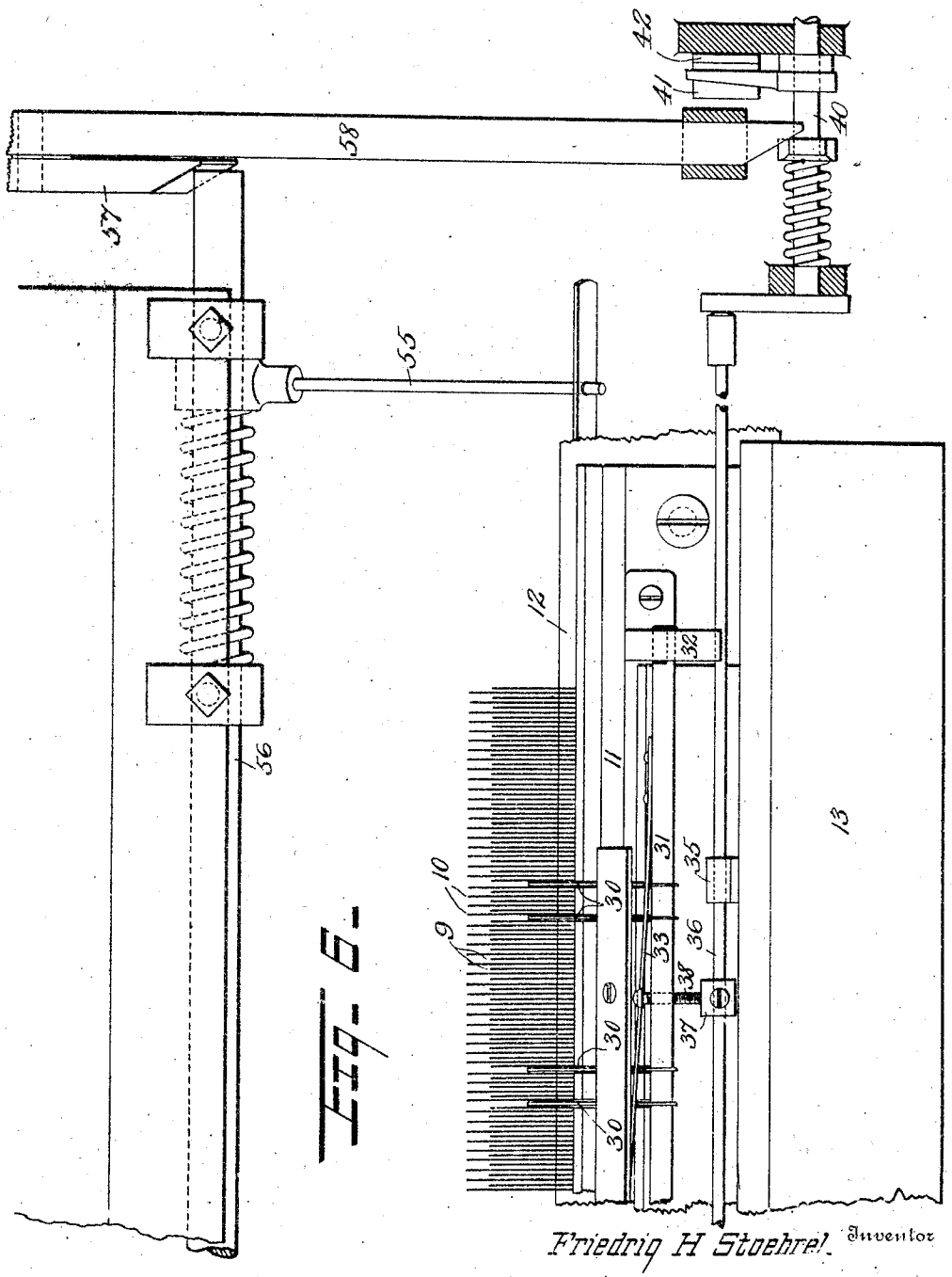

Fig. 6.

Witnesses

D. M. Stewart

C. A. Gaul

Friedrich H Stoehrel Inventor

By J. H. Stewart

Attorney

UNITED STATES PATENT OFFICE.

FRIEDRIG H. STOEHREL, OF READING, PENNSYLVANIA, ASSIGNOR TO THE NOLDE & HORST CO., OF READING, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DROP-STITCH MECHANISM FOR KNITTING-MACHINES.

1,008,751. Specification of Letters Patent. Patented Nov. 14, 1911.

Application filed May 12, 1909. Serial No. 495,384.

To all whom it may concern:

Be it known that I, FRIEDRIG H. STOEHREL, a citizen of the United States, and a resident of the city of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Drop-Stitch Mechanism for Knitting-Machines, of which the following is a specification.

My invention relates to knitting machines, and particularly to straight-frame machines of the "Cotton" type. And it consists in providing a drop-stitch mechanism adapted to automatically close the hooks of determined needles so as to cause them to freely pass the thread laid upon the sinkers; and in providing an improved arrangement of the knocking-over bits to coöperate with the hook-closing means; as fully described hereafter in connection with the accompanying drawings, the novel features being specifically pointed out in the claims.

Figure 1 indicates on an enlarged scale a fragment of knitted fabric such as my invention is adapted to automatically produce. Fig. 2 is a vertical section of a portion of a knitting machine, showing the main parts which coöperate in this present invention and indicating the required operating connections therefor. Fig. 3 is a longitudinal view of the improved knocking-over bit mechanism, looking in the direction of arrow 3 Fig. 2. Figs. 4 and 5 are detached views of one of the ordinary fixed bits and one of the special adjustable bits respectively. Fig. 6 is a plan view of a portion of an end section of the machine, corresponding with Fig. 2, and indicating the mechanism for controlling the action of the hook-closing mechanism and the setting of the adjustable knocking-over bits.

The general construction and operation of the type of knitting machine indicated is well known; and such portions only thereof as directly relate to the present invention need be particularly shown or described.

The knitting needles 8, as indicated, are of the ordinary bearded type, and may be carried and operated in well known manner. The jack-sinkers 9 and dividers 10 are guided in the sinker-head bars 11, 12, and operated by the catch-bar 13 and jacks not shown, as usual.

In the ordinary knitting operation the thread 15 (Fig. 2) which has been laid upon the beaks 16 of the sinkers by the thread-carrier 17, and has been bent around the body of the needles, is engaged by the hooked ends of the descending needles and is carried downward thereby between the sinkers to the previously made looped fabric 18, which latter rests upon the knocking-over comb formed by the fixed bits 19; and the hooks of the needles being closed by pressing the beards 20 of the needles laterally against the fixed presser-bar 21, the engaged thread is carried downward by the needle through the previously formed end loop of the fabric until said loop is stripped over the needles by the knocking-over bits; after which the needles rise to repeat the operation, leaving newly formed loops upon the knocking-over bits. These operations, in connection with the well known coöperating movements of the sinkers and thread carrier form the ordinary plain work or smooth web.

In order to produce the drop-stitch effect indicated in Fig. 1, it is necessary to eliminate a line of loops and substitute parallel cross-lines of thread as indicated at 22; and to produce the best effect it is important to secure proper lengths of these unlooped portions of the thread and a regular and uniform structure of the fabric. To this end my invention provides for closing the hooks of determined descending needles prior to their reaching the last-laid thread upon the sinkers so as to cause them to freely pass instead of engaging said thread and thus avoid the formation of loops by said needle; and further for so supporting the unlooped threads upon the knocking-over bits, during the ordinary looping operations of the other needles, as to secure the desired slack and regularity of structure. The means shown for practically accomplishing these results will now be described.

As indicated in Fig. 2 the end of the needle beard 20 is approaching the thread 15 in its downward movement. Arranged in its path is a drop-stitch finger 30, the end of which has come into contact with the beard 20 and bent its point against the grooved body of the needle so as to close the hook and prevent the thread 15 from entering it. It will be seen that the further downward move-

ment of the needle, with its beard thus held closed by the finger 30, will cause the thread to strip freely over the beard of the needle, thus allowing the latter to descend empty. This finger 30, and as many others as may be desired to produce the desired number of lines of drop-stitching, is secured to a longitudinally arranged presser-bar 31, which, as shown, is mounted upon the sinker-head bar 11 with each end thereof slidably engaged in a guide 32 fixed to said bar 11, so as to be movable to and fro transversely of the needle movement. Springs 33 are arranged to normally retract this presser bar and its attached fingers; which latter are preferably guided in the bed 11 so as to insure their proper registry with the determined needles when projected. The forward movement of the presser-bar and its fingers is effected as shown by the action of the catch-bar 13.

To provide for properly operating the drop-stitch fingers 30 from the catch-bar 13, I mount in bearings 35 upon the forward face of the latter, as shown, a longitudinally movable presser-block rod 36 having adjustably secured thereto presser blocks 37, which blocks are arranged to strike properly adjusted contact points 38 of the presser-bar 31 when the rod 36 is in the operating position indicated in Figs. 2 and 6. To secure the required retraction of the drop-stitch fingers 30 after they have duly effected the closure of the beards 20 as described, so that they will be taken out of the way of the reascending needles and not interfere with the laying of the thread by the thread carrier, I provide mechanism for automatically moving the presser-block rod 36 at proper times so as to prevent engagement of the blocks 37 with the contact points 38; said mechanism as indicated in the drawings, comprising a suitably mounted spring-pressed slide-rod 40 (Fig. 6) and a vertically operating rod 41 (Fig. 2) having a wedge-shaped head 42 arranged to move said slide-rod and thereby operate the presser-block rod; the required vertical movement being imparted to the rod 41 from the cam shaft of the machine in a manner readily understood without further showing or description. As already stated provision is also made for specially supporting upon the knocking-over comb the unlooped threads provided by the drop-stitch operation above described. This comb is ordinarily made up of a series of bits 19 all rigidly held at a uniform level beneath the sinkers.

In my improved construction provision is made for changing the elevation of certain of the bits, 46, corresponding in location with the particular needles upon which the drop-stitch mechanism described has been arranged to operate. As shown in the drawings these certain bits 46 differ from the others in being provided with a special projection 47; said projection adapting them to be operated upon by a slide-plate 48 mounted upon the knocking-over bit head 49. This plate is provided with notches 50, and enables said special bits to be either lowered to the normal level required for ordinary plain knitting, or to be raised above said level, as determined by the longitudinal adjustment of the plate. When the bits 46, arranged on either side of a needle made empty by the drop-stitch mechanism described, are thus elevated above the normal or plain-knitting level, they support the unlooped threads 22 while the remaining edge of the fabric is being pressed down upon the lower bits by the descending full needles, thus insuring the desired uniform length of unlooped threads 22, and neatness and uniformity in the adjacent loops.

The longitudinal adjustment of each plate 48 is effected as indicated, by means of an arm 55 on a spring-pressed rod 56 which may extend the full length of the machine; said rod 56 being moved by the operator in changing from plain to drop-stitch knitting or the reverse. It being important that corresponding adjustment of the presser-block rod 36 should be simultaneously effected, I have provided that said rod 36 shall be automatically set in inoperative position by the same movement which lowers the knocking-over bits 46 to normal level; the connections 57 and 58 to the single operating lever being arranged respectively to operate the bit adjusting rod 56 and the presser-block operating rod 40.

The operation and effect of my improved mechanism having been fully described, it will be readily understood that various modifications of the particular construction shown may be readily made without departing from my invention as specified in the claims.

What I claim is:—

1. In combination with the vertically reciprocated needles, transversely reciprocated sinkers, and fixed guide-bar and operating catch-bar for the sinkers, a presser-bar mounted on said guide-bar and carrying spaced drop-stitch fingers, said presser-bar being operated by the catch-bar so as to close the hooks of determined descending needles and permit the free passing of the last-laid thread upon the sinkers.

2. In combination with the vertically reciprocated needles, transversely reciprocated sinkers, and fixed guide-bar and operating catch-bar for the sinkers, a presser-bar mounted in slide-ways on said guide-bar and carrying spaced drop-stitch fingers, said presser-bar being operated by the catch-bar so as to close the hooks of determined descending needles and permit the free passing of the last-laid thread upon the sinkers.

3. In combination with the vertically re-

ciprocated needles, transversely reciprocated sinkers, and a catch-bar for said sinkers, a presser-bar carrying drop-stitch fingers, and presser devices therefor carried by said catch-bar and adjustable on the latter to operative or inoperative position.

4. In combination with the vertically reciprocated needles, transversely reciprocated sinkers, and a catch-bar for said sinkers, a presser-bar carrying drop-stitch fingers, presser devices therefor adjustably carried by said catch-bar, and means for automatically moving said devices at intervals to operative and inoperative positions.

5. In combination with the vertically reciprocated needles, transversely reciprocated sinkers, and a catch-bar for said sinkers, a presser-bar carrying drop-stitch fingers, presser devices therefor adjustably carried by said catch-bar, means for automatically moving said devices at intervals to operative and inoperative positions, and independent means for locking the same in determined position.

6. In a knitting machine having a drop-stitch mechanism operative upon certain of the needles, a series of knocking-over bits certain of which corresponding in location with said needles, are elevated above the normal knitting position.

7. In a straight knitting machine having a drop-stitch mechanism operative upon certain of the needles, a series of knocking-over bits, and means for simultaneously adjusting the elevation of determined pairs of said bits relative to the others.

8. In a knitting machine having a drop-stitch mechanism operative upon certain of the needles, a series of knocking-over bits comprising certain movably mounted ones, and a slide for simultaneously operating said movably mounted bits.

9. In a knitting machine having a drop-stitch mechanism operative upon certain of the needles, a series of knocking-over bits comprising certain movably mounted ones, and mechanism for simultaneously controlling said movably mounted bits and the action of the drop-stitch mechanism.

In testimony whereof, I affix my signature, in the presence of two witnesses.

FRIEDRIG H. STOEHREL.

Witnesses:
D. M. STEWART,
W. G. STEWART.