F. BENZ, JR.

NARROW WARE LOOM.

APPLICATION FILED DEC. 17, 1909.

982,464. **Patented Jan. 24, 1911.**

3 SHEETS—SHEET 1.

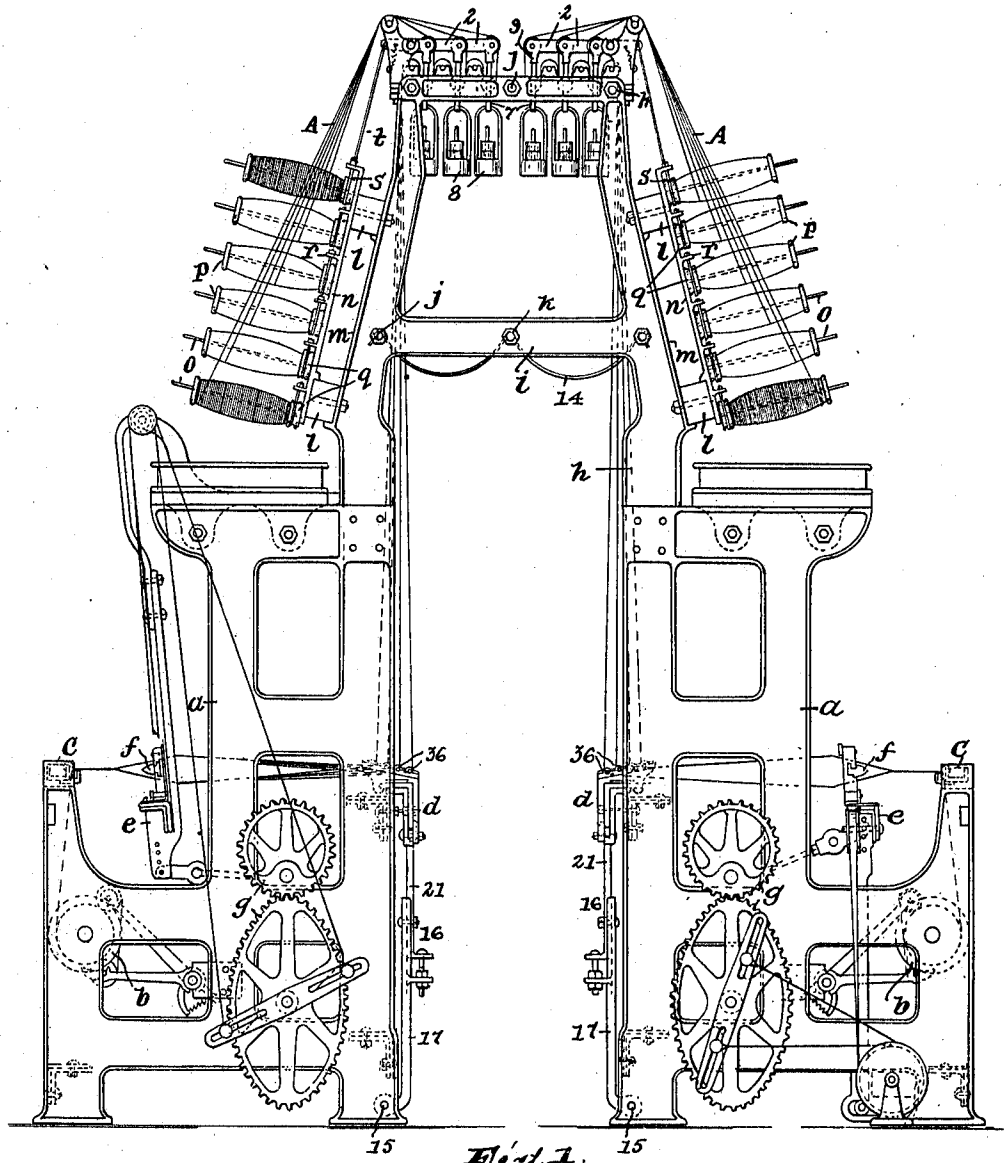

Fig. 1.

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3 SHEETS—SHEET 2.

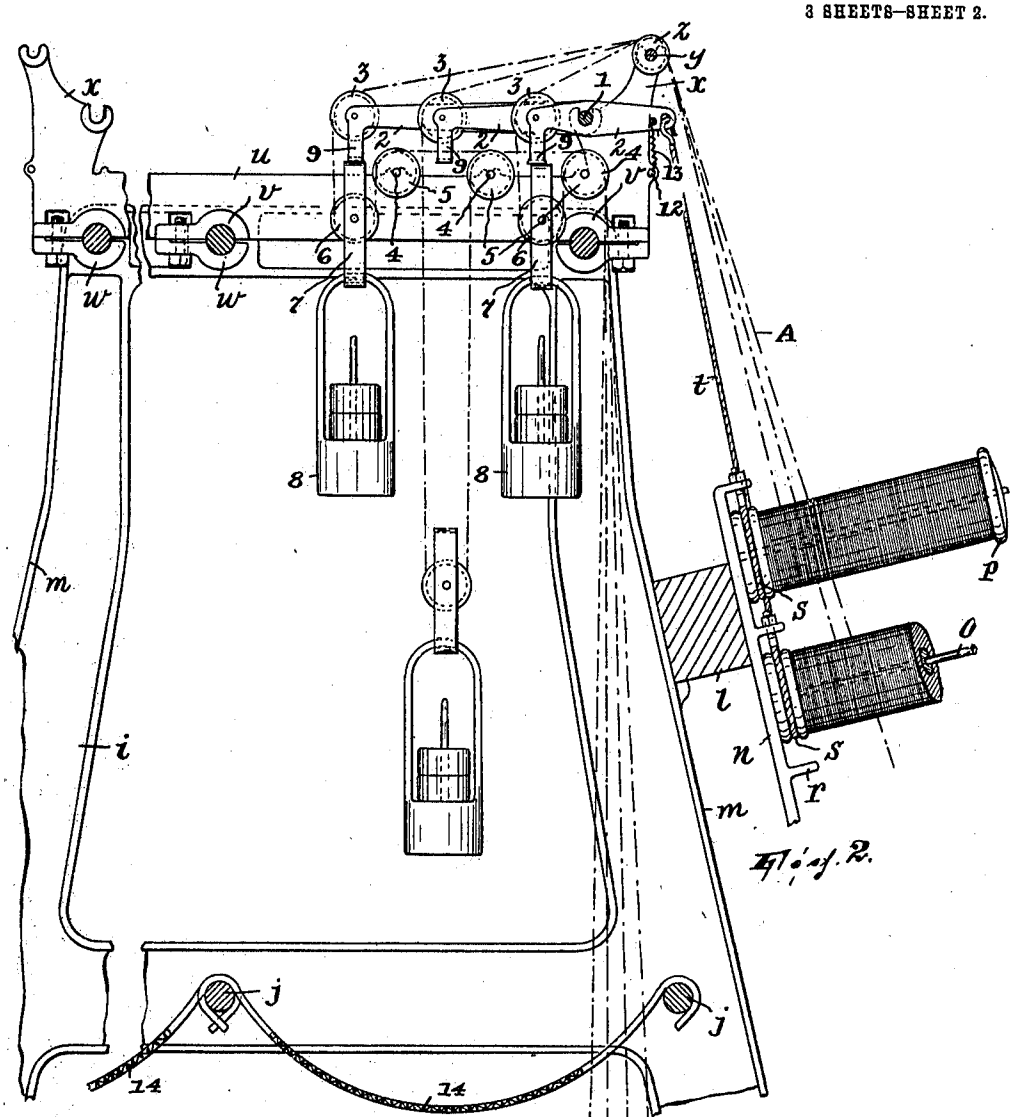

Fig. 2.

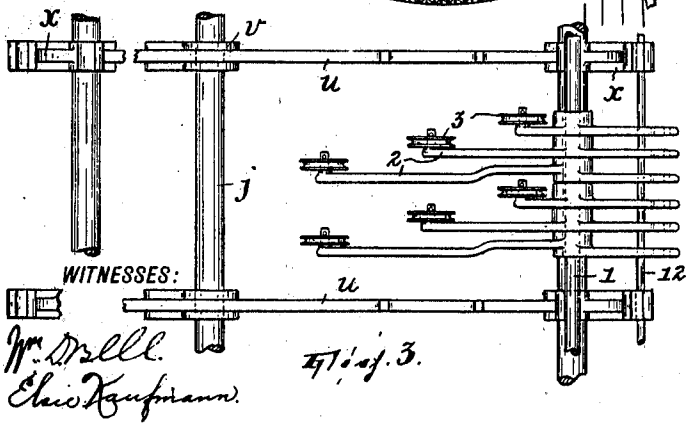

Fig. 3.

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3 SHEETS—SHEET 3.

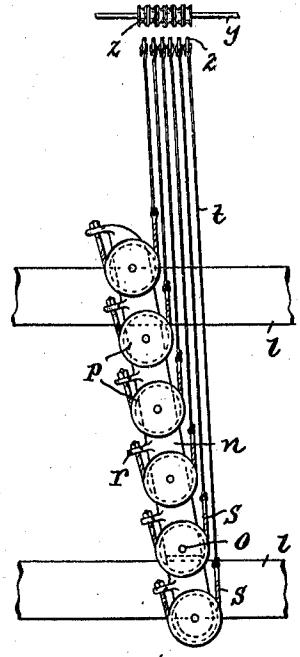

Fig. 4.

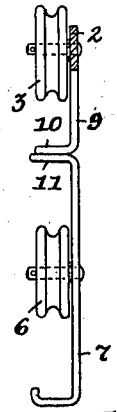

Fig. 5.

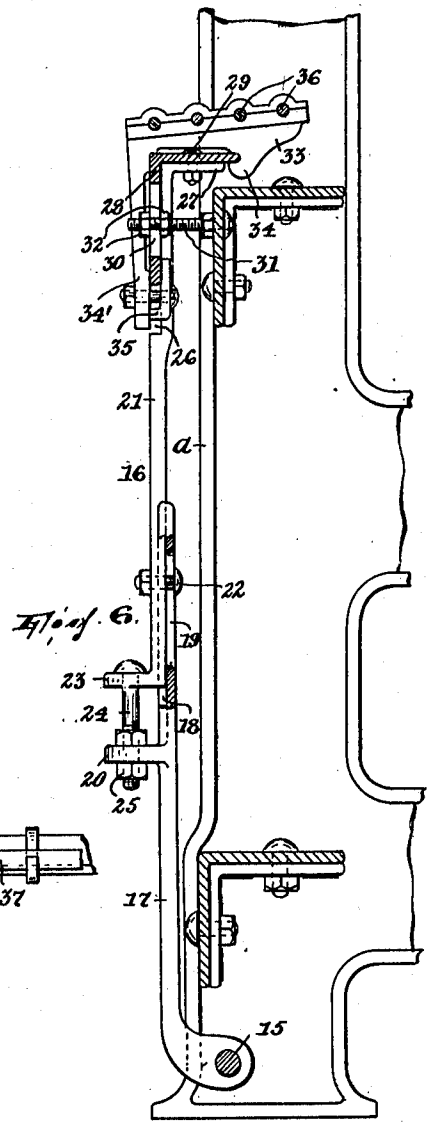

Fig. 6.

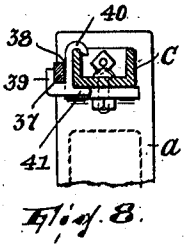

Fig. 8.

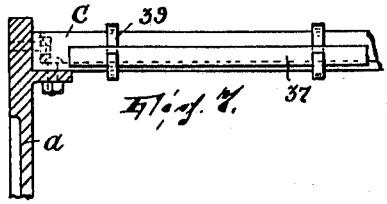

Fig. 7.

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UNITED STATES PATENT OFFICE.

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NARROW-WARE LOOM.

982,464. Specification of Letters Patent. **Patented Jan. 24, 1911.**

Application filed December 17, 1909. Serial No. 533,641.

To all whom it may concern:

Be it known that I, FREDERICK BENZ, Jr., a citizen of the United States, residing in Haledon, Passaic county, New Jersey, have invented a certain new and useful Improvement in Narrow-Ware Looms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to looms and particularly to that kind of looms of the narrow-ware class known as "German" looms, *i. e.*, looms in which the warps are wound on normally fixed spools arranged on skewers; in this class of looms, since the warp spools do not normally rotate, a loop is maintained in each warp by a weight, the loop affording the slack necessary to permit the take-up to be effected as the weaving proceeds. Heretofore, the supporting means for the warp supply spools has been arranged to project from the back of the loom. The consequence of this arrangement was that much space has been lost which I have demonstrated can be saved, with the result that my invention makes it possible to increase the number of looms on a floor by about forty per cent. This I accomplish by arranging the warp supply means on a superstructure surmounting and connecting the upper portions of the frames of two looms disposed back to back, the said supporting means, as well as the take-up mechanism, for each loom being disposed between the vertical planes occupied by the front and back of said loom; further, the means for guiding the warps are so arranged that at the back of each loom the warps appertaining thereto extend substantially vertically, approximately in a plane coinciding with the vertical plane of said back of the loom, whereby a clear aisle is left between the two looms and the warps are perfectly accessible to the weaver at all times.

Referring to the accompanying drawings, Figure 1 is a side elevation of a twin arrangement of looms constructed in accordance with my invention; Fig. 2 is a vertical sectional view taken transversely through the superstructure of the loom, the same appearing on a larger scale than in Fig. 1; Fig. 3 is a plan view of the levers controlling the warp supply spools and their supporting means; Fig. 4 is a fragmentary elevation of the superstructure and a portion of the mechanism carried thereby as seen from the right or left in Fig. 1; Fig. 5 is a detail of the part of the means for controlling the warp supply spools; Fig. 6 is an enlarged vertical transverse sectional view of a fragment of one of the looms and of the improved glass bar bracket mechanism; and, Figs. 7 and 8 are detail views of one of the breast beams.

In the drawings, *a* designates the frames (of usual construction) of two looms disposed back to back, each loom having a take-up mechanism *b*, a breast beam *c*, a glass bar bracket mechanism *d*, a lay or batten structure *e;* shuttles *f*, and a means *g*, of any desired construction, for oscillating the lay structure and reciprocating the shuttles. The frames *a* are surmounted by a superstructure *h*, which is preferably bolted or otherwise removably secured to the frames *a;* said superstructure may comprise two sides *i* connected by three upper and three lower rods *j* having nuts *k* for clamping the sides and rods together. Thus, the improved weaving machine involves the employment of a frame which comprises distinct frame units (one for each of the twin looms) disposed back to back and a superstructure rigidly connecting the upper rear parts of said units.

The sides *i* of the superstructure *h* support the upper and lower beams *l;* the faces *m* of the sides *i* converge upwardly, and it is against these parts that the beams *l* are secured, so that the two lower beams *l* are farther apart than the two upper beams. To each upper and lower beam is secured a series of frames *n* provided with skewers *o* on which are arranged the warp supply spools *p*, each having as its base a peripherally grooved head *q*. The frames *n* are disposed at an incline (viewed from the right or left in Fig. 1), as in Fig. 4, and each series of spools is also disposed at an incline as seen in side elevation (Fig. 1). A series of lugs *r* is formed along one side of each frame *n*, and to these are attached the ends of brake-bands *s* which pass around the

grooved heads q of the spools and have attached to them the flexible connections t which, since the frame n is inclined as in Fig. 4, extend upwardly clear of each other.

A plurality of brackets u are supported on the rods j in parallel arrangement, the same have bearings v which fit over the rods and having bolted to them clips w which coact with the bearings to secure the brackets adjustably to the rods. At each end each bracket has an upwardly extending arm x which carries a bearing rod y for rollers z over which the warp threads A pass from the spools p. Each arm x also supports a fulcrum rod 1 for a set of levers 2, each lever being fulcrumed between its ends on the rod and the inner arms of the several levers in each set being preferably of different lengths. The flexible connections t are connected to the outer ends of these levers, and their inner ends carry the grooved rollers 3 over which the warp threads respectively pass on leaving the rollers z. On other bearing rods 4 supported by the brackets u in a plane below the rods 1 are journaled other grooved rollers 5, the warps extending from these rollers straight down to the glass bar bracket mechanism d, the relative arrangement of the rollers and the glass bar bracket mechanism d (to be described) being such that the respective sets of warps stand close to the vertical plane occupied by the back of each loom. Between corresponding rollers 5 and 3, each warp extends under a grooved roller 6 which is journaled in a hook-shaped bracket 7 supporting in its depending hook a weight-carrier 8; the portion of each thread between the rollers 3 and 5 thus forms a loop to afford the necessary slack. Each lever 2 has its inner end formed with a downward projection 9 whose end is bent off horizontally, as at 10 (Fig. 5), said end being adapted to be engaged by the correspondingly bent off end 11 of the bracket 7. Thus, as the weaving proceeds, the slack formed by the loop in each warp thread will gradually be taken up. Ultimately, the bracket 7 will engage the corresponding lever 2 and, tilting it, will produce a relaxation of the frictional action of the brake-band s on the corresponding spool, so that the spool will be released and the slack represented by the loop will be increased by the consequent fall of the weight. The sensitiveness of the action of the levers to cause the release of the spools when the levers are shifted by the rising weight-carrying bracket 7 may be increased by connecting each lever with a roll 12 carried by the bracket u by a spring 13; this spring has the further function to reduce the strain on the warp represented by the weight of the lever when the bracket 7 is elevating said lever, in effect balancing the lever at that time. The lower set of rods j may be utilized to sustain wire nettings or the like 14 to catch a weight and protect the weaver against injury should the weight fall owing to the breaking of the warp.

Referring, now, to the glass bar bracket mechanism (Figs. 1 and 6) a horizontal rod 15 is arranged in the back lower portion of each frame a. On this rod is fulcrumed a lever structure 16. The lever structure 16 comprises two or more lower sections 17 which are directly fulcrumed on the rod 15 and each of which is provided with a vertical groove 18 and a vertical slot 19 in its upper end, as well as with a rearwardly projecting lug 20; said lever structure also comprises upper sections 21 which fit in the grooves 18 and are secured to the sections 17 by bolts 22 penetrating the slots 19, the lower end of each section 21 having a rearwardly projecting lug 23 whereby, by means of a bolt 24 and nut 25, the upper section is anchored to the lower section. Each upper section is recessed at the back at its upper end, as at 26, and it has its upper extremity turned rearwardly, as at 27, an angle iron 28, connecting the several sections 21, being fitted over the upper ends of said sections 21 and secured thereto by bolts 29. The vertical web of the angle iron 28 is received by the recesses 26 and it has vertical slots 30 receiving threaded studs 31 which project from the frame a and have nuts 32 between which the angle iron is clamped. By adjusting the nuts, the entire lever structure may be adjusted forward or back on its fulcrum 15. A series of brackets 33, each having a jaw 34 receiving the edge of the horizontal web of the angle iron and a downwardly projecting leg 34′, secured to the angle iron 28 by clamps 35, are carried by the lever structure and in these brackets are arranged the glass bars 36 under which the warp threads pass forward to the breast beam c. By adjusting the nuts 25 on bolts 24, the glass bars may be disposed at any desired elevation; and by adjusting the nuts 32, the lever structure may be set forward or back at the proper angle according to which of the glass bars are actually engaged by the warps, it being understood that according to the character of the goods being woven it will sometimes be the back bars 36 and sometimes the forward ones around which the warps pass.

I have shown in Figs. 7 and 8 an improved breast beam construction having for its purpose to produce a flattening of the threads of the warp, whereby to fill up spaces which otherwise might be left in the finished goods. Heretofore, at the breast beam, the goods has extended around a rounded surface, not calculated to produce the flattening effect referred to. In the present instance, the breast beam c is an inverted strip of channel iron and the bar 37 around which the goods extends on its way to the take-up mechanism b is a strip of suitable material (preferably

of hardened steel or the like) having a sharp edge 38. This bar is removably supported on the breast beam by clips 39 in which it rests, the clips having hooked portions 40 which engage over the rear side of the channel iron forming the breast beam and feet 41 bearing against the under side of the channel irons.

Claims for the improved glass bar bracket mechanism shown in detail in Fig. 6 I have made the subject of a separate application filed May 3rd, 1910, Serial No. 559122.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a weaving machine, the combination of a frame comprising spaced frame-units disposed back to back and a superstructure surmounting and connecting the upper portions of said frame-units, and a warp-supply means and a take-up mechanism arranged in each frame-unit substantially between the vertical planes occupied by the front and back thereof, said warp-supply means being carried by the superstructure, substantially as described.

2. In a weaving machine, the combination of a frame comprising spaced frame-units disposed back to back and a superstructure surmounting and connecting the upper portions of said frame-units, a warp-supply means and a take-up mechanism arranged in each frame-unit substantially between the vertical planes occupied by the front and back thereof, said warp-supply means being carried by the superstructure, and means, also carried by said superstructure, for maintaining loops in the warps, substantially as described.

3. In a weaving machine, the combination of a frame comprising spaced frame units disposed back to back and a superstructure surmounting and connecting the upper portions of said frame units, a warp supply means and a take-up mechanism arranged in each frame unit substantially between the vertical planes occupied by the front and back thereof and tension means carried by said superstructure, substantially as described.

4. In a weaving machine, the combination of a frame comprising spaced frame-units disposed back to back and a superstructure surmounting and connecting the upper portions of said frame-units, separate warp-supply means, respectively corresponding to said frame-units, carried by said superstructure, separate take-up mechanisms respectively corresponding to said frame-units and arranged therein below the warp-supply means, and means for guiding the warp-threads downwardly from the respective warp-supply means in vertical planes substantially coinciding with the backs of said frame-units, substantially as described.

5. In a weaving machine, the combination of a frame comprising spaced frame-units disposed back to back and a superstructure surmounting and connecting the upper portions of said frame units, said superstructure having its width in the side elevation of the frame limited to correspond substantially to that of the back portions of said frame-units, separate warp-supply means carried by said superstructure and each overhanging a frame-unit, and separate take-up mechanisms arranged in said frame-units, substantially as described.

In testimony, that I claim the foregoing I have hereunto set my hand this 16th day of December, 1909.

FREDERICK BENZ, JR.

Witnesses:

JOHN W. STEWARD,

WM. D. BELL.