June 17, 1930. W. NICOLET 1,764,576

ART OF WEAVING

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Fig. 1

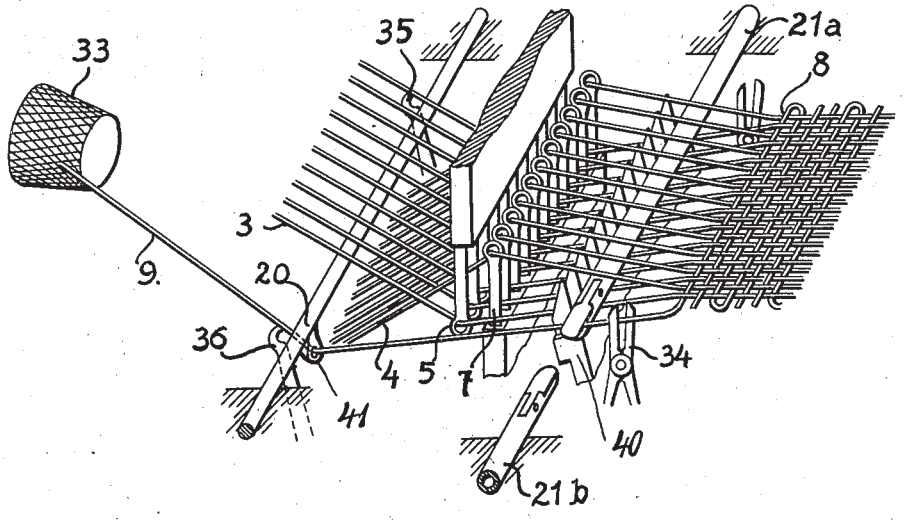

Fig. 2

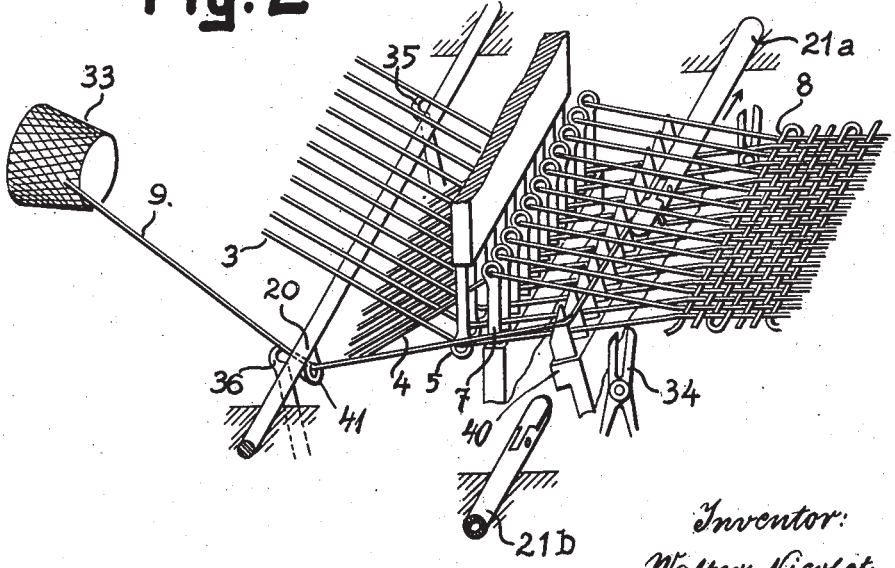

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Fig. 3

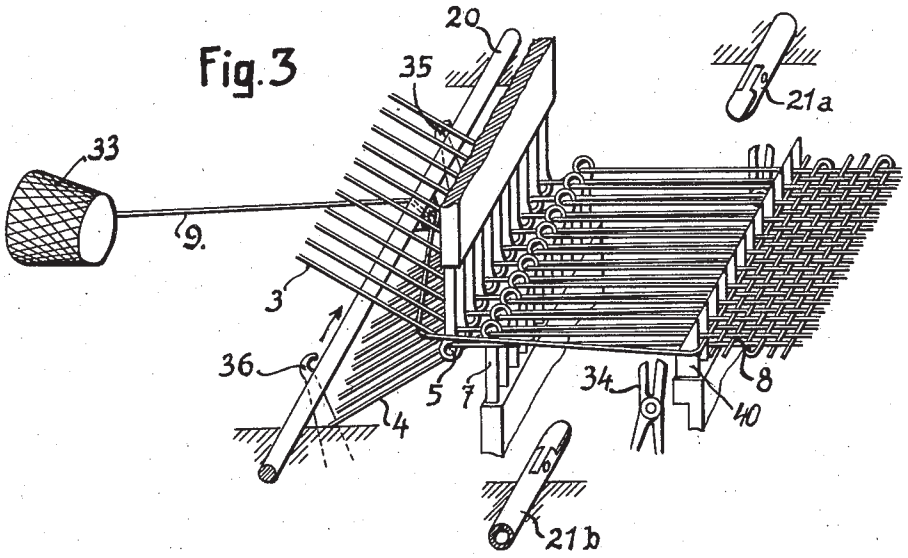

Fig. 4

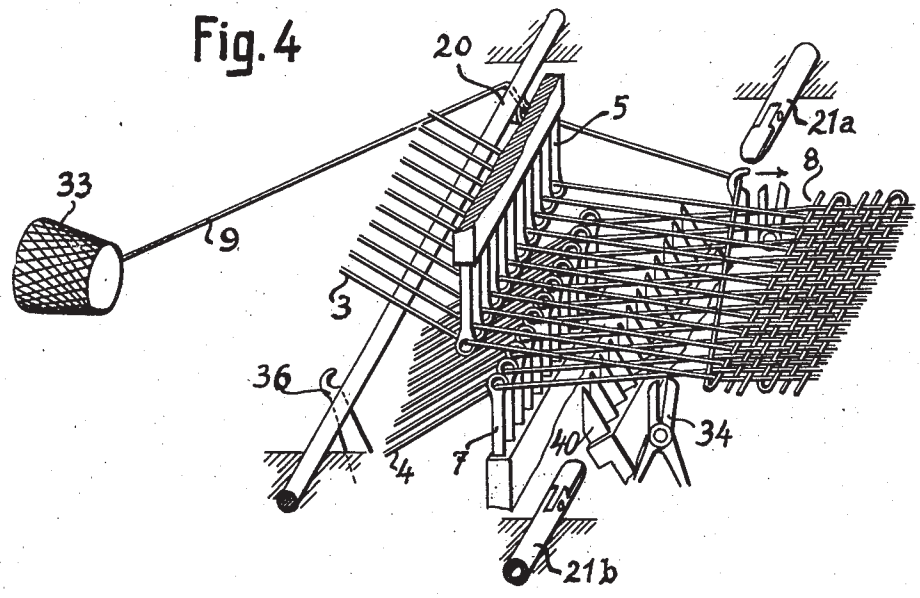

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Fig. 5

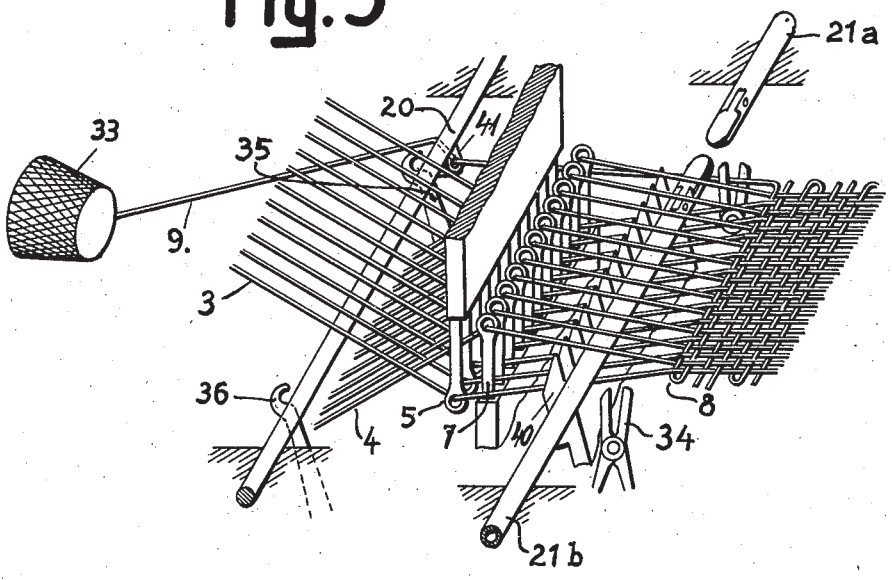
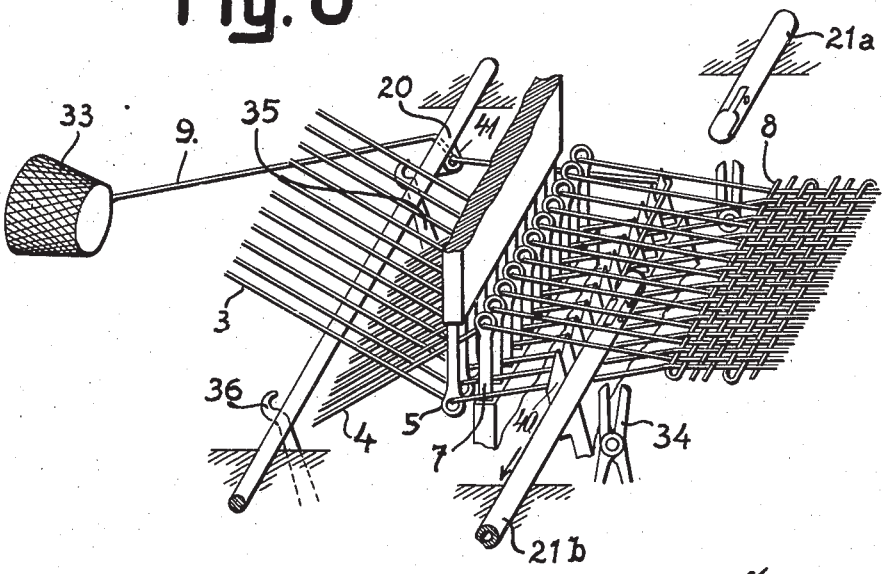


Fig. 6



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Patented June 17, 1930 1,764,576

UNITED STATES PATENT OFFICE

WALTER NICOLET, OF LEIPZIG, GERMANY

ART OF WEAVING

Application filed June 22, 1927, Serial No. 200,650, and in Germany June 28, 1926.

My invention refers to the art of weaving and more especially to the weaving means disclosed in my copending application for patent of the United States, Serial No. 73718, wherein two sheds, one behind the other, are formed by two sets of warp threads, one extending at an angle to the other, by crossing, into which sheds weft material is entered at one and the same time or at short intervals. Of this material first the front part, and after the change of thread the back part of the weft material is beaten up. Each thread in every group of warp threads passes through a hole in one of the needles of every guide comb, the needles of these guide combs facing one another and moving to and fro at right angles to the warp. The beating up of the weft material is effected by rising and falling combs. As already shown in the former patent application picking is preferably done by means of rigid weft bobbins. However, this way of proceeding does not produce a good selvedge when only a single weft thread is placed in each shed. The present invention relates to an improvement of the process and apparatus aforedescribed whereby a fabric of the kind aforesaid can be made by using rigid weft bobbins, this fabric having a selvedge. According to this invention no separate weft bobbins are used for the front and back shed, but material is picked alternately in the front and back shed, respectively, from the one bobbin, and when the loop has been formed the weft thread is cut off from the bobbin.

In the drawings affixed to this specification and forming part thereof my invention is illustrated diagrammatically by way of example.

In the drawings

Figs. 1–6 are diagrams illustrating a loom in six consecutive positions of the threads and weaving mechanism as arranged in accordance with this invention.

Referring to the drawings, 3 and 4 are the two groups of warp threads, and 5 and 7 the guide combs for the warp threads of both groups, the combs having eyes and moving in opposite directions at right angles to the plane of the warp. When the guide combs 5 and 7 have moved towards and past each other to attain the position shown for instance in Fig. 1, in which the bottom comb 7 raises its group of warp threads above the group governed and depressed by the top comb 5, a closed shed is formed in front of the combs and between same and the fabric, and a weft can be inserted in this shed and cast onto the fabric by the reed shown at 40. If now the guide combs 5 and 7 are moved apart, reversing the position of the groups of warp threads, as shown for instance in Fig. 4, an open shed is formed and a weft thread might be entered in this shed by a movement at right angles to the warp.

According to my former application aforementioned wefts are inserted in the closed shed and in the open shed, formed to the rear of the closed shed and of the guide combs by the diverging warp threads, either simultaneously or at short intervals and are then cast onto the fabric, one after the other by suitable reeds.

The present invention contemplates entering part of a weft thread in the closed shed in one direction, thereafter entering the adjoining part of the same thread in opposite direction in the open shed formed by the guide combs moving apart, as above described, thereby forming a hairpin-loop, and then cutting the thread off. In the preferred form of my invention I pull the thread into the closed shed by means of a gripper introduced into and moved across the shed at right angles to the warp, and I pull the second half of the thread into and through the open shed, about to be formed to the rear of the guide combs, by means of a thread guide permanently extending to the rear of said combs and between the two diverging groups of warp threads, the weft thread on its way from the bobbin passing through an eye forming part of this permanent guide, which is capable of axial reciprocatory movement without, however, leaving its position between the warp threads. The second half of the weft thread having been pulled into the open shed by

the thread guide, a rocking pusher arm catches the weft thread intermediate the eye of the permanent guide and the edge of the warp and carries it forward in the open shed, which has in the meantime been formed by the receding guide combs, in the direction towards the first half of the weft, which has in the meantime been cast onto the fabric by the reed. When the second half of the weft thread has thus been carried into a position substantially in parallel with the first half, the reed once more proceeds to cast it on also and directly thereafter the shears positioned on this side of the warp cut the thread off. In the meantime the front shed has been closed again and a gripper moving across this shed from the opposite side of the warp has gripped the end of the thread which is about to be cut off, and, after the cutting has been effected, pulls the free end into and across the closed shed, thus starting another cycle of operations as above described.

Obviously this cycle can be carried through repeatedly with a single weft thread wound on a single bobbin.

The loom illustrated in the drawing by way of example therefore comprises, besides the two reciprocating guide combs 5 and 7, guiding in its eyes the two groups of warp threads 3 and 4, respectively, a reed 40 for casting on the weft, two reciprocating grippers 21^a and 21^b of the needle-type and two shears 34, one on each side, a single permanent guide bar 20 with an eye 41 to the rear of the guide combs, two rocking pusher arms 35 and 36 with hook-shaped ends normally positioned close to and behind the guide bar and a single weft bobbin 33 on which is wound the weft thread 9. The two grippers 21^a, 21^b, one on the right and on the left of the fabric are moved through the closed front shed alternately. When the eye of the guide bar 20 is on the left of the fabric, the gripper 21^a on the right hand side of the fabric is moved through the shed and seizes the weft thread 9 running from the bobbin through the eye 41 to the fabric, and holds it securely, when the shears 34 on that side sever the weft thread between the selvedge of the fabric and the gripper, which is then moved back into its original position. On its way back it pulls the thread from the weft bobbin and inserts in the closed shed the end of the weft thread seized by it (Fig. 2). When the gripper 21^a has reached its original position, the weft thread inserted by it in the closed shed is cast on by the reed 40 (Fig. 3). At the same time the guide combs 5 and 7 move apart, until they assume the position indicated in Fig. 4. The weft entered by the gripper 21^a is now enclosed and the back shed opens. During the casting on of the thread entered by the gripper 21^a and the moving apart of the guide combs 5, 7 the guide bar 20 is moved from its position in Fig. 1 to the right (Fig. 3) into the position shown in Fig. 4, inserting at the same time the thread in the open shed. The rocking arm 35 now carries the weft thread into the path of the reed 40, which casts it on. At the same time the guide combs 5 and 7 are again moved towards each other and, while enclosing the weft thread last cast on, form a closed shed. The gripper 21^b on the left hand side of the fabric is now introduced into the closed shed and seizes the weft thread 9 on the right hand side of the fabric, while the thread is severed as before between the gripper and the selvedge of the fabric (Fig. 5). The gripper 21^b then moves back (Fig. 6) into its original position, inserting on its way a thread in the crossed shed. This thread is cast on and the back shed opened owing to the moving apart of the guide combs 5, 7; simultaneously the gripper 20 moves from its position in Fig. 4 towards the left into the position shown in Fig. 1, inserting on its way a weft thread in the open shed. The rocking arm 36 positioned on the left hand side of the fabric carries the weft thread inserted in the open shed into the path of the reed 40, which casts it on to the fell, whereupon the cycle of operations is gone through again. As shown in Figs. 1–6 of the drawings, the two parts of the weft entered in the closed and in the open sheds form a hairpin-shaped loop entirely separated from the other weft material, the top of the loop lying alternately right and left in the finished fabric. The loop embraces the outer warp thread and prevents the fabric from becoming untwisted. Fabric made in this manner has the plain weave intercrossing 1+1 and a well formed selvedge.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

I claim:—

1. The method of producing a fabric by weaving comprising moving two diverging groups of warp threads to form a closed shed, pulling a weft thread into and across said shed, pulling an adjoining part of the same weft thread through between the two groups of warp threads to the rear of said shed so as to form said weft into a loop, moving said groups of warp threads in the opposite direction to open said shed, carrying the weft entered to the rear of said shed forward in the direction towards the fabric and casting both parts of the weft onto the fabric.

2. The method of producing a fabric by weaving comprising moving two diverging groups of warp threads to form a closed shed, pulling a weft thread into and across

said shed, pulling an adjoining part of the same weft thread through between the two groups of warp threads to the rear of said shed so as to form said weft into a loop, casting the weft in said shed onto the fabric, moving said groups of warp threads in the opposite direction to open said shed, carrying that part of said weft, which had been entered to the rear of said shed, forward in the direction towards and casting same onto the fabric.

3. The method of producing a fabric by weaving comprising moving two diverging groups of warp threads to form a closed shed, forming two adjoining parts of a single weft thread into a loop, one part extending across said shed, the other to the rear of said shed and between the two groups of warp threads, moving said groups of warp threads in the opposite direction to open said shed, carrying the weft entered to the rear of said shed forward in the direction towards the fabric and casting both parts of the weft onto the fabric.

4. The method of producing a fabric by weaving comprising moving two groups of warp threads alternately in one and the other direction to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of said closed shed, entering adjoining parts of a single weft thread in the form of a loop in said sheds, casting the part in said closed shed onto the fabric, moving said groups of warp threads to open said closed shed, carrying the part in said open shed forward and casting it also onto the fabric.

5. The method of producing a fabric by weaving comprising moving two groups of warp threads alternately in one and the other direction to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of said closed shed, simultaneously entering adjoining parts of a single weft thread in the form of a loop in said sheds, casting the part in said closed shed onto the fabric, moving said groups of warp threads to open said closed shed, carrying the part in said open shed forward and casting it also onto the fabric.

6. The method of producing a fabric by weaving comprising moving two groups of warp threads alternately in one and the other direction to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of said closed shed, entering adjoining parts of a single weft thread in the form of a loop in said sheds, casting the part in said closed shed onto the fabric, moving said groups of warp threads to open said closed shed, carrying the part in said open shed forward, casting it also onto the fabric and cutting the thread through.

7. The method of producing a fabric by weaving comprising moving two groups of warp threads alternately in one and the other direction to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of said closed shed, entering adjoining parts of a single weft thread in the form of a loop in said sheds, casting the part in said closed shed onto the fabric, moving said groups of warp threads to open said closed shed, carrying the part in said open shed forward, casting it also onto the fabric, cutting the thread through, moving the warp threads so as to form the two sheds again, entering the cut-off thread in the form of a loop in the said sheds, cutting the threads off and going anew through the same cycle of operations.

8. Loom comprising means to move two groups of warp threads so as to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of the closed shed, weft moving means in front of the shedding plane movable into said closed shed and separate weft moving means permanently extending between said groups of warp threads.

9. Loom comprising means to move two groups of warp threads so as to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of the closed shed, weft moving means in front of the shedding plane movable into said closed shed and separate weft moving means permanently extending between said groups of warp threads and reciprocable between said groups.

10. Loom comprising means to move two groups of warp threads so as to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of the closed shed, weft moving means in front of the shedding plane movable into said closed shed, separate weft moving means permanently extending between said groups of warp threads and reciprocable between said groups and a single weft bobbin, the thread from said bobbin being in permanent sliding connection with said separate guiding means.

11. Loom comprising means to move two groups of warp threads so as to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of the closed shed, weft grippers on opposite sides of said warp threads reciprocable in opposite directions in the common plane of said warp threads, a guide bar with an eye permanently positioned between said groups of warp threads to the rear of said shed forming means and reciprocable in axial direction and a weft bobbin to supply a weft thread to said guide bar.

12. Loom comprising means to move two groups of warp threads so as to form in alternate shedding operations two sheds, a

closed shed and an open shed to the rear of the closed shed, weft grippers on opposite sides of said warp threads reciprocable in opposite directions in the common plane of said warp threads, a guide bar with an eye permanently positioned between said groups of warp threads to the rear of said shed forming means and reciprocable in axial direction, a weft bobbin to supply a weft thread to said guide bar and weft pushing means on either side of the warp movable from said bar past said shed forming means towards the fabric.

13. Loom comprising means to move two groups of warp threads so as to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of the closed shed, weft grippers on opposite sides of said warp threads reciprocable in opposite directions in the common plane of said warp threads, a guide bar with an eye permanently positioned between said groups of warp threads to the rear of said shed forming means and reciprocable in axial direction, a weft bobbin to supply a weft thread to said guide bar and rockable weft pushing means on either side of the warp movable from said bar past said shed forming means towards the fabric.

14. Loom comprising means to move two groups of warp threads so as to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of the closed shed, weft moving means in front of the shedding plane movable into said closed shed, separate weft moving means permanently extending between said groups of warp threads and reciprocable between said groups, a single weft bobbin, the thread from said bobbin being in permanent sliding connection with said separate guiding means and cutting means in front of said shed forming means on either side of the warp.

15. Loom comprising means to move two groups of warp threads so as to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of the closed shed, a weft bobbin and a weft guiding means to the rear of said shed forming means said weft guiding means being reciprocable transversely to said shed forming means, and means for carrying the weft from said guiding means forward between said shed forming means.

16. Loom comprising means to move two groups of warp threads so as to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of the closed shed, a weft bobbin and a weft guiding means to the rear of said shed forming means said weft guiding means being reciprocable transversely to said shed forming means, and rockable means for carrying the weft from said guiding means forward between said shed forming means.

17. Loom comprising means to move two groups of warp threads so as to form in alternate shedding operations two sheds, a closed shed and an open shed to the rear of the closed shed, a weft bobbin and a weft guiding means to the rear of said shed forming means said weft guiding means being reciprocable transversely to said shed forming means, means for carrying the weft from said guiding means forward between said shed forming means and separate casting-on means in front of said shed forming means.

In testimony whereof I affix my signature.

WALTER NICOLET.