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WARP FRAME ATTACHMENT

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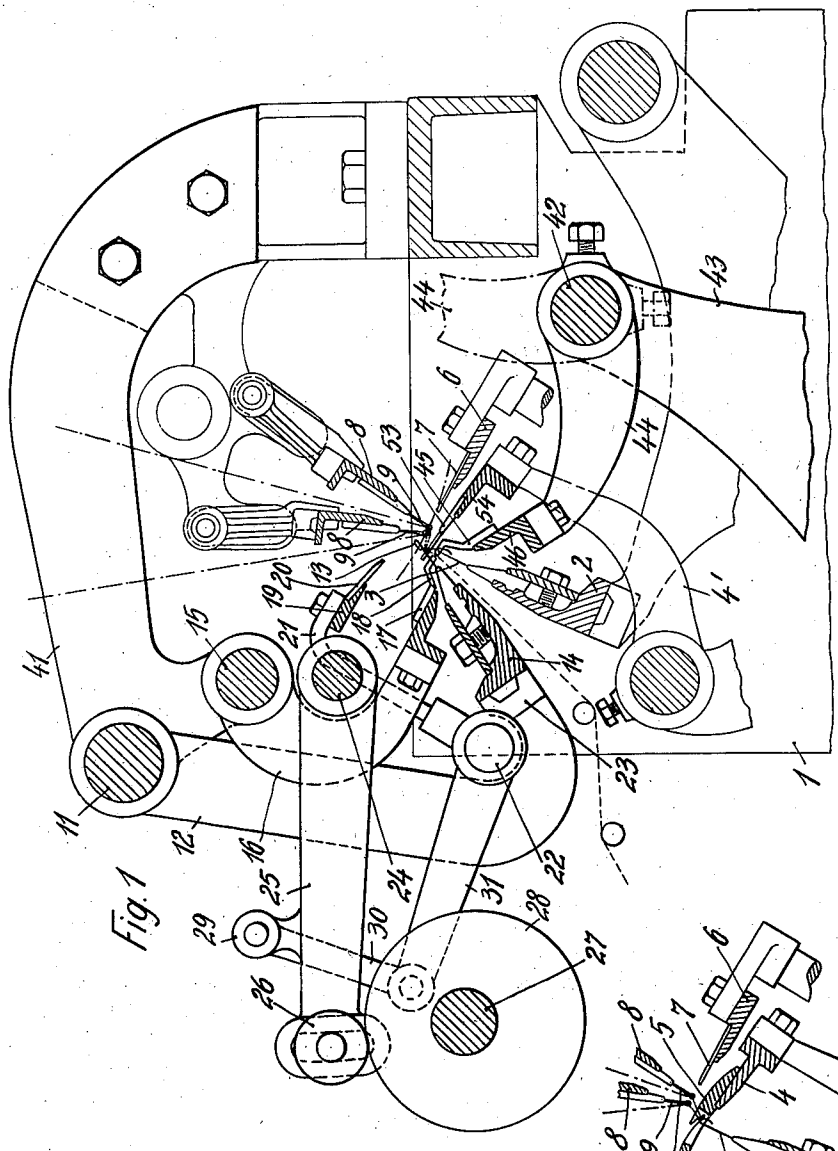


Fig. 1

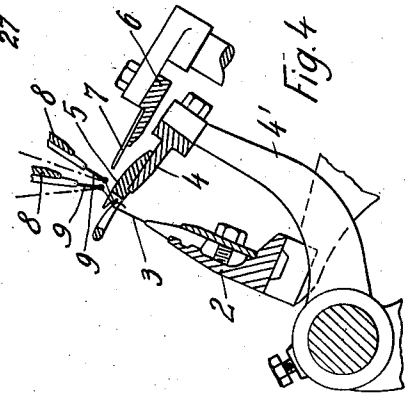


Fig. 4

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Fig. 2

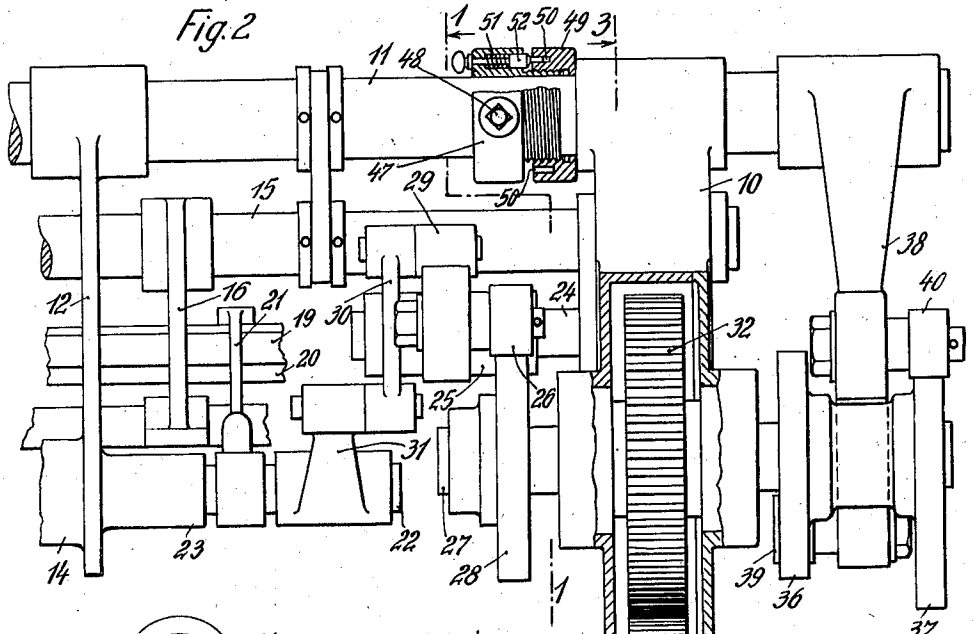
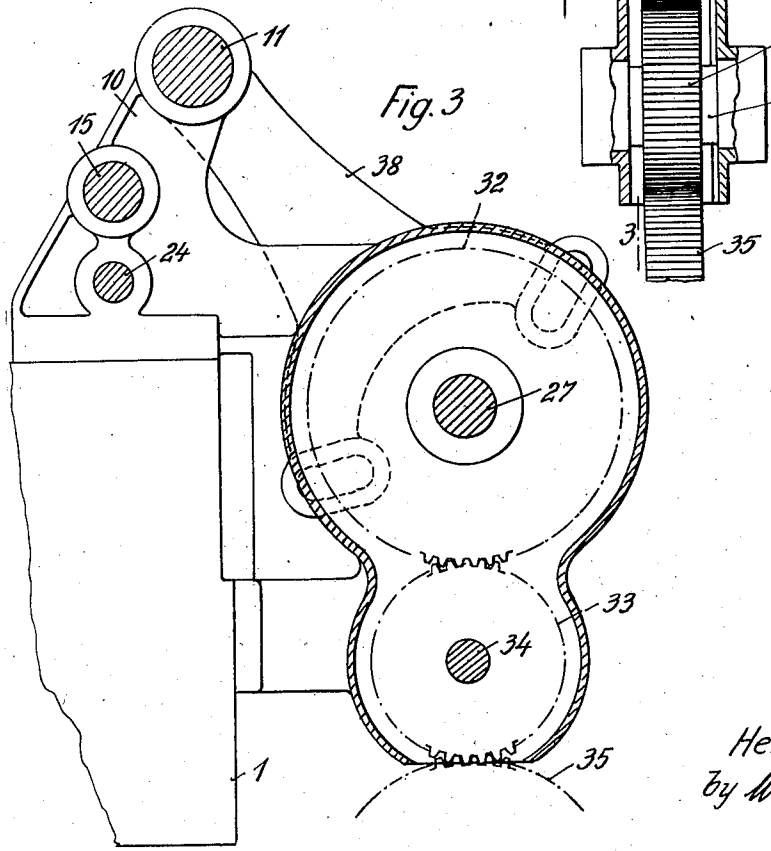


Fig. 3



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Fig. 5

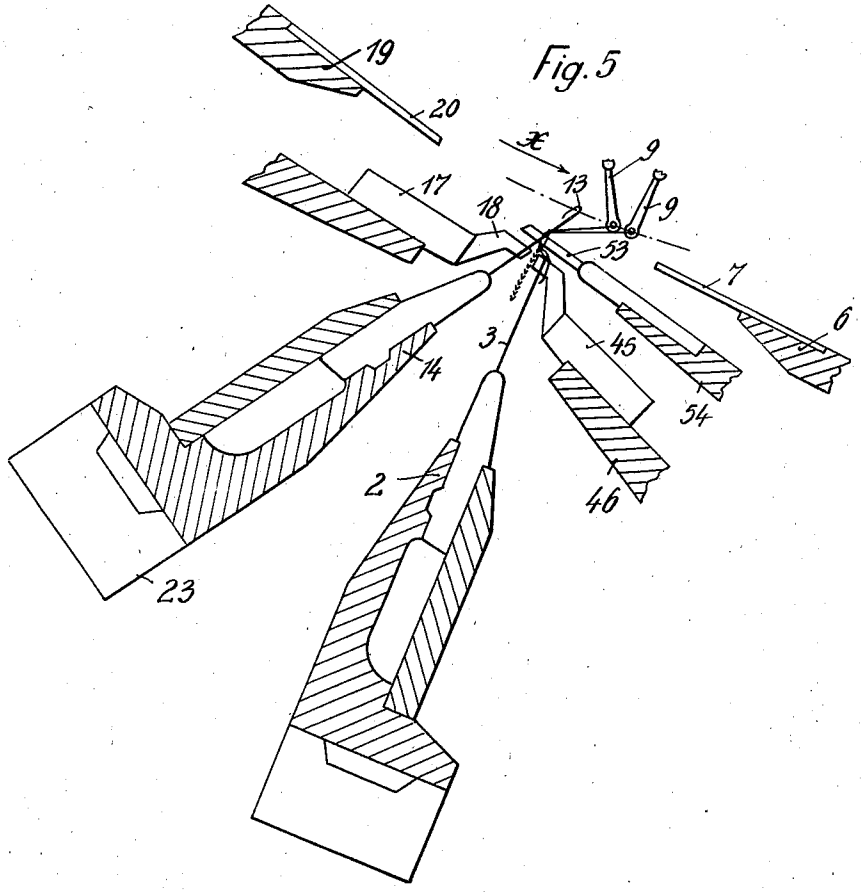
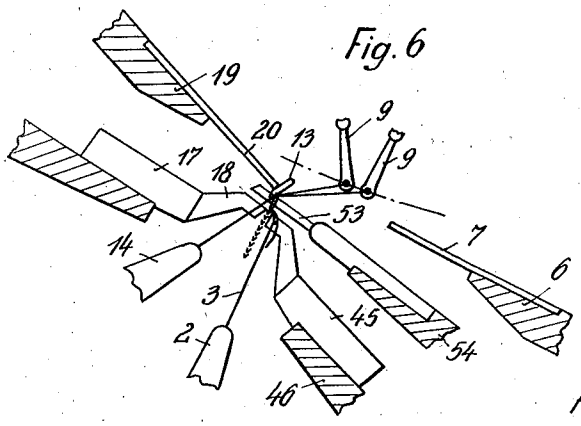


Fig. 6



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Fig. 7

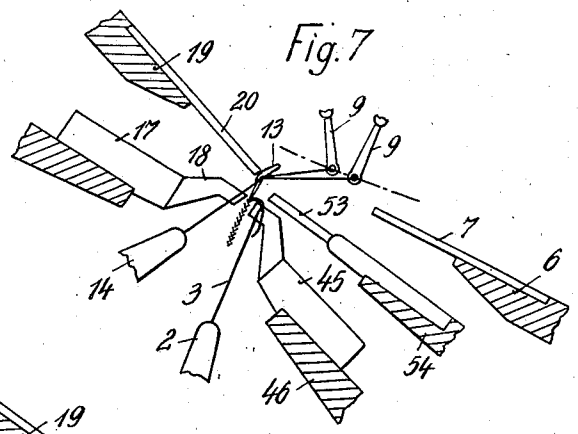


Fig. 8

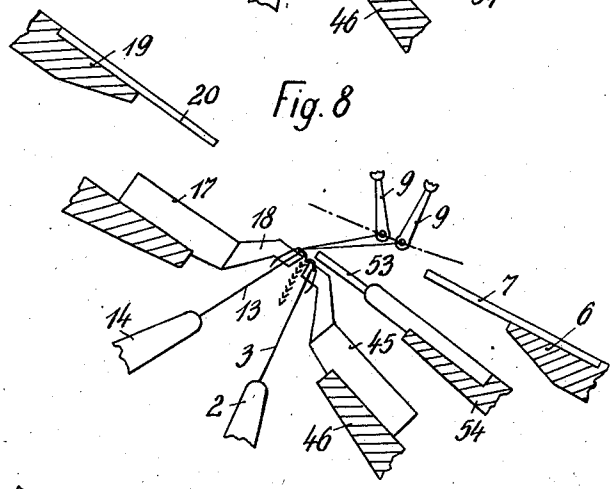
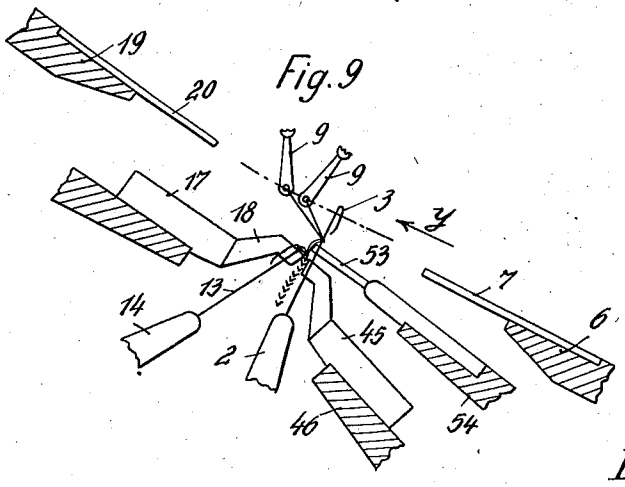


Fig. 9



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Fig. 10

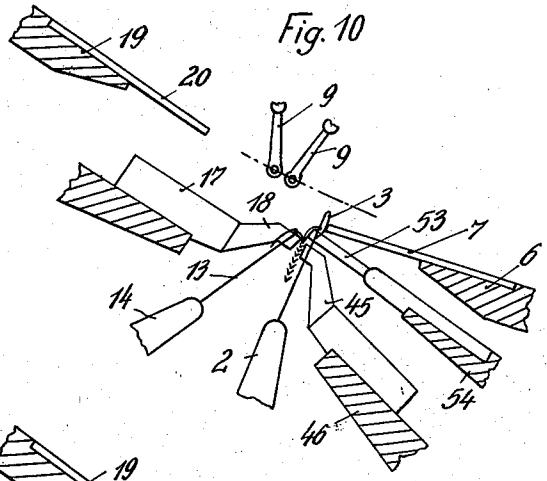


Fig. 11

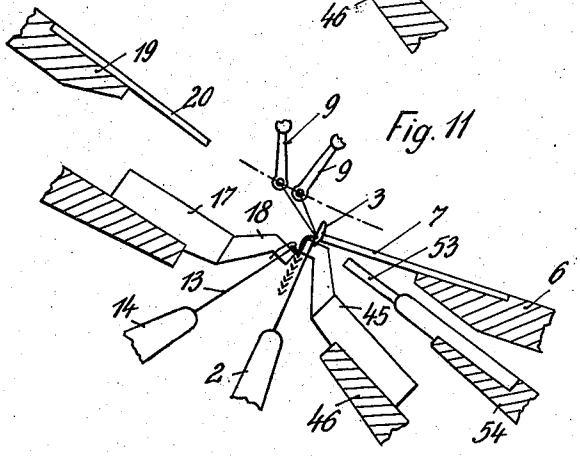
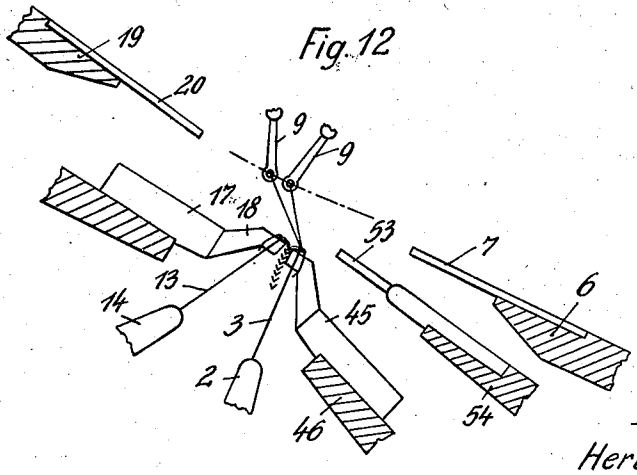


Fig. 12



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Fig. 13

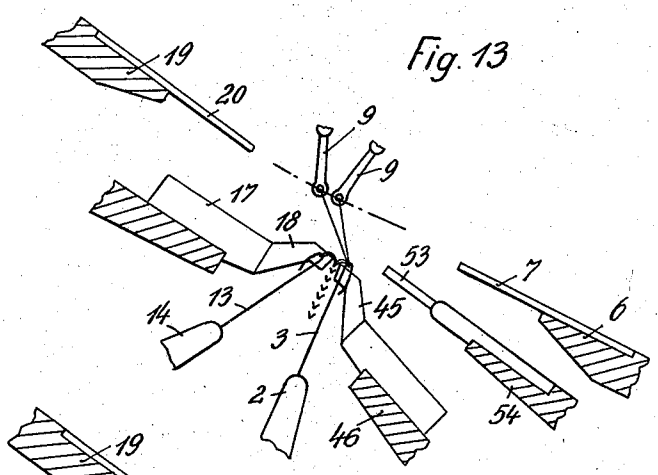


Fig. 14

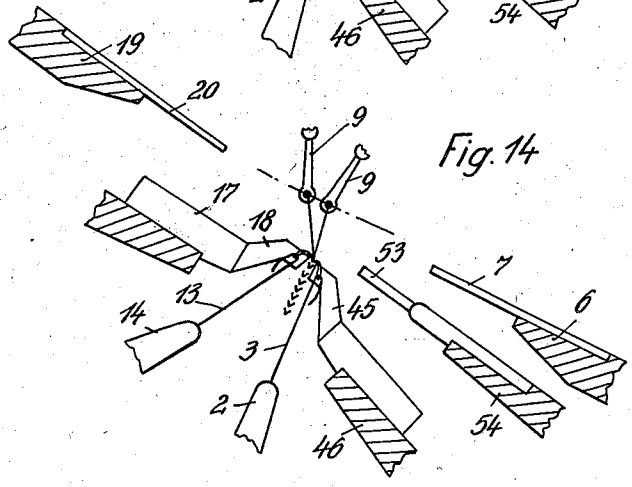
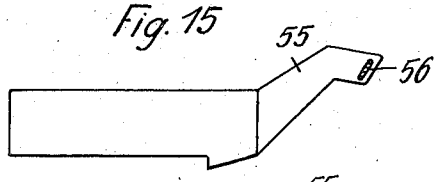


Fig. 15



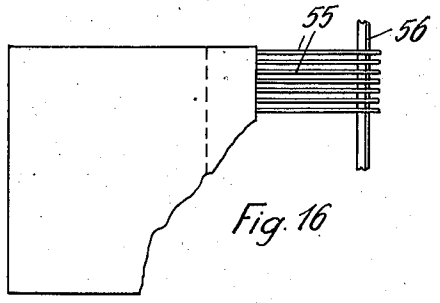


Fig. 16

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Patented Dec. 15, 1936 2,064,709

UNITED STATES PATENT OFFICE

2,064,709

WARP FRAME ATTACHMENT

Herbert Wirth, Hartmannsdorf, near Chemnitz, Germany

Application February 21, 1936, Serial No. 65,149
In Germany February 22, 1935

4 Claims. (Cl. 66—87)

The present invention relates to a device for the manufacture of double-faced warp fabrics of different kinds on plain warp frames adapted to produce plain fabrics.

The production of double-faced warp fabrics has hitherto been possible on Raschel-looms, double rib warp looms and double warp frames only. The present invention, however, allows the production of this fabric on a warp frame for the manufacture of plain warp fabric.

With this object in view, a special device is attached to the plain warp frame, thereby converting the plain warp frame into a double warp frame.

With the device according to the invention not only a substantial reduction of costs is obtained as no special machines need to be provided, but also the adaptability of the plain warp frame is substantially increased. By attaching this new device ordinary double-faced warp fabric as well as a particularly elastic double warp fabric in the kind of so-called interlock fabric may be produced.

In the accompanying drawings one embodiment of a device according to the invention is shown by way of example.

In these drawings:

Fig. 1 is a cross section through a plain warp frame having a device according to the invention attached thereto, the section being taken on the line 1, 1 in Fig. 2, looking in the direction of the arrow and the attached device according to the invention being shown in thick lines, whereas the parts of the plain warp frame are illustrated in thin lines, while certain parts of the plain warp frame, not used when the attachment is employed, are not depicted,

Fig. 2 shows a front elevation of the one end of the warp frame,

Fig. 3 is a cross section on the line 3—3 of Fig. 2 looking in the direction of the arrow,

Fig. 4 shows a detail view,

Figs. 5–14 show the loop forming elements of the warp frame in different operative positions for the production of double-faced fabric,

Fig. 15 shows a side view of the knock over sinker and

Fig. 16 is a plan view of the sinker shown in Fig. 15.

In the frame 1 of a plain warp frame the needle bar 2, carrying the spring beard needles 3, the sinker bar 4 with the hitherto usual sinkers 5, the presser bar 6, carrying the presser 7, and the guide bars 8, carrying the guides 9, are arranged in a well known manner. (Fig. 4.)

To use the plain warp frame for the production of double-faced warp fabric, the attachment forming the subject matter of the present invention is mounted on the frame 1 of the machine.

At both ends of the frame 1 supporting blocks 10 are provided. Fig. 2 only shows the supporting block 10 at the right hand side of the warp frame. In these supporting blocks 10 a shaft 11 is journalled upon which are fixed levers 12, supporting the bar 14, carrying the spring beard needles 13. Mounted upon a shaft 15 in the supporting blocks 10 are levers 16 in which the knock over sinker comb 17 (Fig. 1) carrying the sinkers 18 is journalled. Lever arms 21, carrying the presser bar 19 with the presser 20, are fixed upon bolts 22, journalled in bearings 23 fixed to the levers 12. The presser bar 19 may also be directly fixed to the needle bar 14, carrying the spring beard needles 13. In the supporting blocks 10 bolts 24 are fixed on which cam levers 25 are mounted the free end of each of which carries a roller 26 cooperating with a cam disc 28 mounted upon a cam shaft 27. The cam levers 25 carry bearings 29 in which downwardly extending links 30 are journalled. Fixed to the bolts 22 are lever arms 31 the free ends of which are pivotally connected to the lower ends of the links 30.

As may be seen from Fig. 2, the supporting blocks 10 are hollow and serve for housing the toothed drive wheels 32 and 33. The upper gear wheel 32 is mounted upon the cam shaft 27, while the lower gear wheel 33 is mounted upon a shaft 34. According to the example shown in the drawings the drive is effected by means of the lower wheel 33 driven in turn by a toothed gear 35 fixed to the hand actuated shaft not shown. The drive may, however, also be effected from the main cam shaft of the warp frame.

Mounted upon the shafts 27, carrying the toothed wheels 32, are cams 36 and 37 by means of which levers 38 fixed to the shaft 11 may positively be swung by the fact, that rollers 39 and 40 provided at the forked ends of the levers 38 run upon the circumference of the cams 36 and 37 respectively. By means of the levers 12 fixed to the shaft 11 and carrying the needle bar 14, the spring beard needles 13 carried by said bar 14 are operatively moved. The presser 20 the supporting arms 21 of which are, as described already, journalled in bearings 23 fixed to the levers 12 must participate in the movements of the latter. The required additional swinging movement about the bolts 22 is imparted to the presser

20 by means of the lever arms 31, the links 30 and the cam levers 25 actuated by the cams 28.

The left hand end of the warp frame, not shown in the drawings, is constructed in exactly the same manner as described above for the right hand end.

To support the shafts 11 and 15 one or more removable supporting arms 41, equipped with bearings for the shafts 11 and 15, are provided at about the middle of the warp frame. One of these supporting arms 41 only is shown in Fig. 1.

In the frame 1 of the warp frame a shaft 42 is journalled, upon which cam levers 43 are mounted which, in a well known manner, are driven by a cam mounted upon a cam shaft not shown in the drawings. Upon this shaft 42 swingable arms 44 are arranged in which a bar 46 carrying the knock over comb 45 is fixed.

The shaft 11 together with all parts fixed thereto can be shifted longitudinally in the supporting blocks 10, so that the spring beard needles 13 may as desired be so adjusted, that they lie either opposite the spring beard needles 3 or opposite the spaces between the spring beard needles 3. To allow this adjustment, a threaded sleeve 47 is, by a screw 48, fixed to the shaft 11 near one of the supporting blocks 10. Threaded upon the sleeve 47 is an adjustable ring 49 one face of which bears against the supporting block 10. In the opposite face of the ring 49 a plurality of holes 50 are provided on a circle. The threaded sleeve 47 carries a pin 52 surrounded by a spring 51. According to the desired adjustment of the shaft 11, the spring actuated pin 52 is brought into engagement with one or the other hole 50 in the adjustable ring 49. To shift the shaft 11 in its longitudinal direction, the pin 52 is withdrawn against the action of its spring 51, whereupon the adjustable ring 49 may be turned to obtain the desired adjustment. When the shaft 11 occupies the proper position, the pin 52 is released and under the action of its spring 51 pushed into the hole 50 of the ring 49 which lies nearest the pin.

For producing double-faced warp fabric, the bar 4 carrying the sinkers 5 (Fig. 4) used for the manufacture of plain fabric is removed and replaced by a bar 54 carrying a dipping comb 53. Also the bar 46 carrying the knock over comb 45 which for the manufacture of plain warp fabric is swung upwardly into an inoperative position is, for the manufacture of double-faced warp fabric, brought into the operative position. The double-faced warp fabric is not produced as hitherto with a sinker effecting the locking in and knocking over which moves between the spring beard needles, but by knock over sinkers and the particular dipping comb 53 which brings the lappings for both spring beard needle bars 2 and 14 below the beards of the spring beard needles 3 and 13 before the latter are pressed.

In contradistinction to the construction used hitherto according to which a comb sinker is moved through each needle space, the knock over sinkers serving for knocking over the loops are so constructed, that the front end of these comb sinkers is closed by means of a bar adapted to be shifted into position, so that the spring beard needle is completely enclosed. (Fig. 16).

As shown in Fig. 15 the front end of the knock over sinkers 55 is provided with an elongated hole in which a bar 56 is inserted upon which the knocking over of the loops is effected. The spring beard needles move in the so formed slot closed in front. The bar 56 may easily be exchanged as soon as worn out parts result by the friction of the spring beard needles as well as by the knocked over loops.

The operation of the warp frame with the new device adapted for the manufacture of double-faced fabric attached thereto is as follows:

In the operative position of the individual parts shown in Fig. 5, the spring beard needles 13 have been lifted and the guides 9 have been passed between the spring beard needles 13 in the direction of the arrow x, so that a lapping of the threads upon the spring beard needles 13 has been effected. Now the dipping comb 53 brings the new lapping below the beards of the spring beard needles 13 and simultaneously the presser 20 is advanced and presses the beards of the spring beard needles 13 (Fig. 6). The dipping comb 53 now returns and the bar 14, carrying the spring beard needles 13, together with the presser 20 returns into the pressing position in the knock over comb 18, so that now the old loop is shifted upon the beard of the needles 13. (Fig. 7).

The presser 20 is then returned into its exit position and the bar 14, carrying the spring beard needles 13, remains in a position in which the loops are knocked off (Fig. 8).

Then the bar 2, carrying the spring beard needles 3, is lifted. The guides 9 return between the spring beard needles 3 in the direction of the arrow y, whereby the lapping of the warp threads upon the spring beard needles 3 is effected. (Fig. 9).

The spring beard needles 3 are then moved downwardly into the dipping comb 53 which pushes the new lapping below the beards of the spring beard needles 3, whereupon the presser 7 is moved into the operative position, whereby the beards of the spring beard needles 3 are pressed. (Fig. 10).

The dipping comb 53 now returns and the knock over sinkers 45 push the old loops upon the beards of the spring beard needles 3. (Fig. 11).

Then the presser 7 is returned into its exit position. The sinker bar 46, carrying the knock over comb 45, together with the bar 2, carrying the spring beard needles 3, moves downwardly and also remains in a position in which the loops are knocked off. The sinkers or combs 18, 45 of of both sinker bars 17, 46 lie in the same level (Fig. 12). By further lowering of the spring beard needles 13 knocking over of the old loops on the spring beard needles 13 is effected. (Fig. 13).

After this loop has been knocked over, the other spring beard needle 3 also moves downwardly, so that knocking over of the old loops on this spring beard needle 3 is effected. (Fig. 14).

The cycle of operations is now completed and thereupon the operations described with reference to Figs. 5–13 are repeated.

If the spring beard needles 3 and 13 lie opposite each other, a double-faced warp fabric is obtained in the usual manner. If the bar 14, carrying the spring beard needles 13, is shifted with regard to the spring beard needles 3 in such a manner, that the needles of one bar face the spaces between the needles of the other bar, a loose elastic warp fabric can be produced.

The adjustment of the spring beard needles 13 with regard to the spring beard needles 3 either facing needles or spaces between the nee-

dles is effected by the adjusting device 47—52 provided upon the shaft 11.

The dipping comb 53 acting upon both rows of spring beard needles and fixed to the supporting arms 4' can be adjusted in the longitudinal direction of its supporting shaft, so as to be capable of moving between the spring beard needles of each row, if the needles of the one row are positioned opposite the spaces between the spring beard needles of the other row. The dipping comb 53 may be shifted mechanically, for example from the main cam shaft or from a jacquard mechanism.

What I claim is:

1. A device for the manufacture of double-faced warp fabrics of different kinds upon warp frames adapted for the manufacture of plain warp fabrics only, comprising a dipping comb, replacing operative sinkers of the plain warp frame, a knock over comb arranged below said dipping comb, and means adapted to be mounted upon the plain warp frame, carrying spring beard needles, sinkers and pressers required for the formation of the second face of the fabric.

2. A device as set forth in claim 1 in which said means consist of an attachment, comprising a shaft adapted to be shifted longitudinally, and an adjusting device mounted on said shaft for shifting and adjusting said shaft and all loop forming elements carried thereby, in such a manner, that the spring beard needles, carried by levers fixed upon said shaft, the presser and the knock over comb may be laterally adjusted to position said spring beard needles opposite spring beard needles forming part of the warp frame or opposite spaces between said last mentioned spring beard needles.

3. A device as set forth in claim 1 in which said dipping comb is adjustably arranged in the longitudinal direction of its supporting shaft to allow proper dipping for both groups of needles in either mutual position of same.

4. A device as set forth in claim 1 in which said knock over comb comprises a knock over bar exchangeably mounted in elongated holes provided in the sinker members near the front end thereof.

HERBERT WIRTH.