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LOOM FOR WEAVING

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This invention relates to looms for weaving and refers particularly, though not exclusively to looms employing shuttles of the gripping or nipper type.

Hitherto it has been usual to furnish a loom with a supporting frame comprising lateral parts connected together in front and behind and above and below by transverse struts and to drive the loom from cross shafts having their bearings in the lateral parts of the frame which also carry the main driving and driven parts of the loom. Such an arrangement, however, not only necessitates considerable power for driving the loom but the operation of the slay and of the shuttle tends to cause undesirable vibrations which, in existing forms of loom, cannot be eliminated and result in difficulties arising during operation. This difficulty could not be overcome by increasing the weight of the lateral parts of the frame since instability of the drive for the slay, heald frames and the like would not be effectively overcome.

Inherent inaccuracies in driving and supporting individual parts have hitherto been such that after erection the loom had to be adjusted in almost every detail with consequent loss of time and therefore expense. For this reason manufacturers have sometimes been reluctant to disassemble a weaving loom for transport and have preferred to incur the additional cost of transporting it in the assembled state. In some cases all the driving parts of the loom have been arranged on the lateral parts of the frame and enclosed in a casing and, though this resulted in a compact construction the loom was necessarily heavy and, in addition, freedom from vibration of the moving parts, such for example as the heald frames and slay, was not obtained. The object of the present invention is to overcome the above difficulties. To this end a loom according to the present invention comprises lateral frame members and a longitudinal frame element connecting together the lateral frame members, the longitudinal frame element carrying a driving shaft and such mechanisms driven thereby as are directly associated with the shedding, beating-up and shuttle movements.

Preferably two or more similar sets of mechanism are provided each comprising the means for operating the parts directly associated with the shedding, beating-up and shuttle movements, all of these mechanism sets being driven from the said driving shaft through couplings which can be readily disconnected. Each mechanism set may comprise a shaft length which can be cou-

pled to and then forms an extension of the driving shaft and can also transmit the drive through a coupling to the next adjacent mechanism set.

The number of such separate mechanism sets will then vary in accordance with the desired width of the loom, i. e. its dimension in the direction of the width of the fabric, so that the loom can be readily constructed to suit any width of fabric by choosing the number of the mechanism sets accordingly and coupling these to the driving shaft and to each other.

Preferably the longitudinal frame element, which extends across the loom, its V-shaped in cross-section so that the let-off and take-up beams can be arranged within the limits of the lateral members of the frame. If desired an oil bath may be incorporated in the longitudinal frame element, the supply of lubricant to the moving parts of the loom being effected, for example, by means of one or more circulation pumps.

Two constructions of loom according to the present invention are illustrated somewhat diagrammatically and by way of example in Figures 1 and 2 respectively of the accompanying drawing.

Figure 1 is an embodiment of this invention applied to a loom employing shuttles of the gripping or "nipper" type.

Figure 2 is a modification in which an ordinary shuttle is employed.

In the construction illustrated in Figure 1 the loom, which is of the type employing shuttles of the gripping or "nipper" type, is supported at its ends by two lateral members 1a and 1b which are connected together by a longitudinal frame element comprising two rails 2a, 2b. Formed as a single unit with the rails 2a, 2b is an oil bath 3 of steel plate and V-shaped in cross-section as shown. The let-off beam 4 for the warp 5 is carried between the transverse members 1a and 1b, the warp threads 5 passing over swing beam 6 and being formed into sheds 7a, 7b by actuation of the heald frames 8 through rods 8a, 8b, 8c, 8d. A slay 9 is furnished with a reed 10 whereby the weft is beaten into the shed, the fabric 11 passing over a breast beam 12 to a take-up beam 13.

The main driving shaft 14 of the loom is formed in sections coupled together at 15 between each adjacent pair of a series of mechanism sets mounted on the longitudinal frame element 2a, 2b, each mechanism set transmitting the drive through a sword 16 to the slay 9 and also through the rods 8a, 8b, 8c and 8d to the heald frames. Each mechanism set indicated at 17 incorporates

a bearing for the main driving shaft 14 and is furnished with a casing 18 which includes a shuttle box 19. The take-up beam 13 is driven from the main shaft 14 through gearing 20, 21, 22 and a chain 23 and the let-off beam 4 is driven from the shaft 14 through gearing 24, 25 and a chain 26.

It will therefore be seen that the main driving shaft 14, the gearing 20, 21 and 24, and all the driven parts directly associated with the formation of the fabric 11, i. e. the heald rods 8a, 8b, 8c and 8d, the swords 9, reed 10 and shuttle boxes 19 are carried by the longitudinal frame element constituted by the rails 2a, 2b and oil bath 3.

The mechanism sets 17 distributed along the length of the longitudinal frame element are similar to one another and can be mass produced, the loom being erected by coupling together a number of these units in accordance with the desired width of the loom in the direction of the width of the fabric. Further, the provision of similar individual units in this manner greatly facilitates dismantling and accurate erection of the loom.

In the construction illustrated in Figure 2 picking of the weft is effected by means of an ordinary shuttle which cooperates with shuttle boxes 27, 27' and pickers 34, 34'. The beating up of the weft is effected by a reed 28, and a driving cam 29 driven from the main driving shaft transmits movement through an arm 30 to the picking mechanism 31, 32, 33 or 31', 32', 33'. In addition to the moving parts as included in Figure 1 therefore the picking mechanism in Figure 2 is carried by the central longitudinal frame element.

The V-shaped formation of the oil bath in both constructions above described allows arrangement of the let-off and take-up beams 4 and 13 within the limits of the lateral frame members 1a, 1b, whereby a compact construction with a narrow overall width, i. e. measured in the direction of the length of the warp, is obtained. In this respect it will be understood, that the oil bath itself may be constructed as a hollow girder which constitutes the longitudinal frame element of the loom.

In a loom according to the invention accurate adjustment and mounting of the various moving parts is facilitated and vibration is reduced, whilst in addition the frame need not be heavy even the length of the loom is large. Arrangement of the parts on a longitudinal frame element results in a reduction in the overall height of the loom with consequent improved visibility and access to the parts. Further, fouling of the warp threads by oil from the moving parts is avoided since the warp and fabric lie above and outside the zone within which such parts are arranged. The loom can, furthermore be easily dismantled into its individual units and readily re-erected without involving detailed sorting and assembly of a large number of small elements of the mechanism.

I claim:

1. In a loom for weaving the combination with lateral frame members, of a longitudinal frame element connecting together the lateral frame members and carrying a driving shaft, and two or more similar sets of mechanism each comprising the means for operating the parts directly associated with the shedding, beating-up and shuttle movements, all of these mechanism sets being driven from the said driving shaft through couplings which can be readily disconnected.

2. A loom as claimed in claim 1 in which each

mechanism set comprises a shaft length which can be coupled to and then forms an extension of the driving shaft and can also transmit the drive through a coupling to the next adjacent mechanism set.

3. In a loom for weaving, the combination with lateral frame members of a main longitudinal frame element connecting together the lateral frame members and carrying a driving shaft and carrying such mechanisms driven by said driving shaft as are directly associated with the shedding, beating-up and shuttle movements, said longitudinal frame element having a substantially V-shaped cross sectional configuration for the purpose set forth.

4. In a loom for weaving, the combination with lateral frame members of a main longitudinal frame element connecting together the lateral frame members and carrying a driving shaft and carrying such mechanisms driven by said driving shaft as are directly associated with the shedding, beating-up and shuttle movements, said longitudinal frame element having a substantially V-shaped cross sectional configuration and incorporating an oil bath.

5. A loom for weaving having a shuttle, heald frames, a reed, lateral frame members, a main longitudinal frame element interconnecting said lateral frame members, a driving shaft carried by said main longitudinal frame element, and means for operating said shuttle, said heald frames and said reed; all said means being carried by said main longitudinal frame member and adapted to be driven by said driving shaft.

6. A loom for weaving having lateral frame members, a longitudinal frame element interconnecting said lateral frame members, a driving shaft carried by said longitudinal frame element, a plurality of sets of mechanism also carried by said longitudinal frame element, each set comprising means for causing shedding and beating-up movements, all said sets being connected to, and adapted to be driven by, said driving shaft.

7. A loom for weaving having lateral frame members, a main longitudinal frame element interconnecting said lateral frame members, a driving shaft carried by said main longitudinal frame element, a plurality of sets of mechanism also carried by said frame element, each set comprising means for causing shedding and beating-up movements, and means associated with said sets and with said shaft and adapted to individually connect, and disconnect, said mechanisms with, and from, said driving shaft.

8. A loom for weaving having lateral frame members, a main longitudinal frame element interconnecting said lateral frame members, a driving shaft carried by said main longitudinal frame element, a plurality of individual operating means, and means for readily connecting said operating means with, and disconnecting said operating means from, said driving shaft.

9. A loom for weaving having lateral frame members, a main longitudinal frame element interconnecting said lateral frame members, a plurality of individual operating means carried by said longitudinal frame element, each operating means comprising a shaft, and means for interconnecting and disconnecting the shafts of said operating means.

10. A loom for weaving having shuttles, a slay, heald frames, lateral frame members, a longitudinal frame element interconnecting said lateral frame members, a mechanism for operating the shuttles, a mechanism for operating the slay, and

a mechanism for operating the heald frames, all said mechanisms being mounted on said longitudinal frame element.

11. A loom for weaving having lateral frame members, a longitudinal frame element interconnecting said frame members, beating-up and shedding mechanisms, means for operating said beating-up mechanisms and means for operating said shedding mechanisms, all said mechanisms and means being mounted on said longitudinal frame element.

12. A loom for weaving having lateral frame members, a longitudinal frame element interconnecting said frame members, a beating-up mechanism, and means for operating said mechanism, said mechanism and means being supported by said longitudinal frame element.

13. A loom for weaving having lateral frame members, a longitudinal frame element intercon-

necting said frame members, a shedding mechanism, and means for operating said mechanism, said mechanism and means being solely supported by said longitudinal frame element.

14. A loom for weaving having lateral frame members, a longitudinal frame element interconnecting said frame members, a shuttle operating mechanism, and means for operating said mechanism, said mechanism and means being supported by said longitudinal frame element.

15. A loom for weaving having lateral frame members, a longitudinal frame element interconnecting said frame members, a plurality of members and mechanisms movably cooperating in making the fabric, and a plurality of means for operating said members and mechanisms, all said members, mechanisms, and means being supported by said longitudinal frame element.

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