April 5, 1938. H. WIRTH 2,113,525

RIB WARP FRAME

Original Filed Oct. 20, 1936 2 Sheets-Sheet 1

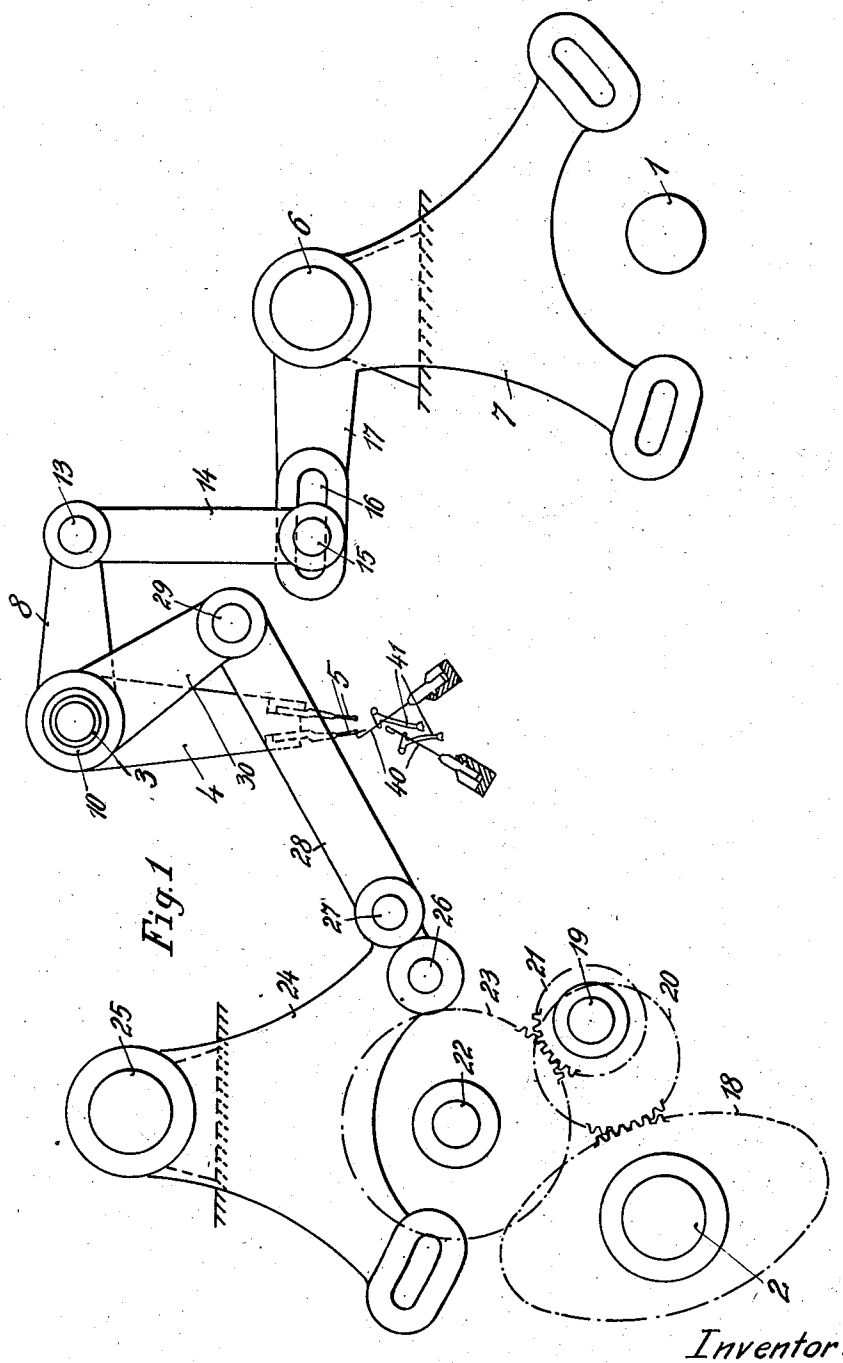


Fig. 1

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RIB WARP FRAME

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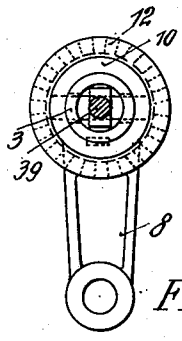


Fig. 3

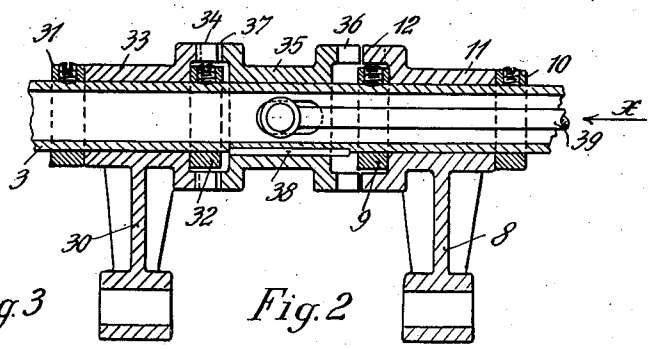


Fig. 2

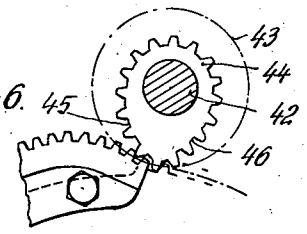


Fig. 6.

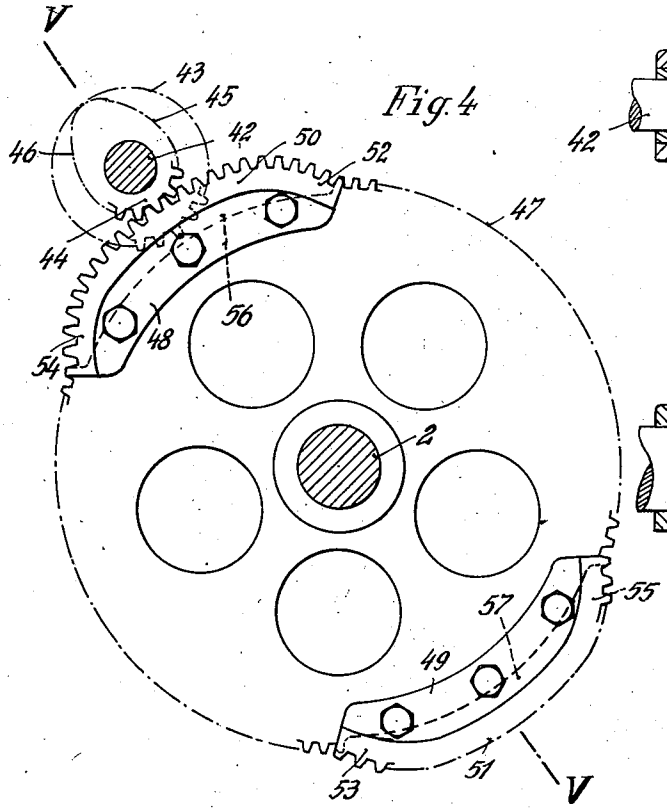


Fig. 4

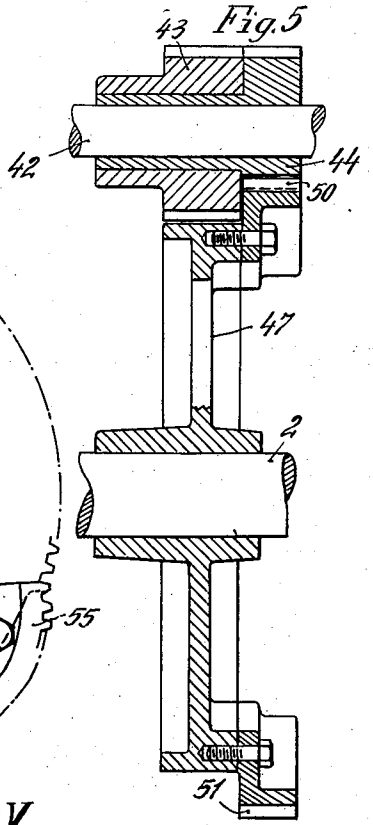


Fig. 5

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UNITED STATES PATENT OFFICE

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RIB WARP FRAME

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7 Claims. (Cl. 66—87)

The present invention relates to rib warp frames, double rib warp frames or the like which are to be made available for producing fabrics in atlas lap and plating or similar laps.

Hitherto the production of fabrics in plating or similar laps has not been possible on double rib warp frames or the like without complicated alterations of the latter, because for the production of fabrics in such laps, the guide needles of one or both lap machines had to swing twice between the spring beard needles in each row. This would require an exchange of the cam mechanism. The two lap movements must be performed in the period of time which in the operation of the machine is provided for performing the path necessary for producing fabrics in atlas lap. The device according to the invention allows the production of fabrics in simple atlas lap as well as in plating and similar laps on double rib warp frames or the like.

According to the invention the production of fabrics in the different kinds of lap is possible by the fact, that the cams required for the fabric production in atlas lap as well as in plating laps are provided in the machine.

A clutch or the like arranged upon the shaft carrying the guide needle machines allows the transfer of the effect of the one or the other cam mechanism upon the guide needle machines. By means of the clutch or the like, the device for producing fabrics in atlas lap is manually or automatically rendered inoperative and simultaneously the plating tackle is positively rendered operative and vice versa.

In the same period of time in which, when producing fabrics in atlas lap, the guide needle machines once swing between the spring beard needles in each row, the guide needle machine or both guide needle machines twice swing between the spring beard needles on producing fabrics in plating laps.

The double lap for producing fabrics in plating or the like laps must be effected in the period of the time provided in the operation of the machine for performing the path necessary for the production of fabrics in atlas lap. To gain the time for carrying out the double lap, the rib warp frame may also be so constructed, that during this period of time the operation of the machine is retarded.

In the accompanying drawings a construction according to the invention is diagrammatically shown by way of example.

In these drawings:

Fig. 1 is a view of the parts of a rib warp frame which come into consideration for the purposes of the invention,

Fig. 2 shows a section through the clutch device,

Fig. 3 is a side view of the clutch device shown in the direction of the arrow x in Fig. 2,

Fig. 4 illustrates a view of an additional mechanism for changing the operating speed during the time provided for performing the lap path,

Fig. 5 is a section on the line V—V of Fig. 4, and

Fig. 6 shows another operative position of the device illustrated in Fig. 4.

In the frame of the machine, not shown on the drawings, the cam shafts 1 and 2 are journalled in a well known manner. Upon a shaft 3 guide needle machines 4, carrying guide needles 5, are pivotally mounted. Rib warp frames hitherto were provided with a cam fixed upon a cam shaft by means of which the guide needle machines were actuated. This cam was of such construction as to allow the required lap movements to be carried out. The use of this lap device, however, allowed carrying out of one kind of lap only, i. e., atlas lap.

Pivotally mounted upon a bolt or pivot 6 is a lever 7 adapted to be moved by a lap cam, not shown in the drawings. Pivoted upon the shaft 3, carrying the guide needle machines 4, is a lever 8 movements of which in the longitudinal direction of the shaft 3 are prevented by means of set collars 9 and 10. At one side the hub 11 of the lever 8 is provided with clutch teeth 12. By means of a pivot or bolt 13 one end of a link 14 is pivotally connected to the lever 8, while the other end of this link carries a pivot or bolt 15 engaging a longitudinal slot 16 provided in an arm 17 forming part of the lever 7 actuated by the lap cam mechanism.

Fixed upon the cam shaft 2 is an eccentric gear wheel or an elliptic toothed wheel 18 which engages an eccentric gear wheel 20 mounted upon a pivot or a rotatable shaft 19. The latter also carries a gear wheel 21 engaging a gear wheel 23 mounted upon a pivot or shaft 22. Fixed upon the shaft 22 is a cam, not shown in the drawings, which actuates a cam lever 24 mounted upon a pivot 25. The cam lever 24 is provided with a projection 26 which carries a bolt of pivot 27. One end of a link 28 is attached to this pivot 27, while the other end of the link is, by means of a pivot or bolt 29, pivotally connected to a lever 30. The latter is, in a manner similar to the lever 8, loosely mounted upon the shaft 3. Set collars 31 and 32 prevent movements of the

lever 30 in the longitudinal direction of the shaft 3. At one side the hub 33 of the lever 30 carries clutch teeth 34.

Between the two levers 8 and 30 carried by the shaft 3 a clutch element 35, provided with clutch teeth 36 and 37, is mounted upon this shaft 3. The clutch teeth 12 carried by the hub 11 of the lever 8 as well as the clutch teeth 34 on the hub 33 of the lever 30 are provided at the sides of the hubs 11 and 33 facing the clutch element 35. The latter is connected to the shaft 3 by means of a wedge 38. The clutch element 35 may, however, be shifted in the longitudinal direction of the shaft 3 for which purpose a rod 39 is provided. By shifting the clutch element 35 either its teeth 36 may be brought into engagement with the teeth 12 on the hub 11 of the lever 8, or its teeth 37 may be brought into engagement with the teeth 34 on the hub 33 of the lever 30.

The spring beard needles are designated with 40 and the sinkers are shown at 41.

If the teeth 12 are coupled to the teeth 36, the cam movements are transferred to the shaft 3 by means of the cam lever 7 and the lever and link system 17, 14, 8. The guide needle machine or the guide needle machines 4 then perform the movement required for the production of fabrics in atlas lap. For the production of such fabrics the guide needles 5 in each row swing once only between the spring beard needles 40.

If the clutch element 35 is shifted by means of the rod 39, the clutch teeth 12 and 36 are disengaged and the clutch teeth 37 and 34 are brought into engagement (Fig. 2).

A cam not shown in the drawings and mounted upon the cam shaft 22 is so constructed, that the lever 30, fixed upon the shaft 3, is moved by the cam lever 24 and the link 28 in such a manner, that the guide needles 5, carried by the guide needle machines 4, may, as required for the production of fabrics in plating laps, twice swing between the spring beard needles 40 in the period of time available for performing the path of the atlas lap.

By means of the elliptic gear wheel 18 and the eccentric wheel 20, the cam shaft 22 is correspondingly faster rotated, so that the double lap may be effected in the period of time provided in the operation of the machine for performing the lap path.

To aid this mode of operation a drive may be provided for the two cam shafts by means of which the speed of rotation of the shafts may be retarded during the period of time available for carrying out the lap movements. Hereby time is gained for the accelerations of the plating cam required for carrying out platings without altering the time for the other movements.

Fixed upon the well known drive shafts 42, connected with each other, are gear wheels 43 and oval-shaped gear wheels having change over gearings 45 and 46 the dimensions of the pitch curves of which change from that of the gear wheels 43 to that of a smaller portion 44 of the said oval-shaped gear wheel and back again to that of the gear wheels 43 respectively. The gear wheels 43 engage the main gear wheels 47 mounted upon the cam shafts 1 and 2 driving the rib warp frame. The gear wheel 47 mounted upon the cam shaft 2 only is shown in Fig. 4 of the drawings. Mounted upon the main gear wheels 47 are toothed segments 48 and 49 which are adapted to cooperate with the gear rotating with the gear wheels 43. The pitch circle of the teeth 50 and 51 of the segments 48 and 49 respectively are arranged upon a rim which is greater than that of the main gear wheels 47, the arrangement being such that the teeth 50, 51 may engage the smallest portions 44 of the oval-shaped gear wheels. In the direction of rotation, the front and rear portions of the segment 48 are provided with change over teeth 52 and 54 respectively, the pitch circle of which progressively decreases from that of the teeth 50 to that of the gear wheel 47. In a similar manner, the front and rear portions of the segment 49 are provided with change over teeth 53 and 55 respectively. The portions 56 and 57 of the main gear wheels 47 corresponding to the length of the segments 48 and 49 respectively are, as shown in Fig. 4, not provided with teeth.

The operation of the frame according to the invention is as follows:—

In a well known manner the rib warp frame is driven by the gear wheels 43, 47.

The segments 48 and 49 are arranged upon the main gear wheels 47 at the portions corresponding to the lap path and their length corresponds to the length of said path.

If the front end of the segment 48 or 49 i. e., the portion carrying the teeth 52 and 53 respectively comes into contact with the ascending portion 45 of the oval-shaped gear wheel, as shown in Fig. 6, the engagement of the teeth of the main gear wheel 47 with the teeth of the gear wheel 43 is interrupted, because the portions of the wheel 47 corresponding to the length of the segments are, as indicated at 56 and 57 (Fig. 4) not provided with teeth. On further rotation the smallest portion 44 of the oval-shaped gear wheel comes into engagement with the teeth 50 or 51 the pitch circle of which is greater than that of the main gear wheel 47.

Due to the changed ratio of gearing, the rotation of the cam shafts is retarded for the period of time during which the segments 48 and 49 respectively are operative, so that time for twice swinging the guide needles between the spring beard needles, required for the production of fabrics in plating or similar laps, is gained. The cams may, due to this arrangement, be constructed in a more advantageous manner.

At the end of the period of the lap path, the gear wheel 43 is, by the engagement of the teeth 54 or 55 with the descending change over portion 46 of the oval-shaped gear wheel, again brought into engagement with the teeth of the main gear wheel 47, so that the rib warp frame operates again with the normal speed of rotation.

What I claim is:

1. In a rib warp frame, double rib warp frame or the like as set forth, guide needle machines, a first cam controlling the production of fabrics in atlas lap, a second cam controlling the production of fabrics in plating lap, and means for alternately effecting the lap movements of said guide needle machines by said first cam and said second cam for the production of fabrics in atlas lap or in plating or similar laps.

2. In a rib warp frame, double rib warp frame or the like as set forth, a shaft, a guide needle machine carried by said shaft, a cam shaft, a cam, controlling the production of fabrics in atlas lap, mounted upon said cam shaft, a second cam shaft, a second cam, controlling the production of fabrics in plating lap, mounted upon said second cam shaft, levers loosely mounted upon said shaft, a cam lever actuated by said cam controlling the atlas lap, a second cam lever actuated by said cam controlling the plating lap,

a link connecting said cam lever to one of said levers loosely mounted upon said shaft, a second link connecting said second cam lever to the other of said levers loosely mounted upon said shaft, and a clutch member adapted to alternately connect said levers to said shaft.

3. A rib warp frame, double rib warp frame or the like, as set forth in claim 2 in which said clutch member is fixed upon said shaft by a wedge allowing movements of said clutch member in the longitudinal direction of said shaft, a rod fixed to said clutch member being adapted to shift said clutch member.

4. A rib warp frame, double rip warp frame or the like, as set forth in claim 2 in which said clutch member is fixed upon said shaft by a wedge allowing movements of said clutch member in the longitudinal direction of said shaft, both ends of said clutch member carry coupling teeth adapted to cooperate with coupling teeth carried by the hubs of said levers loosely mounted upon said shaft, and a rod is fixed to said clutch member to allow longitudinal shiftings of the latter.

5. A rib warp frame, double rib warp frame or the like as set forth in claim 2 in which eccentric gear wheels are provided adapted to accelerate, during the lap path, the speed of rotation of said cam effecting the movement of said guide needle machines when performing plating laps.

6. A rib warp frame, double rib warp frame or the like as set forth in claim 2 in which both cam shafts are driven by main gear wheels each of which carrying toothed segments the pitch circle of the teeth of which is greater than that of the said main gear wheels and decreases from the center portion towards both ends to merge into the pitch circle of the corresponding main gear wheel, said teeth of said segments cooperating with an oval-shaped gear fixed upon a drive shaft, also carrying a circular gear wheel cooperating with the said main gear wheel, and provided with teeth the pitch curve of which increases from a smallest circular portion to a greatest portion of the same radius than that of the said circular gear wheel mounted on the same shaft.

7. A rib warp frame, double rib warp frame or the like as set forth in claim 2 in which both cam shafts are driven by main gear wheels each of which carrying toothed segments the pitch circle of the teeth of which is greater than that of the said main gear wheels and decreases from the center portion towards both ends to merge into the pitch circle of the corresponding main gear wheel, said segments being fixed to portions of said main gear wheel not provided with teeth and having teeth cooperating with an oval-shaped gear fixed upon a drive shaft, also carrying a circular gear wheel cooperating with the said main gear wheel, and provided with teeth the pitch curve of which increases from a smallest circular portion to a greatest portion of the same radius than that of the said circular gear wheel mounted on the same shaft.

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