June 25, 1963 A. CUIENGNET 3,095,015

WEAVING LOOMS

Filed April 30, 1958

Fig:1

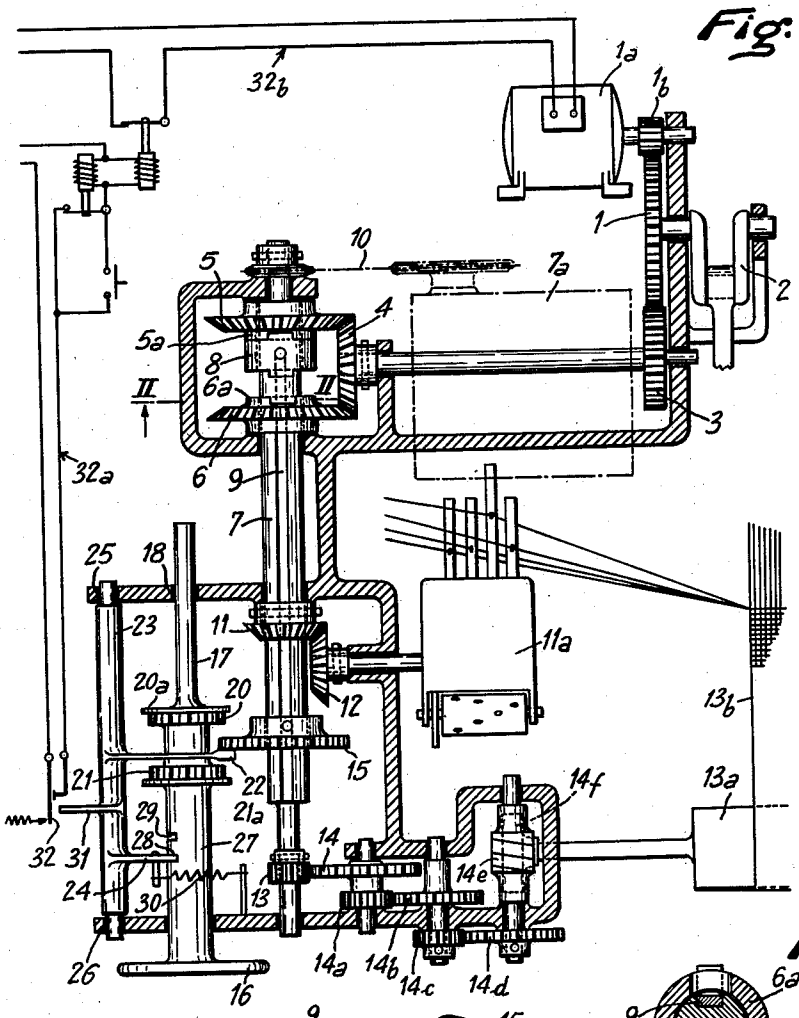


Fig:2

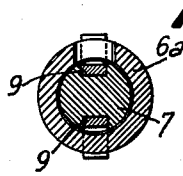
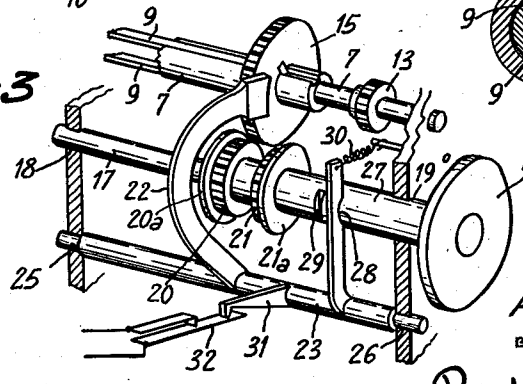


Fig:3



INVENTOR;
A. Cuiengnet
BY
Richards & Geier
ATTORNEYS

United States Patent Office 3,095,015 Patented June 25, 1963

3,095,015

WEAVING LOOMS

Alfred Cuiengnet, Lambersart, France, assignor to Raymond Dewas, Amiens (Somme), France

Filed Apr. 30, 1958, Ser. No. 732,027
Claims priority, application France May 3, 1957
11 Claims. (Cl. 139—1)

It is known that with certain kinds of weaving looms having continuous weft feed and positively driven weft inserting devices, the shed closes on the weft inserter at the moment when it releases the weft that it has introduced. In view of this it is not possible to operate the loom backwardly, that is to say, to reverse the motion of the loom, because the weft inserter in such case presents itself to a closed or insufficiently opened shed. This impossibility complicates the unweaving operation. Furthermore, mechanical complications are encountered, if it is desired to operate in the backward direction only the parts involved in unweaving, such as the heald drive, the weft selecting and presenting device and the fabric take-up, and to stop the batten and the driving means for the weft inserter or inserters.

An object of the present invention is the provision of means which will enable, on such looms, to carry out the unweaving operation easily whilst the parts which operate the batten and those which operate the weft inserter (or inserters) turn in the usual direction, in order that a normally open shed be available to the weft inserter (or inserters).

This result is achieved by the improvements of this invention consisting of a mechanism which allows, when unweaving is necessary, the operating means for the healds as well as the mechanism for selecting and presenting the wefts to the inserter when weaving with different kinds of wefts and also the guiding and taking-up of the fabric as well as possibly the delivery of warp threads or any other accessory to turn in a backward direction, whilst the operating means for the batten and those which operate the weft inserter of weft inserters turn in normal direction.

One way of carrying the invention into effect is described hereinafter and shown diagrammatically by way of example in the drawings accompanying this specification in which:

FIGURE 1 is a view of the whole mechanism;

FIGURE 2 is a sectional view taken on the line II—II of FIGURE 1 on an enlarged scale; and

FIGURE 3 is a perspective view of the safety arrangement.

In the drawing, a motor 1*a* drives a pinion 1*b* meshing with a toothed driving disc 1 which operates a main crank shaft 2, on the end of which it is keyed; the disc 1 is geared to the wheel 3 on the spindle of which the bevel pinion 4 is keyed.

Two bevel pinions 5 and 6 are constantly engaged with the pinion 4 and are loosely mounted on a spindle or intermediate shaft 7.

On this last named spindle, and between the two pinions 5 and 6 is a claw coupling or direct drive dog teeth sleeve or clutch 8 having a movable part that can slide to couple the spindle 7 with one or other of the pinions 5 or 6; the arrangement of the clutch 8 is such that it only allows the coupling in a single angular position of the clutch relatively to each pinion, so as to provide the required synchronism of the backwardly moving members relatively to the forwardly moving members.

The dog teeth sleeve 8 is rigidly attached to long keys 9 mounted to slide in suitable keyways in the spindle 7 (FIGURES 2 and 3).

The transmission means described above and interposed between the toothed disc 1 and the clutch 8 is such that

the spindle 7 turns at the same speed as the crank shaft 2.

The spindle 7 drives the operating means of 7*a* for the healds by means of a chain drive 10, the mechanism 11*a* for selecting and presenting the wefts by the pair of bevel wheels 11 and 12, and the regulator for the guiding roller of the fabric 13*b* and the roller 13*a* for the taking-up of the fabric by the pinions 13, 14, 14*a*, 14*b*, 14*c*, and 14*d* and the worm gears 14*e* and 14*f*.

The sliding keys 9 rigidly connect a dog teeth sleeve 8 of the clutch to a wheel 15.

A hand wheel 16 is rigidly attached to a shaft 17, slidable in the bearings 18 and 19, on which are keyed two wheels 20 and 21; these wheels are provided with flange-like thrust plates 20*a* and 21*a* respectively, the diameter of which is greater than that of the said wheels 20 and 21. Thus by pushing or pulling the hand wheel 16 one or other of the wheels 20 and 21 may be coupled to the wheel 15 rigidly attached to the sliding keys 9, and by turning the hand wheel the dog teeth sleeve 8 may be brought into the desired position, namely, the position in which the dog teeth sleeve 8 is engaged either in the corresponding coupling part 5*a* of the pinion 5 or 6*a* of the pinion 6, as will be described in detail hereinafter.

A safety arrangement is provided to prevent the dog teeth sleeve 8 from accidentally leaving the one or other of its engagement positions with the pinions 5 or 6 respectively. This arrangement comprises a plate 22 that can be placed in the immediate proximity to the wheel 15 in one or other of the positions which it occupies depending on whether the dog teeth sleeve 8 is engaged with the pinion 5, as shown in the drawing, or with the pinion 6; this plate thus forming an obstruction when the set constituted by the sleeve 8 the keys 9 and the wheel 15 is displaced.

The plate 22 is rigidly connected to a rod 23 carrying a latch 24 and rotatably mounted in the bearings 25 and 26. This latch 24 cooperates with a sleeve 27, mounted on the shaft 17, provided with cam-like notches 28 and 29 in which the latch engages to lock the shaft 17 in corresponding rest position when the wheel 20 and 21 are out of engagement with wheel 15.

FIGURES 1 and 3 show a return spring 30 for the plate 22 and latch 24.

The operation is as follows:

During normal operation, the mechanism occupies the positions shown in FIGURE 1, namely, dog teeth sleeve 8 is engaged with the corresponding coupling part 5*a* of the pinion 5, and the latch 24 is engaged in the notch 28 of the sleeve 27. If an unweaving operation must be carried out, even for unweaving a single weft thread, it is necessary for the loom to be set into reverse, as explained hereinabove.

When the loom is stopped due to breakage or lack of weft, the hand wheel 16 is turned and it will drive the shaft 17 and the sleeve 27 rigidly connected therewith. The notch 28 is then turned around the shaft axis and the latch 24 is pushed by the sleeve to a position in which it does not prevent any longer the longitudinal shifting of the shaft 17. Since the latch 24 is rigidly connected with the rod 23, this swinging of the latch will also result in a movement of the plate 22, which will release the wheel 15. Thus the assembly formed by the clutch 8, the keys 9 and the wheel 15, is released, so that it may be shifted along the spindle 7.

The hand wheel 16 is than pulled to slide the shaft 17 to an intermediate position in which the wheel 20 is brought into engagement with the wheel 15; the pulling being contuined to cause the disc 20*a* to slide the wheel 15, keys 9 and the dog teeth sleeve 8.

At this moment, either the dog teeth sleeve 8 is in correct position to engage with the notches carried by

the corresponding coupling part 6*a* of the pinion 6, so that by pulling the wheel 16, the sleeve 8 is positively connected with the pinion 6, or on the contrary, it is necessary to turn the wheel in one direction or the other, whilst maintaining the pull, until engagement is effected.

It will be noted that while the operator turns the hand wheel 16 to locate the engagement position of the clutch 8, the shaft 7 is positively rotated and so are the parts operatively connected therewith, namely, the operating means 7*a* for the healds which is driven by the chain drive 10, the weft presenting mechanism 11*a* which is driven by the pair of bevel wheels 11 and 12 and the regulator for the guiding roller of the fabric and the roller 13*a* for taking-up the fabric which are driven by the pinions 13 and 14 to 14*d* and worm gears 14*e* and 14*f*.

When the clutch is engaged the hand wheel 16 is pushed back into the position where the safety latch 24 engages the notch 29. This engagement is possible only if the plate 22 has been placed forward the wheel 15, in other words, if the wheel 15 has been pulled into the correct position.

The loom can then be put again into operation and turned, turn by turn, for unweaving, i.e. for removing by hand one weft after the other. The crank shaft 2 as well as the operating means for the weft inserter (not shown), turn in normal direction for the forward drive, whilst the operating means 7*a* for the healds (chain wheel 10), means 11*a* for the selection and presentation of the wefts (pair of bevel wheels 11 and 12) and means for the regulator and the take-up 13*a* of the fabric (drive members 13 to 14*f*) turn backwardly.

Owing to the reversal of the operating means for the presentation of the weft with regard to those of the weft inserter, there is no risk for said inserter, during the unweaving of catching one weft and, therefore, it passes empty through the shed.

Upon completion of the manual unweaving operation, a reverse manipulation of the wheel 16 returns the parts to the position for normal weaving shown in FIGURE 1. At this moment, the drive of the healds is correctly timed, the selecting and presenting device is ready for the presentation of the right weft and the fell is properly positioned relatively to the reed.

If the wheel 15 is not correctly placed in one or other of the above mentioned operations, the plate 22 presses against the teeth of the wheel 15, and the latch 24 is not able to engage in either of the notches 29 or 28 under the action of the spring 30, thus informing the operator that he should correct the adjustment before putting the loom into motion.

However to prevent the putting into motion of the loom due to the carelessness of the operator, a cam 31 is provided which is keyed on the rod 23 and which opens a switch 32 placed in a circuit 32*a* which controls the supply circuit 32*b* of the driving motor, thus preventing the operation of the latter.

It is to be understood that variations, improvements in detail and the employment of equivalent means can be devised without departing from the scope of the invention.

Thus the operation of the wheel 16 to enable a breakage of or deficiency in the weft to be remedied might cause the disengagement, in a predetermined position relatively to the loom cycle, of all other auxiliary devices of the loom, the reengagement of these arrangements being effected when, after completion of the unweaving, reverse manipulation of the wheel is effected.

Moreover, on the stoppage of the loom due to breakage or deficiency of the weft, the sequences of operations preliminary to unweaving the loom can be effected by an automatic arrangement instead of by manual operation of the shaft 17 through the hand wheel 16 as described above, so that the loom is made ready for unweaving. The same device may as well carry out automatically the operations for bringing back the parts of the arrangement for normal weaving.

I claim:

1. In a weaving loom having positively driven weft-inserting means supplied with weft from bobbins located outside the shed, the shed closing upon each weft being released by said inserting means, a main drive shaft, power means adapted to rotate said drive shaft in a predetermined direction, heald operating means, and cloth take-up means, and gear driven transmission means for driving said heald operating means and said cloth take-up means from said main drive shaft; the combination of reversing means located in said transmission means between said main drive shaft and said heald operating means and said cloth take-up means, and manually movable control means adapted in one position thereof to make said reversing means inoperative for normal running of the loom and in another position thereof to make said reversing means operative for allowing removal of defective weft threads.

2. A weaving loom according to claim 1, further comprising weft selecting and presenting means also driven from said main drive shaft through said transmission means.

3. A weaving loom according to claim 1, wherein said transmission means comprise an intermediate shaft positively connected to said heald operating means to said cloth take-up means, and adapted to be driven from said main drive shaft.

4. In a loom, a main shaft, power means rotating said main shaft in a predetermined direction, heald operating means, cloth take-up means, clutch means having two driving positions, means operatively connecting said main shaft with said clutch means for driving said clutch means, an intermediate shaft connected with said clutch means, means operatively connecting said intermediate shaft with said heald operating means and said cloth take-up means, said clutch means in one of said positions driving said intermediate shaft in one direction for the normal operation of the loom, said clutch means in the other one of said positions driving said intermediate shaft in the opposite direction for the reverse operation of the loom, and manually operable control means connected with said clutch means for moving said clutch means into any one of its said two positions.

5. In a loom, a main shaft, power means rotating said main shaft in a predetermined direction, heald operating means, cloth take-up means, an intermediate shaft, two bevel pinions loosely mounted upon said intermediate shaft, means operatively connecting said main shaft with said bevel pinions for rotating said bevel pinions in opposite directions, each of said bevel pinions having toothed coupling parts, a movable dog-teeth clutch adapted to selectively mesh with the toothed coupling part of any one of said bevel pinions, means operatively connecting said intermediate shaft with said heald operating means and said cloth take-up means, means rotatable along with said intermediate shaft and movable longitudinally relatively thereto, the last-mentioned means being firmly connected with said dog-teeth clutch, and manually operable control means adapted to engage and actuate the last-mentioned means for turning said intermediate shaft and bringing said dog-teeth clutch into engagement with a toothed coupling part of one of said bevel pinions.

6. In a loom, a main shaft, power means rotating said main shaft in a predetermined direction, heald operating means, cloth take-up means, an intermediate shaft, two bevel pinions loosely mounted upon said intermediate shaft, means operatively connecting said main shaft with said bevel pinions for rotating said bevel pinions in opposite directions, each of said bevel pinions having toothed coupling parts, a movable dog-teeth clutch adapted to selectively mesh with the toothed coupling part of any one of said bevel pinions, means operatively connecting said intermediate shaft with said heald operating means and said cloth take-up means, a gear wheel, means firmly connecting said gear wheel with said dog-

teeth clutch and supporting said gear wheel upon said intermediate shaft for rotation along with the intermediate shaft and for longitudinal movement relatively thereto, a manually operable control shaft extending parallel to said intermediate shaft and rotatable and movable longitudinally relatively thereto, at least one gear wheel keyed upon said control shaft and adapted to engage and mesh with the first-mentioned gear wheel, and flange means firmly connected with said control shaft and adapted to engage the first-mentioned gear wheel for moving it longitudinally upon said intermediate shaft, whereby said dog-teeth clutch is moved relatively to said bevel pinions.

7. A loom in accordance with claim 6, comprising a sleeve firmly connected with said control shaft and having two spaced cam-like notches, a latch adapted to selectively engage either one of said notches, and a rotary rod firmly connected with said latch and extending parallel to said intermediate shaft and said control shaft, said latch engaging one of said notches to lock said control shaft when said gear wheels are out of engagement.

8. A loom in accordance with claim 6, having locking means comprising a plate having an inoperative position and operative positions in which said plate selectively engages either lateral face of the first-mentioned gear wheel, and a rotary rod firmly connected with said plate and extending parallel to said intermediate shaft and said control shaft.

9. A loom in accordance with claim 8, wherein said power means comprise an electric motor and an energizing circuit connected with said motor and having a switch, said loom further comprising a cam firmly connected with said rotary rod and adapted to engage and open said switch in the inoperative position of said plate.

10. In a loom, a main shaft, power means rotating said main shaft in a predetermined direction, heald operating means, cloth take-up means, an intermediate shaft, two bevel pinions loosely mounted upon said intermediate shaft, means operatively connecting said main shaft with said bevel pinions for rotating said bevel pinions in opposite directions, each of said bevel pinions having toothed coupling parts, a movable dog-teeth clutch adapted to selectively mesh with the toothed coupling part of any one of said bevel pinions, means operatively connecting said intermediate shaft with said heald operating means and said cloth take-up means, a gear wheel, means firmly connecting said gear wheel with said dog-teeth clutch and supporting said gear wheel upon said intermediate shaft for rotation along with the intermediate shaft and for longitudinal movement relatively thereto, a manually operable control shaft extending parallel to said intermediate shaft and rotatable and movable longitudinally relatively thereto, two spaced gear wheels keyed upon said control shaft, said control shaft having two rest positions wherein the last-mentioned gear wheels are located on opposite sides of the first-mentioned gear wheel, said control shaft being movable in opposite directions from any one of said two rest positions to intermediate positions in which the corresponding gear wheel keyed on said control shaft engages the first-mentioned gear wheel, and thrust plates respectively carried by the two last-mentioned gear wheels and adapted to engage the first-mentioned gear wheel for moving it longitudinally upon said intermediate shaft when said control shaft is moved from either of said two intermediate positions, whereby said dog-teeth clutch is moved relatively to said bevel pinions.

11. In a loom having positively driven weft inserting means supplied with weft from bobbins located outside the shed, the shed closing upon each weft being released by said inserting means, a main drive shaft, power means adapted to rotate said shaft in a predetermined direction, heald operating means, cloth take-up means, and gear driven transmission means for driving said heald operating means and said cloth take-up means from said main drive shaft; the combination of means located in said transmission means between said main drive shaft and said heald operating means and cloth take-up means for selectively driving said transmission means in one direction for the normal operation of the loom and in an opposite direction for the reverse motion of said transmission means, said heald operating means and cloth take-up means, and manually movable control means adapted in one position thereof to place said first-mentioned means in a position for normal operation of the loom, and in another position to place said first-mentioned means in a position for reverse motion of said transmission means for allowing removal of defective weft threads.

References Cited in the file of this patent

UNITED STATES PATENTS

2,421,539	Clarke	June 3, 1947
2,640,504	Blanchard	June 2, 1953

FOREIGN PATENTS

177,540	Switzerland	June 15, 1935