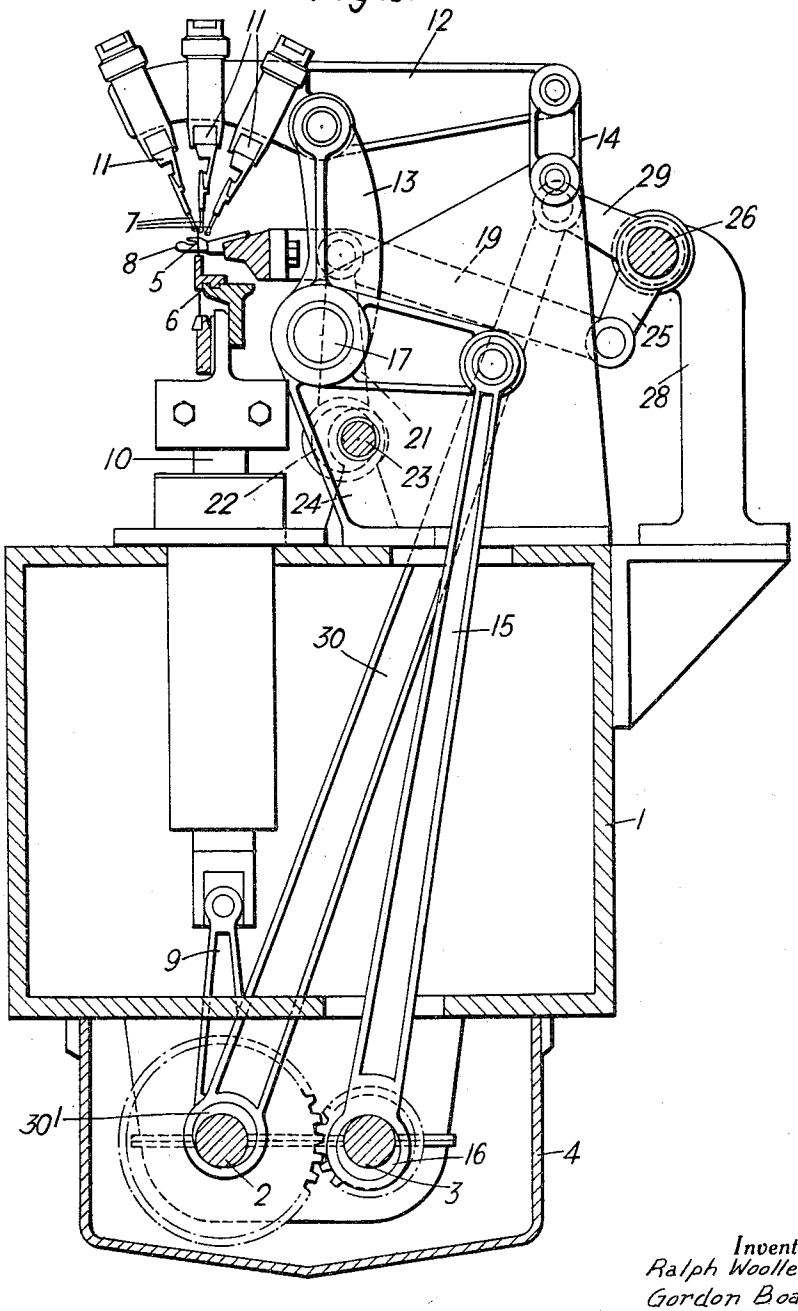
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WARP KNITTING MACHINES

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Fig. 1.



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Fig. 3.

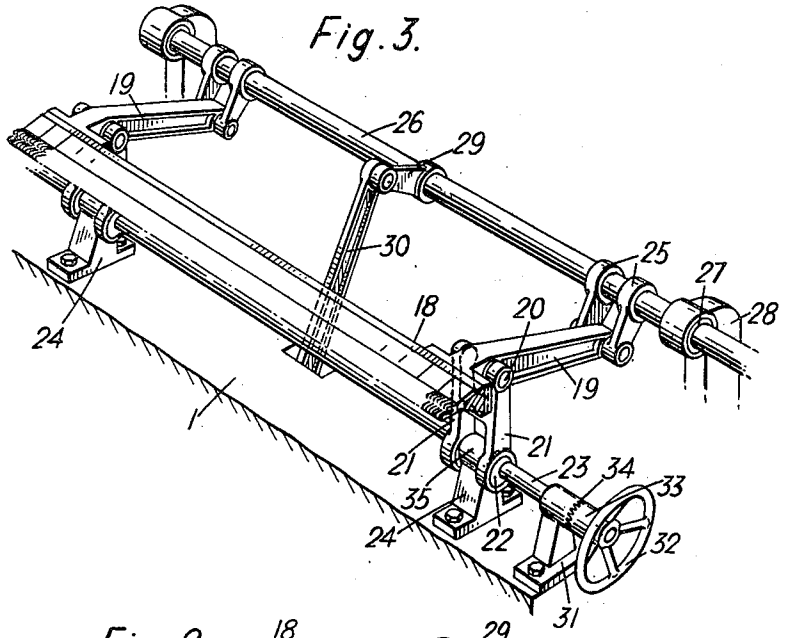


Fig. 2.

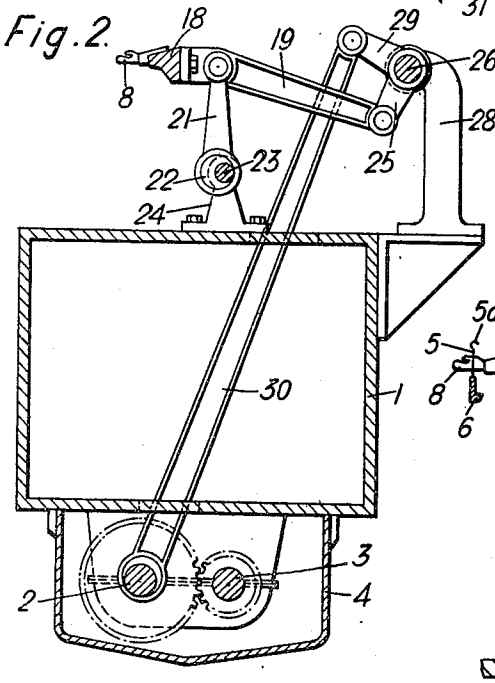
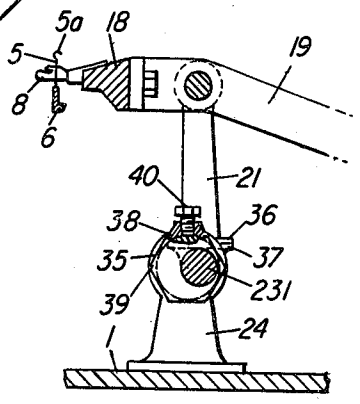


Fig. 4.



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WARP KNITTING MACHINES

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4 Claims. (Cl. 66—86)

The present invention relates to flat warp knitting machines which have a row of reciprocating hooked needles, into the hooks of which the warp threads are laid by a row of warp guides which move to and fro across the row of needles, and which also have a row of sinkers provided with knock-over edges which are reciprocated to and fro transversely to the direction of movement of the needles in between the individual needles in the row. In such a machine, as the hooks of the needles move down into the spaces between the knock-over edges of the sinkers, the loops of thread previously formed around the shanks of the needles are cast off over the tops of the needles by those knock-over edges.

The amount of knock-over which is necessary, that is to say the maximum distance of the knock-over edges of the sinkers above the tops of the hooks of the needles when the needles are in their lowermost position, is dependent upon the fabric loop structure being knitted and also upon the nature of the warp threads. Furthermore, it is possible to control, to a certain extent, the number of courses of stitches knitted per inch of fabric by varying the amount of the knock-over. Thus if the amount of knock-over is large, the loops of each course of stitches are made larger and the number of courses of stitches per inch of fabric is reduced.

In order that a machine may readily be used with different threads and may readily be adapted to produce different fabric loop structures, it is desirable that the amount of knock-over should be easily adjustable.

According to the present invention, the sinkers in such a flat warp knitting machine are fixed to a bar which is supported by a pivoted link which extends in the direction of movement of the needles, and the end of the link remote from the sinkers is carried on a pivot, the position of which is adjustable in the direction of movement of the needles.

Preferably, the pivot on which the link is mounted is a shaft on which an eccentric is fixed. The link is pivoted on the eccentric and the shaft is releasably held in a bush fixed to the frame of the machine. To adjust the position of the centre of the eccentric and thus also the pivotal axis of the link, the shaft is released in the bush and is rotated to move the centre of the eccentric on which the link is mounted as necessary. The shaft is then fixed again within the bush.

An example of a flat warp knitting machine constructed in accordance with the invention, is illustrated in the accompanying drawings, in which:

Figure 1 is a cross section through the bed of the machine showing the knitting elements and their operating mechanisms;

Figure 2 is a cross section through the machine similar to that shown in Figure 1, but to a smaller scale, and showing only the sinkers and their operating mechanism;

Figure 3 is a perspective view of the sinkers and their operating mechanism shown in Figure 2; and

Figure 4 is a cross section through the machine similar to part of that shown in Figure 2 but to a larger scale to show a modification.

The machine shown in Figures 1 to 3 comprises a bed 1 which extends along the full length of the machine and under which two driving shafts 2 and 3 are mounted within a sump 4.

The knitting elements consist of a line of needles 5 having hooks 5*a* (shown in Figure 4) and carried on a needle bar 6, three rows of guide eyes 7 and a row of sinkers 8.

As shown in Figure 1, the needles are reciprocated up and down by means of an eccentric on the shaft 2 which operates through a connecting rod 9 and a guide rod 10 which carries the needle bar 6. The guide eyes 7 are carried on guide bars 11 which are, in turn, mounted on arms 12 carried on one arm of a pivoted bell crank lever 13 and a link 14, the other arm of the bell crank lever 13 being connected by a rod 15 to an eccentric 16 on the shaft 3. As the shaft 3 rotates, the bell crank lever 13 is oscillated to and fro about its pivot 17 and the guides are thus moved to and fro from right to left, as seen in Figure 1.

The sinkers 8 are mounted on a sinker bar 18 which is carried at each end on an arm 19. Each of the arms 19 is pivotally fixed by a pin 20 to a pair of substantially vertical links 21 which are rotatably mounted on eccentrics 22 which are fixed to a shaft 23. The shaft 23 is carried in bearing bushes in brackets 24 fixed to the bed 1 of the machine.

The ends of the arms 19 away from the sinker bar 18 are pivoted to pairs of arms 25 which are fixed to a further shaft 26 which is rotatably mounted in bushes 27 carried in pedestals 28 mounted on the bed 1 of the machine. At about its mid-point, a further arm 29 is fixed to the shaft 26 and this arm is connected by a connecting rod 30 to an eccentric 30′ fixed on the driving shaft 2. As the driving shaft 2 rotates, the shaft 26 is oscillated by means of the connecting rod 30 and the arm 29 and thus the arms 19 together with the sinkers 8, are moved to left and right, as seen in Figures 1 and 2, into and out of engagement between the needles 5.

The shaft 23 extends at one end through a bore in a bracket 31 (see Figure 3) and on the end of the shaft 23 beyond the bracket 31, a hand wheel 32 is mounted. The adjacent faces of the bracket 31 and of the boss 33 of the hand wheel 32 are provided with interengaging teeth 34. The hand wheel 32 is mounted so that it can move axially on the shaft 23 against the action of a spring. Thus when the hand wheel is pulled towards the right, as shown in Figure 3, the teeth 34 on the boss 33 are moved out of engagement with the corresponding teeth on the bracket 31 so that the shaft 23 can be rotated.

To raise the sinkers 8 from the position shown in Figures 2 and 3, the teeth 34 on the hand wheel 32 are disengaged as described above, and the hand wheel is rotated in a clockwise direction through a small angle. The centres of the eccentrics 22 are thus raised and with them the links 21, the arms 19, the sinker bar 18 and the sinkers 8 are also raised. When the sinkers have been raised sufficiently, the hand wheel 32 is released and the teeth 34 are brought back into engagement with the corresponding teeth on the bracket 31 so that the hand wheel 32 together with the shaft 23, is again locked in position.

To lower the sinkers 8, the teeth 34 on the hand wheel 32 are disengaged and the hand wheel is rotated through a small angle in a counterclockwise direction.

In the modified construction illustrated in Figure 4, the links 21 are provided at their lower ends with flanges 36, by means of which they are rigidly fixed to flanges 37 fixed on a rotatable shaft 231. The shaft 231 is carried in bushes 38 within the housing parts 35 of the brackets 24. The bushes 38 have hexagonal portions 39 projecting beyond the edge of the housing parts 35. The bushes 38 may be rotated within the housing parts 35 by means of a spanner engaged with the projecting part

39. The bushes 38 have eccentric inner and outer surfaces and can be locked in any angular position by means of set screws 40.

When the eccentric bushes 38 are rotated, the shaft 231 together with the links 21 and the parts attached thereto, are bodily moved upwards or downwards depending on the direction of rotation of the bushes.

We claim:

1. In a flat warp knitting machine including a row of needles each with a shank and a hook, driving means for reciprocating said needles along the line of said shanks, a row of sinkers and driving means for reciprocating said sinkers in a direction transversely of said row of needles, the improvement which comprises a sinker position adjusting member having a first cylindrical surface and a second cylindrical surface eccentric to said first surface, a support carrying said member for angular movement about said first cylindrical surface, a link extending in the direction of movement of said needles, one end of said link being mounted for rocking movement on said second cylindrical surface, a sinker bar carrying said sinkers and fixed to the other end of said link, manually-operated means for adjusting the angular position of said member on said support and thereby adjusting the position of said link and said sinkers in the direction of movement of said needles and locking means for holding said member in any of a plurality of adjusted positions.

2. In a flat warp knitting machine including a row of needles each with a shank and a hook, driving means for reciprocating said needles along the line of said shanks, a row of sinkers and driving means for reciprocating said sinkers in a direction transversely of said row of needles, the improvement which comprises a shaft, a bearing supporting said shaft for angular movement therein, an eccentric fixed on said shaft, a link extending in the direction of movement of said needles, one end of said link being mounted for rocking movement on said eccentric, a sinker bar carrying said sinkers and fixed to the other end of said link, manually-operated means for adjusting the angular position of said shaft in said bearing and thereby adjusting the position of said link and said sinkers in the direction of movement of said needles and locking means for holding said shaft in any of a plurality of adjusted positions.

3. In a flat warp knitting machine including a row of needles each with a shank and a hook, driving means for reciprocating said needles along the line of said shanks, a row of sinkers and driving means for reciprocating said sinkers in a direction transversely of said row of needles, the improvement which comprises a shaft, a bush having eccentric internal and external surfaces surrounding and supporting said shaft for rocking movement on said internal surface, a housing suporting said bush for angular movement therein about said external surface, a link extending in the direction of movement of said needles, one end of said link being mounted on said shaft for rocking movement therewith, a sinker bar carrying said sinkers and fixed to the other end of said link, manually-operated means for adjusting the angular position of said bush in said housing and thereby adjusting the position of said link and said sinkers in the direction of movement of said needles and locking means for holding said bush in any adjusted position in said housing.

4. A flat warp knitting machine as claimed in claim 2, wherein said manually operated means comprises a handwheel fixed to said shaft and said locking means comprises a first ring of teeth fixed to said handwheel, a second ring of teeth, a fixed bracket carrying said second ring of teeth and means releasably urging said first ring of teeth into engagement with said second ring of teeth.

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