

P. GROSSER.

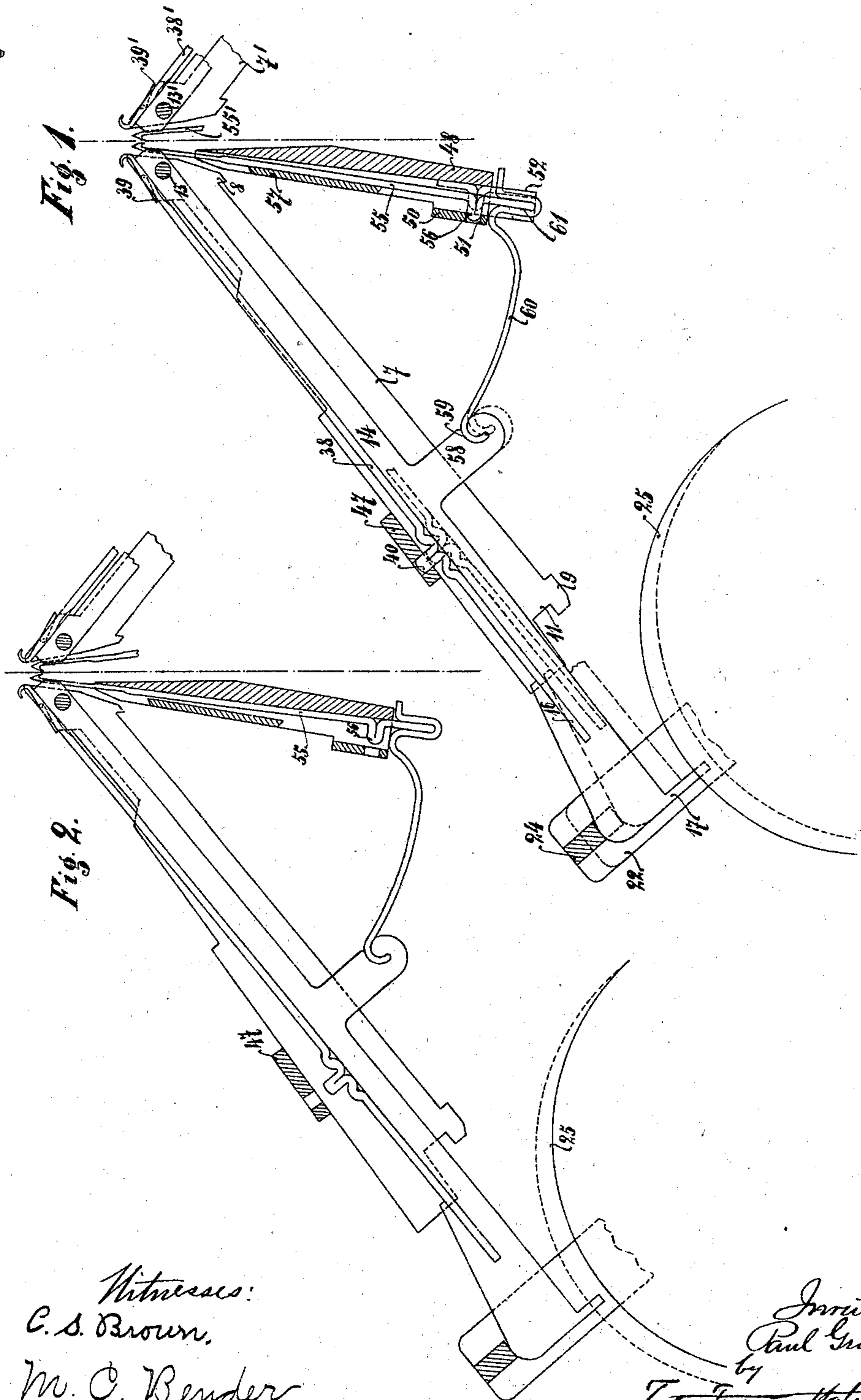
WEB HOLDER DEVICE FOR STRAIGHT KNITTING MACHINES.

APPLICATION FILED JULY 13, 1910.

967,760.

Patented Aug. 16, 1910.

4 SHEETS—SHEET 1.



Witnesses:
C. S. Brown,
M. C. Bender.

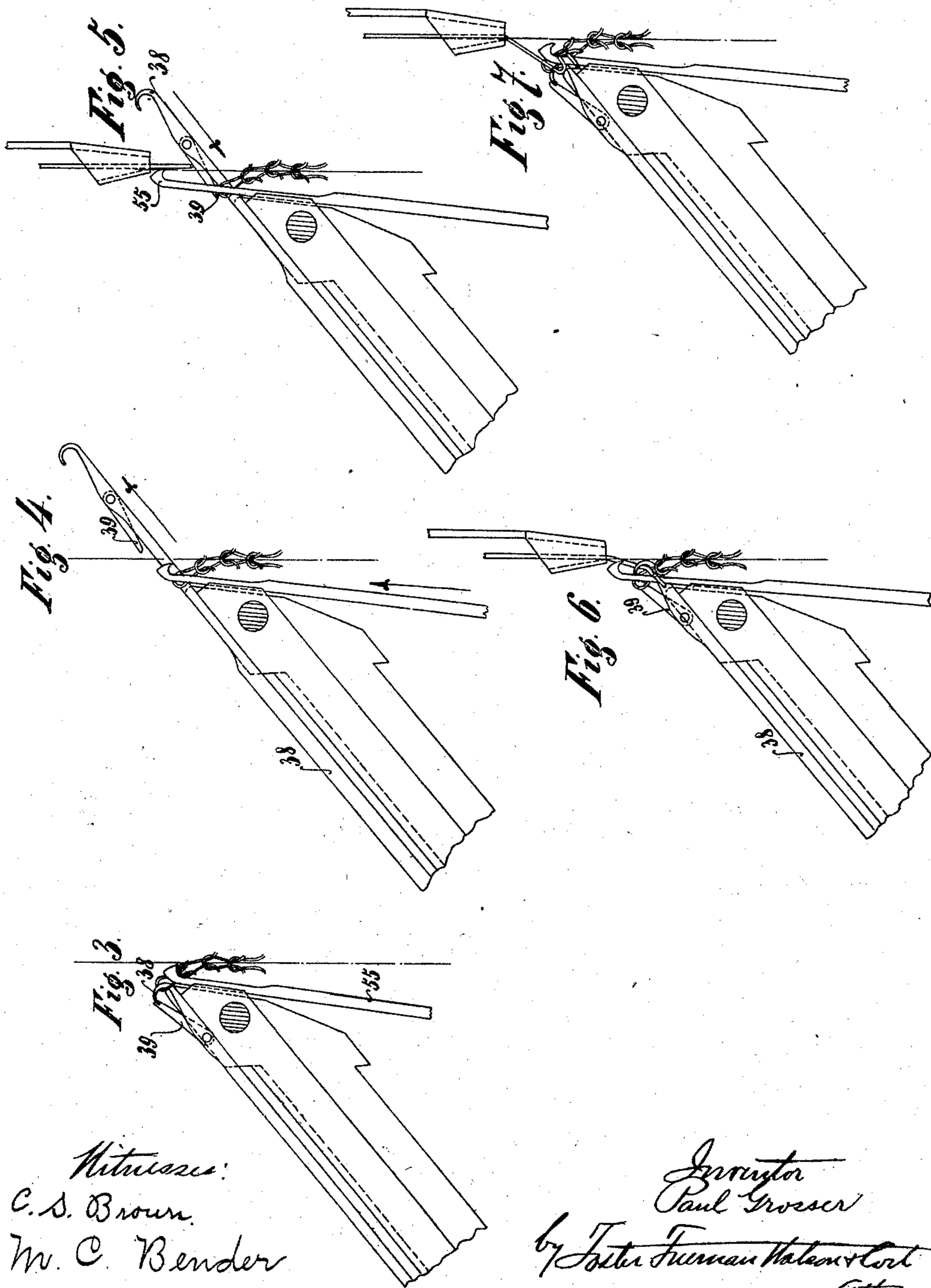
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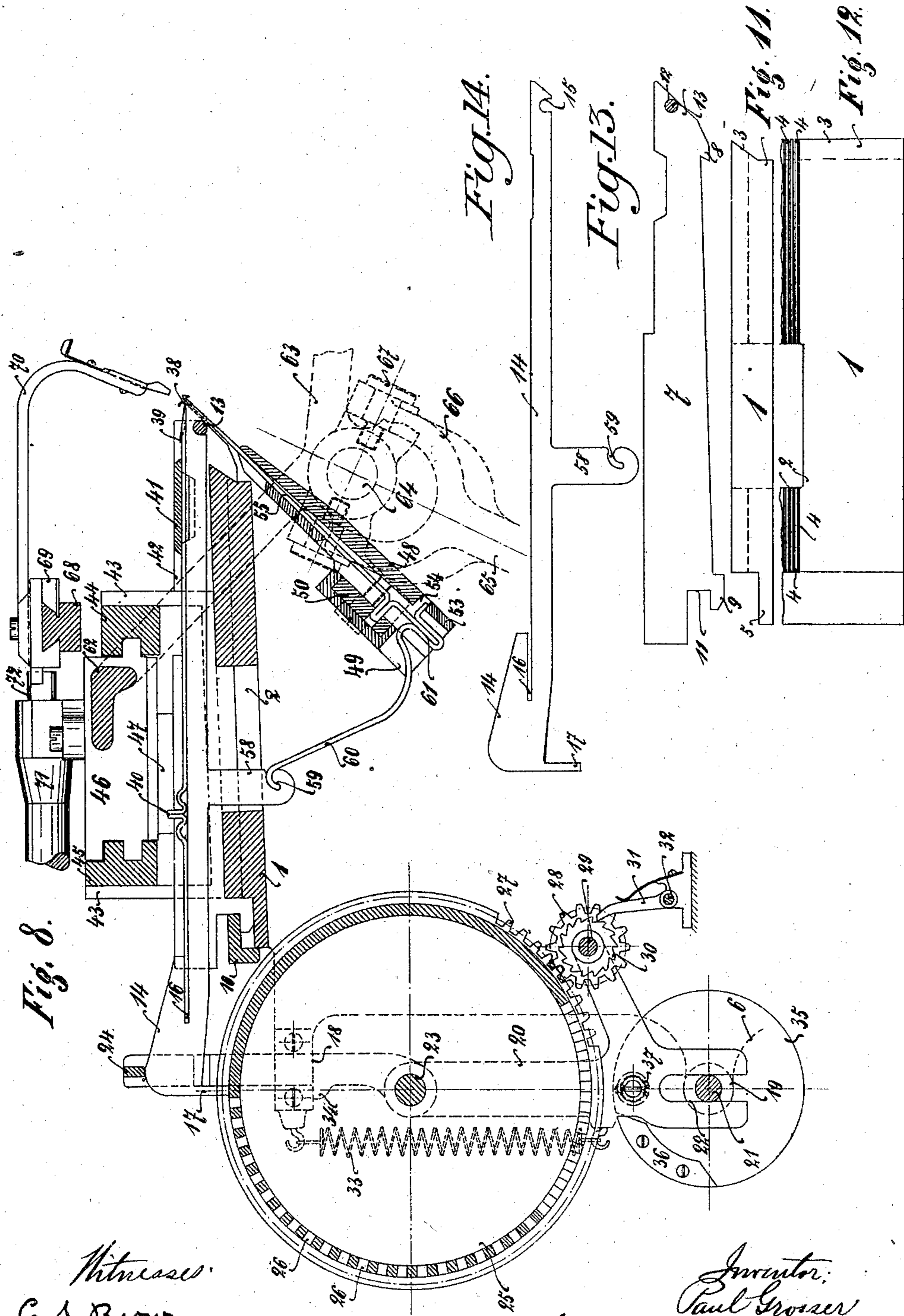
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4 SHEETS—SHEET 2.



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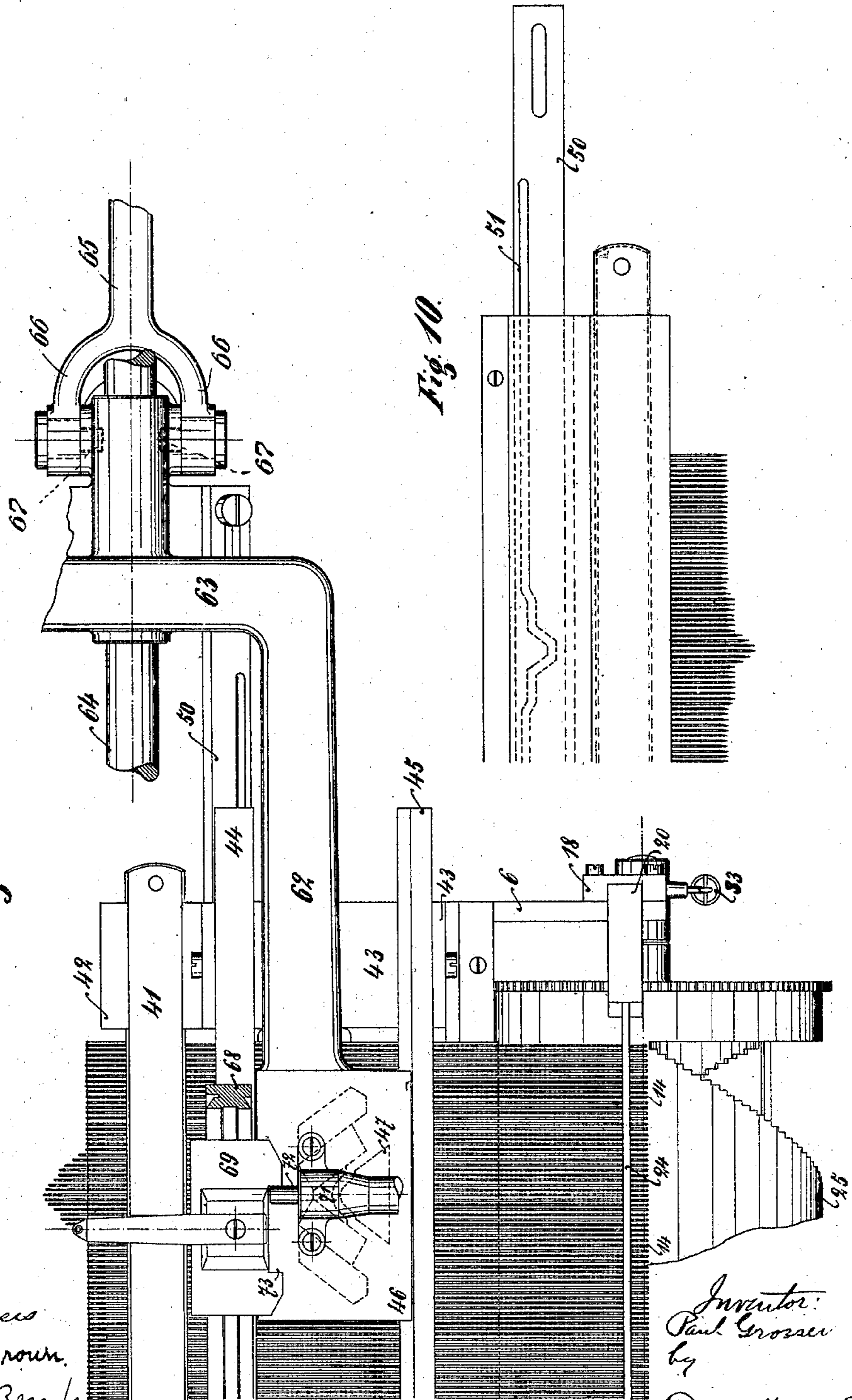
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4 SHEETS—SHEET 4.

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Fig. 9.



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WEB-HOLDER DEVICE FOR STRAIGHT-KNITTING MACHINES.

967,760.

Specification of Letters Patent. Patented Aug. 16, 1910.

Application filed July 13, 1910. Serial No. 571,740.

To all whom it may concern:

Be it known that I, PAUL GROSSER, a citizen of the Empire of Germany, residing at Markersdorf, District of Leipzig, in the Empire of Germany, have invented a new and useful Web-Holder Device for Straight-Knitting Machines, of which the following is a specification.

There are known straight knitting machines with a horizontal needle bed for knitting needles and a more or less vertical web holding sinker plate with transverse grooves (similar to those of the needle bed) for hooked web holders or sinkers beneath the knitting needles, the needles being operated by cams upon a slide reciprocating above the needle bed, and the hooked sinkers being similarly operated by cams in a slide reciprocating on the sinker plate. Such knitting machines, however, are not arranged for fashioning the fabric produced. There are other known straight knitting machines with two oppositely inclined needle beds for knitting needles and two nearly vertical sinker plates for sinkers above the knitting needles, the four planes of the knitting needles and of the sinkers having nearly the same line of intersection. These machines are provided with one pattern drum for each needle bed and with devices for moving the several needles in each bed independently of one another in their vertical planes into and out of engagement with the cams, so that the wares to be produced can be fashioned. Such machines present two essential defects, of which one consists in that the needles are difficult of access and survey, and the other defect consists in that all of the sinkers can not be moved out of engagement with their cams in correspondence to the respective knitting needles, so that the actuated sinkers constantly rub against the loops held by the idle needles, whereby of course the fabric is damaged.

My invention consists in a straight knitting machine, which combines the advantages of the two classes mentioned above while avoiding their defects. The knitting needles are preferably disposed on two oppositely inclined needle beds and are movable on separate supports which can be slightly rocked in their vertical planes about two parallel axes near the line of intersec-

tion of the inclined needle beds by means of two pattern drums and devices connected therewith for moving them into and out of engagement with their cams. Two nearly vertical sinker plates are disposed beneath the two needle beds and have transverse grooves similar to those of ordinary needle beds for hooked sinkers, the inclined planes of which have a line of intersection a little above that of the planes of the knitting needles. The sinker plates are so arranged as to permit the hooked sinkers to slightly rock in their vertical planes about the upper ends of their grooves, so that they can be moved into and out of engagement with their cams. The hooked sinkers in each sinker plate are connected with the rocking supports in the corresponding needle bed, so that each hooked sinker is obliged to partake in the rocking motion of the corresponding knitting needle. In this manner the straight knitting machine is enabled to produce fashioned goods, while the yarn is protected from damage by hooked sinkers rubbing against it.

I will now proceed to describe my invention with reference to the accompanying drawings, in which—

Figure 1 is a diagrammatical vertical cross section through the machine and shows a left knitting needle with its rocking support and guides, the left sinker-plate in section, a left hooked sinker, a connection between it and the corresponding rocking support, a part of the pattern drum, and the upper parts of a right knitting needle, its rocking support and guides and of the corresponding right hooked sinker, the left knitting needle and the left hooked sinker being in simultaneous engagement with their cams, Fig. 2 is similar to Fig. 1 and shows the left knitting needle and the left hooked sinker as moved out of engagement with their respective cams, Figs. 3 to 7 are diagrams which will be referred to later on, Fig. 8 is a vertical cross section through the left needle bed, the left sinker plate and the left pattern drum, the needle bed being assumed to be turned from its inclined position into a horizontal plane, Fig. 9 is an upper view of the same, Fig. 10 is a reversed plan view of the left sinker plate, which is assumed to be turned into a horizontal plane, so as to show its hooked sink-

ers in relation to the corresponding knitting needles in Fig. 9, Fig. 11 is an end view of the left needle bed proper, Fig. 12 is a plan view of the front end of the same, Fig. 13 is a side view of a guide for the knitting needles, and Fig. 14 is a side view of a rocking support.

Similar characters of reference refer to similar parts throughout the several views.

1 in Fig. 8 denotes a grooved plate (see Figs. 11 and 12) having a longitudinal slot 2, a beveled-off right edge 3 and a plurality of transverse grooves 4, 4 similar to those of ordinary needle beds. The plate 1 has a cut 5 along the left edge and is fastened at the ends on two standards 6 of any known construction which form parts of the machine frame. A guide 7 of the shape shown at Fig. 13 is inserted in every groove 4 of the plate 1 and is made to engage with its nose 8 over the face of the beveled-off edge 3 and with its set-off part 9 in the cut 5. A suitable angle-piece 10 (Fig. 8) passing over the whole length of the plate 1 engages in recesses 11 (Fig. 13) of all the guides 7 and is fastened on the plate 1 or the frame by screws or the like, so that in this manner all the guides 7 are rigidly connected with the plate 1 and are secured in their vertical position. All the guides 7 have a hole 12 through which a rod 13 (Fig. 8) passes. In every space between any two guides 7 a rocking support or needle lever 14 of the shape shown at Fig. 14 is inserted and is made to rock on the rod 13 which engages in its cut 15. The rocking support 14 is widened at its left (lower in Fig. 1) end and has therein a rectangular recess 16 and thereat a nose 17. At each standard 6 a guide 18 and an eye 19 are provided. A yoke 20 of the shape shown at Fig. 8 is guided at each standard 6 on the one hand by the guide 18 and on the other hand by a shaft 21 mounted to turn in the two eyes 19 and engaging in a slot 22 at the lower end of the yoke. The two yokes 20 are rigidly connected with one another by a shaft 23 and a bar 24, which latter passes over the widened ends of the supporting rods 14. The upper parts of the yokes 20 are in Fig. 9 shown as offset inward so as to reduce the length of the bar 24. A pattern drum 25 of any known construction is mounted on the shaft 23 to turn and is provided with sundry longitudinal slots 26, 26 of varying length, into any of which the noses 17 of the respective rocking supports 14 can engage. The arrangement and length of the slots 26, 26 in the pattern drum 25 will have to depend upon the fashioned goods to be produced. At one end of the pattern drum 25 is fastened a gear wheel 27 meshing with a pinion 28, which is mounted to turn on a pin 29 on an arm of the yoke 20 and is rigidly connected with a ratchet wheel 30.

A spring-pressed pawl 31 rocking on a pin 32 on the standard 6 is adapted to engage in the ratchet wheel 30. Each yoke 20 is drawn upward by a helical spring 33 connecting it with the guide 18, so that a lug 34 normally bears against the guide 18. Two cam disks 35 (one at each standard 6) are fastened on the shaft 21 and have each a cam 36, which is adapted to pass over a roller 37 on the yoke 20 and thereby to depress the latter. The machine is assumed to be provided with any known mechanism (not shown) for periodically and alternately turning and stopping the shaft 21 in accordance with the fashioned goods to be produced.

In every space between any two guides 7, 7 a knitting needle 38 is guided, which slides on the upper surface of the rocking support 14, engages in the recess 16 of the latter and is provided with the usual latch 39 and lug 40. A known plate 41 with beveled-off edges passing over the whole series of knitting needles 38 and engaging in recesses of suitable projections 42 at the ends of the plate 1 serves for preventing the hook ends of the knitting needles 38 from being thrown upward. Suitable forked supports 43 are fastened on the ends of the plate 1 and serve for holding two parallel rails 44 and 45, in which a slide 46 is mounted to reciprocate. The slide 46 is on its underside provided with cams 47 of any known construction for operating the lugs 40 of the several knitting needles 38.

A sinker plate 48 similar to an ordinary needle bed and having a series of transverse grooves is in any known manner secured in the machine frame. At both ends the sinker plate 48 is provided with one guide 49 for guiding a bar 50 provided with a cam groove 51. The sinker plate 48 has a cut 52 (Fig. 1), in which a bar 53 (Fig. 8) is so secured as to leave a slot 54. In every transverse groove of the plate 48 a hooked sinker 55 is mounted to move, which is similar to an ordinary knitting needle, only that it has no latch at its hook. It is provided with a lug 56, which can engage in the cam groove 51 of the bar 50. A plate 57 engaging with its beveled-off edges in suitable recesses of the sinker plate 48 prevents the hooked sinkers 55 from being thrown off and permits them only to turn through a very small angle while rocking on the upper ends (Fig. 1) of the transverse grooves in the plate 48. The sinkers 55 move in parallel vertical planes that alternate with those in which the knitting needles 38 move. Every rocking support 14 is shown to have an arm 58, which passes through the slot 2 of the plate 1 and is provided at its end with a curved recess 59. A connection 60 of a shape clearly shown at Fig. 1 engages with its left end in the curved recess 59 of

the arm 58 and with its right end in the slot 54 between the sinker plate 48 and the bar 53. The connection 60 has a recess 61, in which the lower end of the corresponding hooked sinker 55 can move.

So far the left half of the machine has been described. The needle bed and the sinker plate in the right half of the machine and all the parts therein moving are similar to those described above. Therefore all the parts on the right, which are visible in Fig. 1, are denoted by the same characters of reference, only that the latter are primed. The slide 46 in Fig. 9 may be made in one with a bar 62, which at its front end may be connected with the corresponding bar of the right slide by a crosshead 63. The latter is mounted to move on a rod 64 fastened in any known manner in the machine frame and can be reciprocated from the machine in any known manner, for example by means of a lever 65 with a forked free end 66 and pins 67 or the like. The bar 50 (Fig. 9) on the left may be adjustably connected with a suitable projection on the crosshead 63 and the corresponding bar on the right may be in a similar manner connected with the crosshead, so that the two slides with the cams for the two series of knitting needles and the two cam bars for the two series of hooked sinkers are simultaneously reciprocated. A rail 68 above the left needle bed in Fig. 8 may be fastened on the machine frame for guiding a slide 69, on which a yarn guide 70 of any known construction may be fastened. Some known bracket 71 may be fastened on the left slide 46 for operating the yarn guide 70, it engaging with its projection 72 in a recess 73 of the slide 69. However, any other known mechanism may be employed for operating one or any of several yarn guides. The cams 47 at the two slides 46 and the cam grooves in the two bars 50 are so adjusted or shaped as to produce the effects herein-after described.

The knitting machine described operates as follows: During the rotation of the shaft 21 the cams 36 of the cam disks 35 on either side of the machine will strike the rollers 37 and thereby depress the two yokes 20 with the pattern drum 25 and by the bar 24 also all the rocking supports 14 for withdrawing the lugs 40 of the knitting needles 38 from the path of the cams 47. At the same time the two ratchet wheels 30 will be fed one tooth forward by the spring-pressed pawls 31, and consequently also the pattern drum 25 will be fed. When the noses 17 of some of the rocking supports 14 happen to bear on the portion of the pattern drum 25 between any two of its longitudinal slots 26, 26 and the two yokes 20 are released by the two cams 36, the yokes will be returned to their initial position by the two helical

springs 33, so that the said rocking supports 14 and therewith their knitting needles 38 are raised and the lugs 40 of the latter are brought into the path of the cams 47. The other rocking supports 14 with the knitting needles 38 on them remain in their normal position in which they are supported by their connections 60 bearing against the bar 53 or against the lower ends of the corresponding hooked sinkers 55 which in turn bear against the bottoms of the transverse grooves in the plate 48. The said mechanism for driving the shafts 21 is so adjusted that the pattern drum 25 on one side can be fed at the end of the stroke of the crosshead 63 in one direction and the other pattern drum can be fed at the end of the stroke in the opposite direction. In Fig. 1 the full circle indicates the pattern drum 25 in its raised position and the dotted circle, on the contrary, indicates the lowered normal position of the said pattern drum.

Any left knitting needle 38 is now taken into consideration with reference to Figs. 3 to 7. In Fig. 3 it assumes its normal lowest position and holds a loop. The corresponding hooked sinker 55 also occupies its normal lowermost position and engages the loop between two neighboring knitting needles. The sinker 55 is first raised a little (Fig. 4) before the knitting needle 38 is moved upward, so as to prevent the latter from taking along with it the loop held by it. (This is very necessary for close gods.) The latch 39 is opened, either by the loop or positively by some known device (not shown). Thereupon the needle 38 is moved downward, so that its latch 39 passes over the loop, while the sinker 55 is further raised (see Fig. 5), so that its hook permits the newly fed yarn to pass under and bear against the sinker 55. The latch 39 is raised and closed, either by the old loop or positively, as the case may be. During the continued downward motion of the needle also the sinker lowers (Fig. 6), so that it can engage with its hook the yarn and aid in knocking the old loop over the latch and hook of the needle (Fig. 7), while the latter during the continued downward motion of the sinker pulls the new loop through the old loop. On the sinker returning to its lowest position shown at Fig. 3 the new loop will occupy the same position as the old loop had previously occupied. When in this position the web holder or sinker maintains the downward strain on the last course of the web. At the end of the stroke the bar 24 will depress all the raised rocking supports 14 and their needles 38 and by their connections 60 also the sinkers 55 will be returned to their initial position. As long as the sinkers 55 remain in this position their hooks will stop and will not rub against the loops held by the idle needles,

so that the goods are better protected from damages than hitherto.

The knitting machine can be varied in many respects without departing from the spirit of my invention.

I claim:

1. In a straight knitting machine, the combination with a bed, of needles adapted to rock in said bed in vertical planes, a needle operating cam, a sinker plate beneath said bed, hooked sinkers adapted to rock in said sinker-plate in vertical planes, a cam for operating said sinkers, connections between said needles and said sinkers, means for selectively moving said needles into the path of said needle-operating cam whereby the corresponding sinkers are simultaneously moved into the path of said cam, and means for returning all of said needles into their initial position.

2. In a straight knitting machine, the combination with two beds, of a rod passing through each said bed parallel to and in proximity to one edge, needles movable in intercepting planes on said beds and adapted to rock about said rods, needle cams for operating said needles, a sinker plate beneath each bed in a plane passing approximately through the line of intersection, hooked sinkers adapted to rock in said sinker plate in vertical planes, sinker cams for operating said sinkers, connections between said needles and said sinkers, means for selectively moving said needles into the path of said needle cams whereby the corresponding sinkers are at the same time moved into the path of said sinker cams, and means for re-

turning all of said needles into their initial position.

3. In a straight knitting machine, the combination with a bed having transverse grooves and a longitudinal slot, of guides inserted in the grooves of said bed and having at one end a hole, a rod passing through the holes of said guides, means for securing said guides on said bed, rocking supports inserted between said guides and adapted to rock on said rod, each having an arm which passes through the longitudinal slot of said bed, means for limiting the movement of said rocking supports, needles movable on said rocking supports between said guides, needle cams for operating said needles, a sinker plate beneath said bed in a plane approximately tangent to said rod and having transverse grooves, hooked sinkers movable in the grooves of said sinker plate and adapted to rock therein about the ends near said rod, means for limiting the movement of said hooked sinkers, sinker cams for operating said hooked sinkers, connections between the arms of said rocking supports and the lower ends of said hooked sinkers, means for selectively moving by said rocking supports said needles into the path of said needle cams whereby the corresponding sinkers are at the same time moved into the path of said sinker cams, and means for returning all of said rocking supports into their initial position.

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