

June 7, 1932.

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1,862,178

LOOM HAVING STATIONARY WEFT SUPPLIES

Filed Nov. 30, 1929

2 Sheets-Sheet 1

FIG. 1.

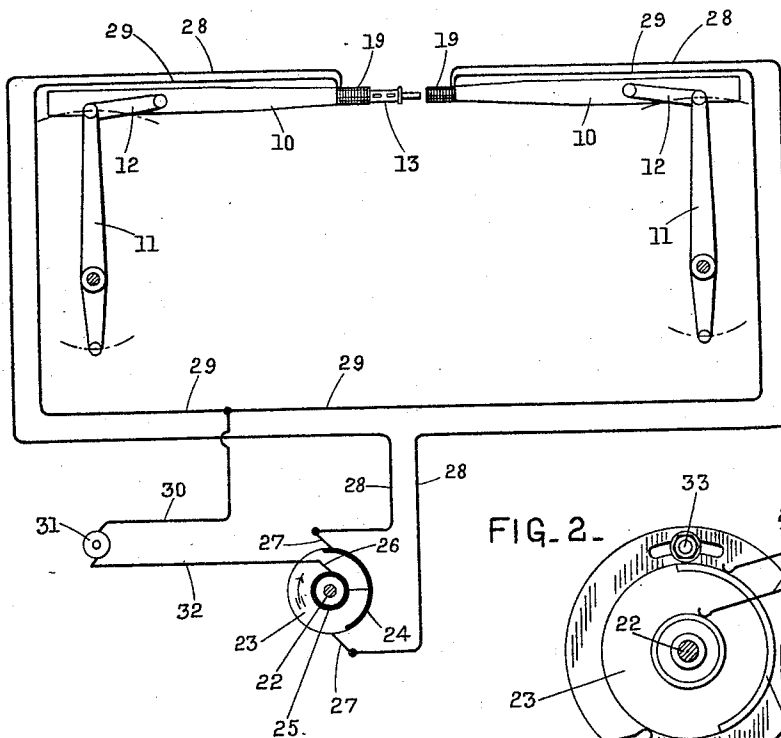


FIG. 2.

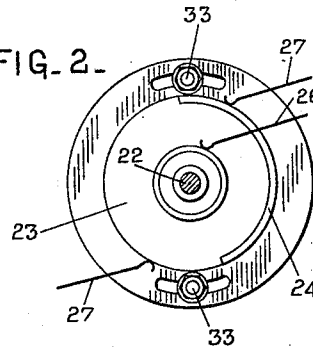


FIG. 3.

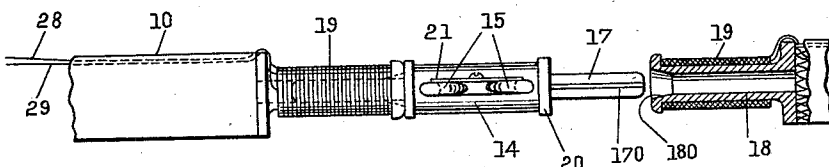
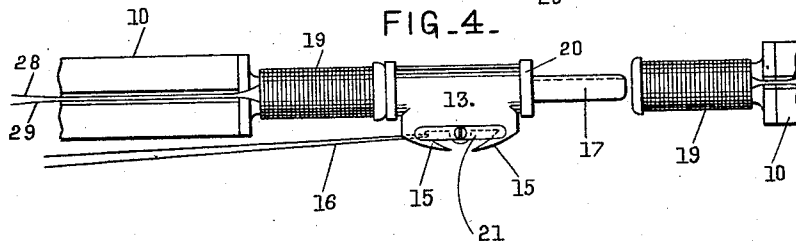


FIG. 4.



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FIG. 5.

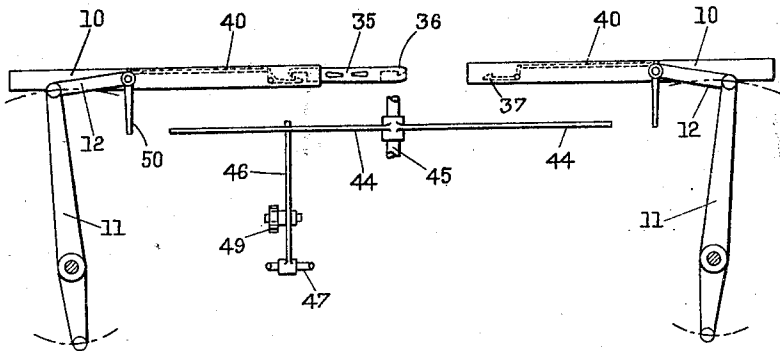


FIG. 6.

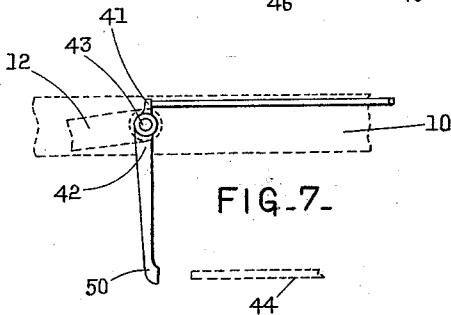
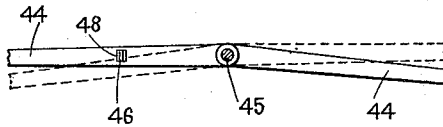


FIG. 7.

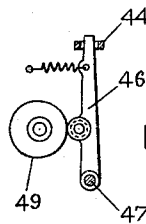


FIG. 8.

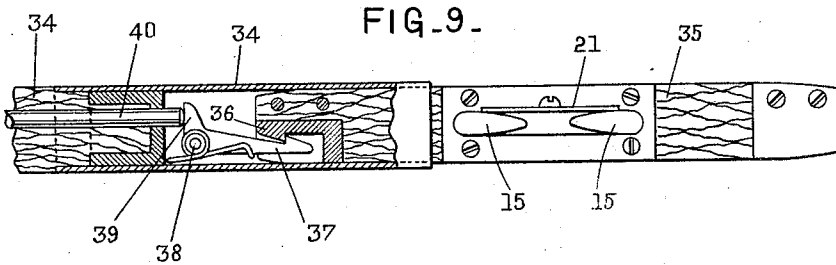


FIG. 9.

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LOOM HAVING STATIONARY WEFT SUPPLIES

Application filed November 30, 1929, Serial No. 410,765, and in Great Britain December 4, 1928.

This invention relates to looms for weaving, and more particularly to shuttleless looms, i. e. looms in which the weft, instead of being laid in the shed from a pirn or the like carried by a shuttle that is passed through the shed, is supplied from a stationary supply and inserted pick by pick in the shed.

According to the invention, weft from a stationary supply is received by a carrier member, laid in the shed thereby, and then released therefrom, the carrier member being brought part way through the shed by a rod or the like and then transferred to a second rod or the like which transports it through the remainder of the shed.

The carrier member is provided with a hook or other device to receive weft presented to it at the side of the loom and is suitably formed to be received and carried by the rods or the like, while it is provided with means by which it is held to one or the other of the rods or the like, any suitable means being employed to effect the release of the carrier member from one rod or the like and its engagement with the other. The weft, which may be laid as a single or double pick, is retained by the carrier member from the time it is received thereby until it is released after the carrier member has passed to the other side of the loom, when it is disengaged from the hook or other device. Being held or supported by the rods or the like, the carrier member, together with the weft, is moved through the shed at a predetermined speed, and the weft is laid smoothly and evenly in the shed.

Any desired means may be employed to transfer the carrier member from the one to the other of the rods or the like by which it is handed or passed through the shed. Thus, mechanical, electrical, pneumatic, or other means may be used for the purpose, such means being controlled either by suitable mechanism or timing gear operating in conjunction with the driving gear of the loom or of parts thereof, or simply by means actuated by the arrival of the carrier member at or near the position requiring transfer. In the case of mechanical transfer, a latch mechanism effecting the release of the carrier mem-

ber from one rod or the like and its engagement with the other rod or the like may be actuated by cam or other gear mechanism operating at required intervals, for instance cams operating in conjunction with the means for effecting the passage of the rods or the like into and out of the shed; or inter-operation between the latches may secure the release of one latch and the engagement of the other to effect the transfer of the carrier member.

Electric transfer mechanism may effect, by means of electro-magnets or solenoids, the coupling or release of the carrier member to or from the rods or the like, being effected by the making or breaking of the circuits of the electro-magnets or solenoids either automatically by the movement of the rods or the like or by suitable timing gear. The coupling may be effected by electromagnets or solenoids acting directly on the carrier member, or a part or parts thereof, or the electro-magnets or solenoids may operate latches which serve to couple the carrier member to the rods or the like. Thus, latches which are actuated by springs or the like to couple the said members may be released at the required intervals by means of the electromagnets or solenoids.

While the weft insertion may be effected from one side of the loom only, the carrier member may equally well be arranged to insert weft from both sides, either alternately or in any desired sequence or arrangement. Further, means may be provided to select and present to the carrier member one of a number of yarns which it is desired to use for mixing purposes or to produce coloured, patterned, or other effects.

Weft may be presented in any desired manner to the carrier member for insertion in the shed, the invention not being limited to any precise method of causing the engagement of the weft to the carrier member. For example, for insertion of the weft as a single pick, the end of the weft on the stationary yarn package may be taken by the carrier member, which draws the requisite amount of weft through the shed, after which the shot is severed from the package. The carrier then

repeats the insertion, either from the opposite side of the loom or after its return through the shed.

According to another method of laying the weft by means of the carrier member, the weft may be measured into a loop at one or both sides of the loom, and a limb of each loop may be taken in turn alternately from each side of the loom and laid as a single pick, the bight of the loop forming the selvedge of the fabric.

According to a further method, the weft may be received by the carrier member as a loop, which is either carried as a double pick through the shed, or is laid as a single pick by the end of the loop connected to the yarn package being severed when the loop has been carried part way through the shed.

The accompanying drawings show by way of example how the invention may be carried into effect, but it is to be understood that the following description is in no way limitative.

Figs. 1 to 4 illustrate one form of weft-inserting means employing electrical transfer mechanism for the carrier member according to the invention.

Fig. 1 shows in diagrammatic form the arrangement of the weft carrier inserting devices and the electrical connections;

Fig. 2 is an enlarged view of the contact making mechanism employed;

Figs. 3 and 4 are elevations and plan respectively to a larger scale of the weft carrier and the inserting arms.

Figs. 5 to 9 illustrate another form of apparatus according to the invention, employing mechanical transfer means for the weft carrier;

Fig. 5 shows a general arrangement of the apparatus;

Figs. 6, 7 and 8 are details of the transfer effecting means shown in Fig. 5; and

Fig. 9 is a part sectional view of the weft carrier and one of the inserting arms.

Referring to Figs. 1 to 4, two rods 10 are caused to reciprocate along the race (not shown) of a loom by means of any suitable mechanism, such as levers 11 actuated by a cam or cams or other means from the driving shaft of the loom, and connected by links 12 to the rods 10. The rods are caused to move inwards and outwards together at any desired speed, and serve to convey a weft carrying member 13 across the lay of the loom. The carrier member 13 comprises a body portion 14 provided with hooks 15 to receive the weft 16, and with longitudinally projecting extensions 17.

The inner end of each of the rods 10 comprises a socket 18 for the reception of one of the extensions 17 of the carrier member, the socket being surrounded by a coil 19. The socket may be made of permeable material for operation as an electro-magnet, in

which case parts, such as 20, of the carrier member may be made of steel, iron, or other magnetic material for attraction to the end of the socket. Alternatively, the socket 18 may be made of non-permeable material, in which case the extensions 17 are preferably of soft iron, the socket and extensions functioning as solenoids.

Means, such as holes in the sockets, or grooves 170 in the sockets or the extensions, are provided to allow trapped air to escape on the entry of the extensions into the sockets, and to facilitate such entry, the sockets 18 are preferably flared or bell-mouthed as at 180. The extensions 17 may have tapered ends for the same purpose. In order to maintain the carrier in proper position to receive the weft, the sockets and extensions are so formed as to prevent relative rotation. For instance, they may have a square or other polygonal cross-section.

When one of the extensions 17 of the carrier member 13 is fitted into a socket 18 on one of the rods 10, the carrier member is firmly held to the rod carrying the socket when the circuit through the coil 19 is completed, but is loosely carried by the coil when the circuit is broken. Thus, when the carrier member 13 firmly held to one of the rods, say, the left-hand rod, is carried across the lay, the free extension of the carrier enters the socket of the right-hand rod, and by the opening of the circuit of the left-hand coil and the closing of that of the right-hand coil, the carrier, still with its extensions 17 engaged in both sockets 18, becomes held to the right-hand rod. When the rods recede, the carrier member is withdrawn by the right-hand rod and completes its movement from the left to the right-hand of the lay.

Weft presented to one or other of the hooks 15 at the side of the loom, at or about the time the carrier reaches one of its outermost positions, is engaged by a spring finger 21 that holds the weft during insertion, or, where a loop of weft is inserted, maintains a tension on it, while allowing it to slide over the hook.

It will be understood that the carrier member 13 travels with one of the rods 10 during the outward half of one pick and the inward half of the next, but it is not essential that it should be firmly held to the rod on the inward movement, as the rod is then merely serving to push the carrier member. It is, however, convenient to maintain the circuit of each coil closed for approximately a whole pick, the carrier member being held to each rod in turn during an outward and an inward movement of the rod. A contact-maker suitable for this purpose is shown in Figs. 1 and 2.

A shaft 22 suitably mounted on the loom frame is driven at half the crank-shaft speed through gearing (not shown) and carries

an insulated disc 23 having on its periphery a contact segment 24. A slip-ring 25 mounted on the shaft 22 is connected to the contact segment 24, and receives current through a brush 26. Two brushes 27 are arranged to make contact in turn with the segment 24 on rotation of the shaft 22. The brushes 27 are connected through wires 28 to one terminal of each of the coils 19 respectively, the other terminals of the coils 19 being connected by wires 29, 30 to one pole of the supply 31. The brush 26 is connected to the other pole of the supply 31 by a wire 32. The extent of the contact segment 24 round the periphery of the disc 23 depends on the duration of contact required for each coil, and approximates to 180°. In the case of electromagnetic operation of the coils and carrier, it may be necessary to employ an arc of contact of less than 180° because of the lag produced by hysteresis in the magnetic socket.

Referring now to Fig. 5, weft-inserting rods 10 are arranged to reciprocate along the race of the loom in a manner similar to that described with reference to Fig. 1. The inner ends of the rods 10 are formed as sockets 34 adapted to receive the ends of a weft carrier 35, which is provided with hooks 15 and a tensioning device 21. A hook 36 formed on each end of the carrier 35 is adapted to be engaged by a latch 37 pivoted at 38, an arm 39 on the latch being arranged for engagement with push rods 40 extending through the interior of the rods 10. One end of each rod 40 abuts against the end 41 of a lever 42, which may be conveniently pivoted at the connection 43 of the link 12 with the rod 10.

A two-armed lever 44 is pivoted about a vertical axis 45, and a lever 46 pivoted at 47 is arranged to enter a slot 48 in one arm of the lever 44, a cam 49 or other suitable means causing the lever 46 to receive a complete oscillation at every two picks of the loom. The lever 44 is thus caused to oscillate, so that its arms are brought in turn into position to engage the downwardly depending arm 50 of the lever 42 on the rod 10 which is carrying the member 35 into the shed. The length of each arm 44 is such that the lever 42 is oscillated to an extent sufficient to release the latch 37 from the hook 36 of the carrier 35. The latch 37 on the other arm 10 engages with the carrier 35 to withdraw the carrier through the remainder of the shed. On the next pick, the transfer takes place in the reverse direction.

Various modes of operating the loom according to the invention will now be described, it being immaterial whether transfer is effected by the electrical means or by the latch mechanism above described.

If it is desired to insert weft as a single pick, the end of the weft supply is presented at the side of the loom to one of the hooks 15 on the carrier member 13 and is drawn under

the tension device 21. The carrier 13 is then taken into the shed by one rod 10, transferred to the other rod, and withdrawn thereby, and pulls a length of weft through the shed. It is desirable that tension be applied to the weft proceeding from the supply in order to lay the weft straight in the shed, this tension being less, of course, than that imparted to the end of the weft to hold the weft to the carrier.

When the weft is laid in the shed, the end near the yarn supply is held so that the movement of the carrier 13 out of the shed causes the end held on the hook 15 to be withdrawn. After the beat-up, the carrier lays weft in a similar manner from the other side of the loom.

Instead of single pick insertion, a double pick may be laid in the form of a loop, from one or both sides of the loom, the hooks on the carrier member drawing the loops through the shed and then being disengaged to leave the loop in the shed.

Further, a loop of weft may be carried part way through the shed, say to the point of transfer of the carrier member, when one end of the loop is severed, the free length of the weft being drawn through the hook and laid in the remaining part of the shed by the continued movement of the carrier member.

If desired, any suitable selvaging means may be employed, either by way of selvaging the loops of a double pick; by seizing and turning into the next shed the ends of weft laid in a previous shed; by separate selvaging shuttles; or in any other way.

What we claim and desire to secure by Letters Patent is:—

1. In a loom having a stationary weft supply, the combination with two socket members and means for reciprocating said socket members simultaneously towards and from the center of the shed, of a carrier for receiving weft from the supply, extensions on said carrier adapted to be received in said socket members, said extensions having means therein for allowing air trapped in the socket member to escape and means for transferring the carrier from one of said socket members to the other.

2. In a loom having a stationary weft supply, the combination with two socket members and means for reciprocating said socket members simultaneously towards and from the center of the shed, of a carrier for receiving weft from the supply, extensions of said carrier adapted to be received in said socket members, said extensions having grooves therein to allow air trapped in the socket member to escape and means for transferring the carrier from one of said socket members to the other.

3. In a loom having a stationary weft supply, the combination with two socket members and means for reciprocating said socket

members simultaneously towards and from
the center of the shed, of a carrier for receiv-
ing weft from the supply and means for
transferring the carrier from one socket mem-
ber to the other, said means including hooks
5 carried by said carrier, latches mounted in the
socket members and means for successively
disengaging said latches comprising an arm
adapted to oscillate in a horizontal plane and
a cam actuated lever for oscillating said arm.
10 In testimony whereof we have hereunto sub-
scribed our names.

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