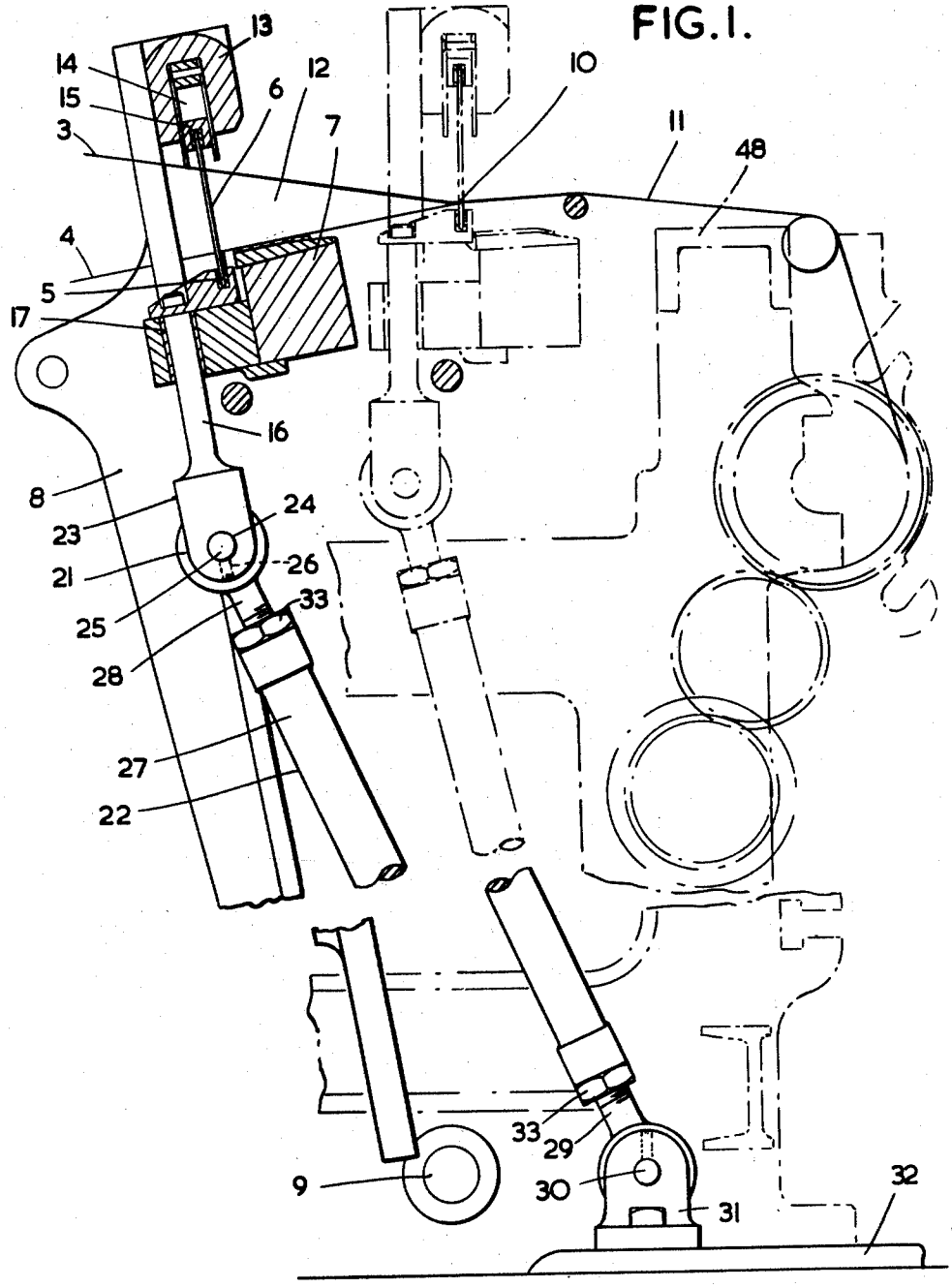
Dec. 23, 1958 A. G. BILLING ET AL 2,865,407

WEAVING

Filed Dec. 30, 1954 2 Sheets-Sheet 1

FIG. 1.



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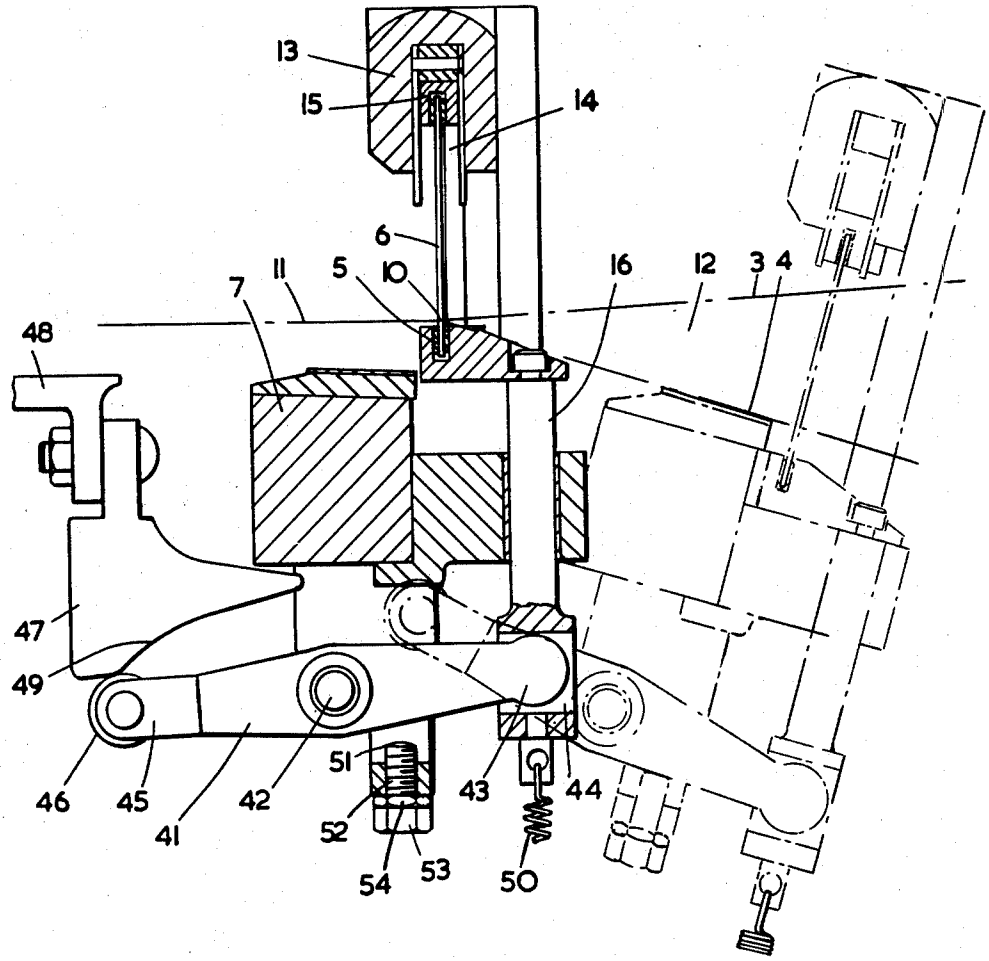
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Dec. 23, 1958 A. G. BILLING ET AL 2,865,407

WEAVING

Filed Dec. 30, 1954 2 Sheets-Sheet 2

FIG. 2.



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2,865,407

WEAVING

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Application December 30, 1954, Serial No. 478,778

Claims priority, application Great Britain January 14, 1954

1 Claim. (Cl. 139—188)

The invention relates to weaving and particularly to the construction and operation of flat looms for weaving, and is especially concerned with the arrangements in such looms for beating-up the weft into the fell of the fabric.

The invention is an improvement in or modification of that described in United States Patent No. 2,587,009 which describes and claims a method of weaving and a flat loom in which a pivotally oscillating reed is used to beat-up the weft into the fell of the fabric and in which that portion of the reed engaging the fell of the fabric during beat-up is close to the ends of the reed wires, where said wires are supported in the reed. Beating-up with the part of the reed close to the ends of the reed wires eliminates warps streaks which are apt to arise when the reed is in its customary position and which are due to irregularity and unevenness of the reed wires.

According to the present invention a method of weaving fabrics on a flat loom in which a reed mounted on a pivotally oscillating sley is used to beat-up the weft into the fell of the fabric and in which the part of the reed engaging the fell of the fabric during beat-up is close to the ends of the reed wires, where the reed wires are supported in the reed, is characterised in that positioning of the reed at beat-up is effected by a movement of the reed in the direction of its wires derived from the forward motion of the sley.

A loom according to the invention comprises a sley, a reed carried thereby, means for oscillating the sley so as to effect beat-up and means for displacing the reed relatively to the sley before each beat-up so as to cause the fell of the fabric to be engaged by a portion of the reed close to the ends of the reed wires, and is characterised in that the oscillating motion of the sley is transmitted to the reed as a vertical motion relative to the sley. The vertical oscillation of the reed can be derived from the back and forth motion of the sley by a compact and simple mechanism that gives solid support to the reed at beat-up, and can be easily fitted to a conventional loom.

Thus in a loom where the sley is mounted on swords which oscillate about a rock shaft near the base of the loom the reed may be mounted on short vertical lifter rods adapted to slide in suitable openings in the sley and a vertical motion relative to the sley can be imparted to the reed by pivotally connecting the lifter-rods to two adjustable links which are pivoted near the base of the loom about an axis parallel to the rock shaft, whereby the reed is oscillated about an axis horizontally displaced from the axis of oscillation of the sley. This provides a positive drive for raising and lowering the reed relatively to the sley and the weight of the reed and lifter-rods is taken by the floor members of the loom frame.

Alternatively the vertical motion can be imparted to the reed by rocker arms, pivoted to and beneath the sley, engaging at one end with cams fixed on the front rail of the loom, and connected at the other end to the reed lifter-rods. This construction is similar to that employed in loose reed looms for securing the lower edge of the reed immediately before beat-up.

By way of example two forms of sley and reed arrangement in accordance with the present invention and the way in which they operate will now be described in greater detail with reference to the accompanying drawings, in which:

Figure 1 is a side view of the relevant parts of a loom in accordance with the invention; and

Figure 2 is a detail side view of an alternative arrangement in accordance with the invention.

In looms of the type in connection with which the invention may be employed the warp ends shown at 3, 4 in Figure 1 are drawn from the warp beam (not shown) through the healds (not shown) which separate them into two sheets 3 and 4 during the insertion of each pick of weft and thence through the reed 5, the vertically disposed wires 6 of which space the warp ends 3, 4 across the width of the warp. The reed 5 is carried by a sley 7 mounted on sley swords 8 which rock back and forth about a rock shaft 9 near the base of the loom. The reed 5 in its rear centre position (at the left in Figure 1) and the two sheets 3, 4 of warp joining at the fell 10 of the fabric 11 form the shed 12 through which a shuttle lays the successive picks of weft. After each pick has been inserted in the shed 12, the sheets 3, 4 of the warp are brought together again by the healds to close the shed and the reed 5 is carried forward with force to beat-up the yarn into the fell 10 against the backing of the previous pick.

In order to position the reed 5 so that it engages the fell of the fabric 11 with that part of the reed wires 6 close to their ends, the reed cap 13 is fixed to the sley 7 and is provided in its lower face with a deep longitudinal groove 14 in which the upper baulk 15 of the reed can reciprocate vertically. The reed is mounted on lifter rods 16 free to slide vertically in sleeves fitted in suitable openings 17 at the rear of the sley 7.

For the purpose of the invention each lifter-rod 16 is connected by means of a knuckle joint 21 to the upper end of a link 22 adjustable in length, the lower end of the link being pivotally connected to the lower part of the loom frame. The lower end of the lifter rod 16 is forked at 23 and formed with eyes 24, and the pin 25 of the knuckle joint passes through the eyes and is fixed within the fork by means of grub screws 26. The adjustable link comprises a tubular central portion 27 with left and right internal threads at the ends. In the top end is screwed a short end shaft 28 formed with an eye provided with a ball bearing through which the pin 25 of the knuckle joint 21 passes. In the lower end of the central portion 27 is screwed a similar short shaft 29 mounted by means of a ball bearing on a pin 30 fixed on a pedestal 31 on the lower frame member 32 of the loom. The link 22 can be adjusted in length by rotating the central portion 27 and nuts 33 are provided on both end shafts 28, 29 to lock the link at any given length. The pedestal 31 is located in front of the rock shaft 9 and the pin 30 about which the links 22 oscillate is parallel to the shaft 9 so that as the sley 7 describes an arc of a circle about the shaft 9 the reed which is constrained to describe an arc of a circle about the fixed pin 30 in the pedestal 31 slides relatively to the sley 7 in the direction of the lifter-rods 16. The required lift of the reed 5 is obtained by selecting the position of the pedestal 31 relatively to the rock shaft 9, and by correspondingly adjusting the length of the link 22.

When the sley 7 is at back centre position the reed 5 is in normal shedding position with the two warp sheets 3, 4 of the open shed 12 passing through the reed near the lower and upper ends of the wires 6. As the sley 7 moves forward the lifter-rods 16 slide in the sley openings 17 until the sley reaches front centre position (on the right in Figure 1) when the lower ends of the wires 6

are at the level of the fell **10** of the fabric **11**. Beat-up is thus effected by the portion of the reed near the ends of the reed wires.

This arrangement provides a positive drive for the reed during the forward and backward movement of the sley. The weight of the reed and moving parts are directly supported by the floor bearings of the frame so that little power is required for the drive and a firm support is provided for the reed at beat-up.

In an alternative arrangement as shown in Figure 2 horizontal rocker arms **41** are pivoted at their mid-points about an axis extending parallel to and beneath the sley **7**, and their rear ends **43** slide in bores **44** at the lower ends of the lifter rods **16**, so that as the arms **41** rock about their axis **42** they impart a vertical reciprocating motion to the lifter rods **16**. The front ends **45** of the rocker arms **41** are provided with rollers **46** engaging triangular shaped cams **47** carried by the front rail **48** of the loom frame. The profile of the lower faces **49** of the cams **47** engaged by the rocker rollers **45** consists of two parts: a downward slope designed to swing the rocker arms, and an arc of a circle centred on the centre of rotation of the sley to provide a dwell when no further motion of the reed **5** relative to the sley **7** takes place. The lifter-rods **16** are also connected at their lower ends to helical tension springs **50** anchored beneath the sley to the rocker rail (not shown) of the loom and adapted to pull the reed **5** and lifter-rods **16** downwards against stops **51**. The stops are provided by screws **52** with heads **53** and lock nuts **54** on the sley member, positioned under the rear ends **43** of the rocker arms. The height of the screws **52** can be adjusted to determine the lowest point reached by the reed **5**.

When the sley **7** is at back centre position (on the right in Figure 2) the reed **5** is in normal shedding position with the two warp sheets **3**, **4** of the open shed **12** passing through the reed **5** near the lower and upper ends of the wires **6**. The rear ends **43** of the rocker arms **41** are down against the stops **51** which locate the reed **5** in this position. As the sley **7** moves forward the rocker arm rollers **46** engage the lower faces **49** of the cams **47** and the reed **5** is raised until the rollers reach the arcuate parts of the cams, when no further movement of the reed **5** relative to the sley **7** occurs and the reed is beaten-up

hard against the fell **10**. The position in which the reed **5** is thus held is such that the part of the wires **6** which engages the fell **10** is that nearest the lower ends of the wires. When the sley **7** moves back again the reed **5** returns to its normal shedding position under the pull of the helical tension springs **50**.

It may be seen that in a loom provided with a reed and sley arrangement in accordance with the present invention beat-up of the weft is effected with that part of the reed which is strongest and least likely to suffer from irregularity and unevenness. Variations in tightness of the warp ends giving rise to differences in the lustre of fabric and in the degree of absorption of dye-stuffs in the subsequent dyeing are substantially eliminated. The mechanism required is simple and compact; it provides a solid support for the reed at beat-up and it can be readily fitted to a conventional loom.

Having described our invention, what we desire to secure by Letters Patent is:

A flat loom for weaving comprising a rock shaft near the base of the loom, a sley which is adapted to oscillate back and forth about the rock shaft, a reed carried by the sley and having straight reed wires, mechanism for oscillating the sley about the rock shaft to effect beat-up, reed lifter-rods slidably extending through openings in the sley and carrying the reed, and links connected to the lifter rods and pivoted near the base of the loom about an axis parallel to the rock shaft, whereby the horizontal oscillation applied to the sley by the oscillating mechanism is transmitted to the reed as a vertical oscillation relative to the sley and the fell of the fabric is engaged during each beat-up by a portion of the reed close to the end of the reed wires.

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