

J. P. HUMPHRIES.
 LOOM FOR WEAVING TUFTED PILE FABRICS.
 APPLICATION FILED JAN. 11, 1909.

940,531.

Patented Nov. 16, 1909.
 4 SHEETS—SHEET 1.

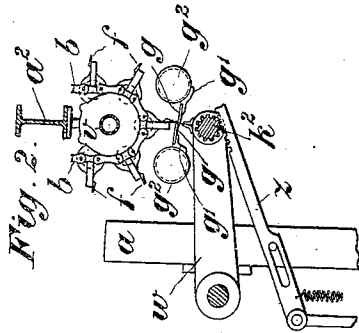
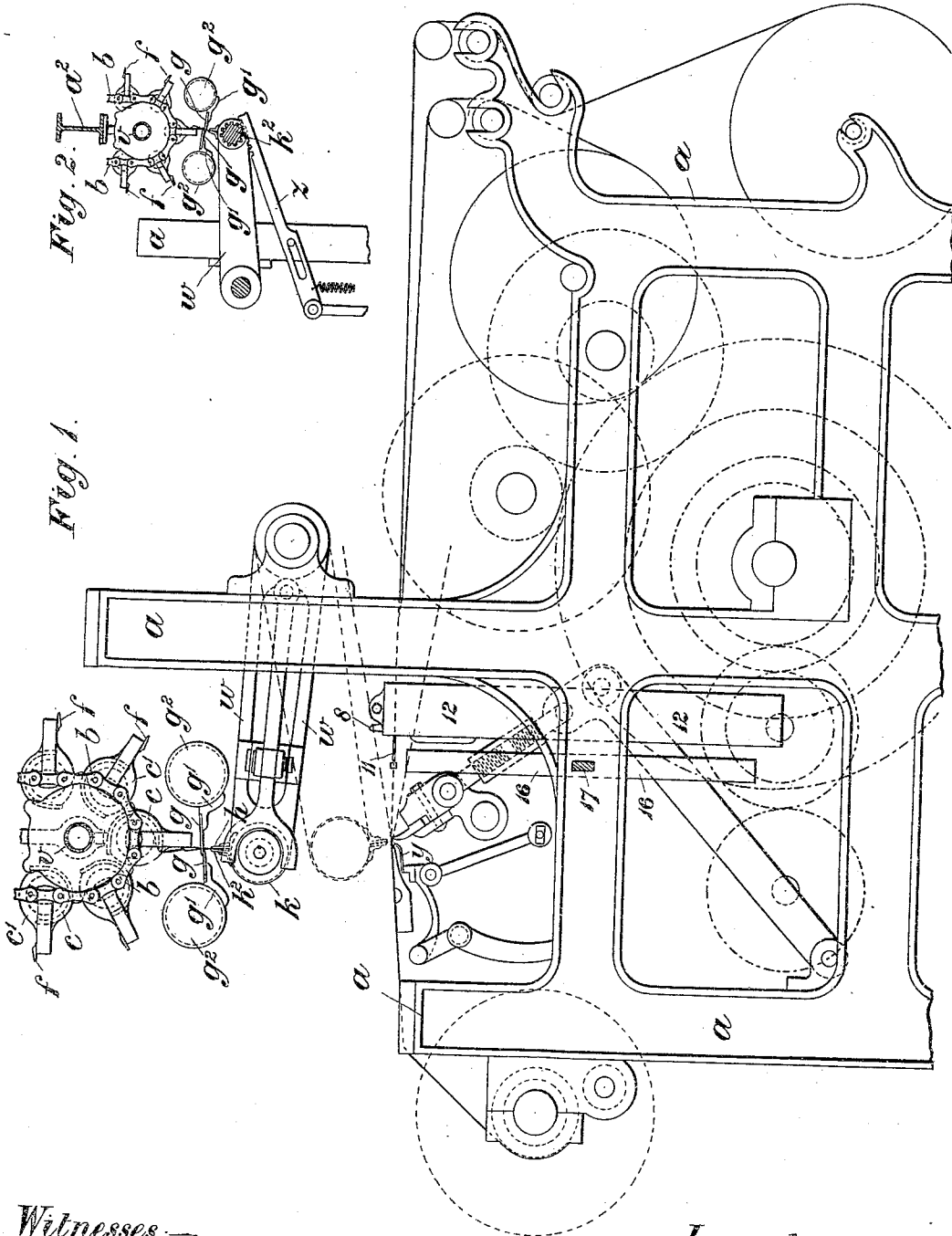


Fig. 1.



Witnesses,—

[Signature]
[Signature]

Inventor,—

James P. Humphries

James L. Norris

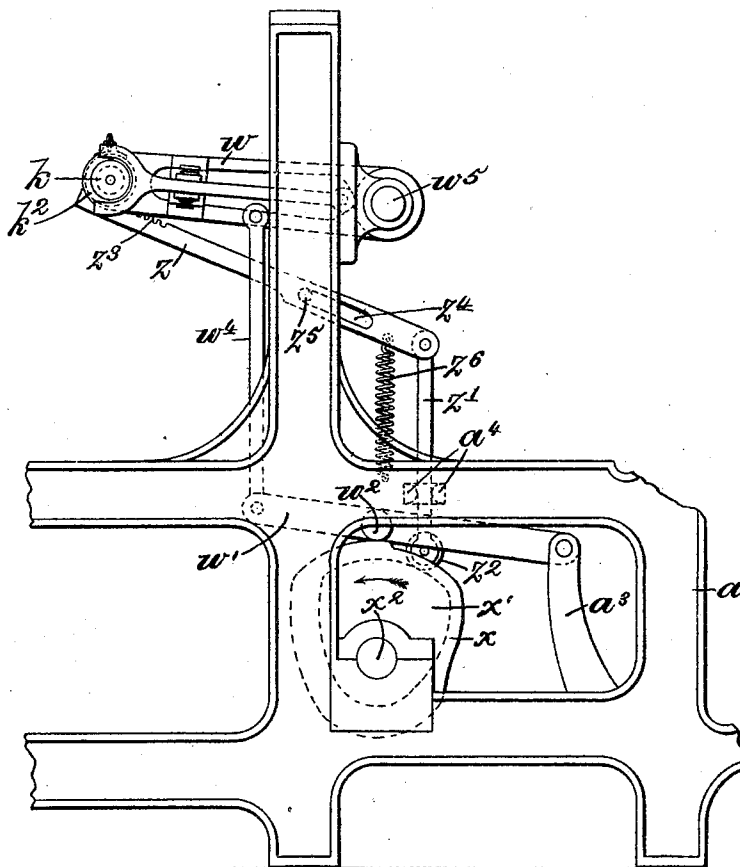
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Fig. 3.



Witnesses:

W. B. Ketchum
Robert G. Smith

Inventor:

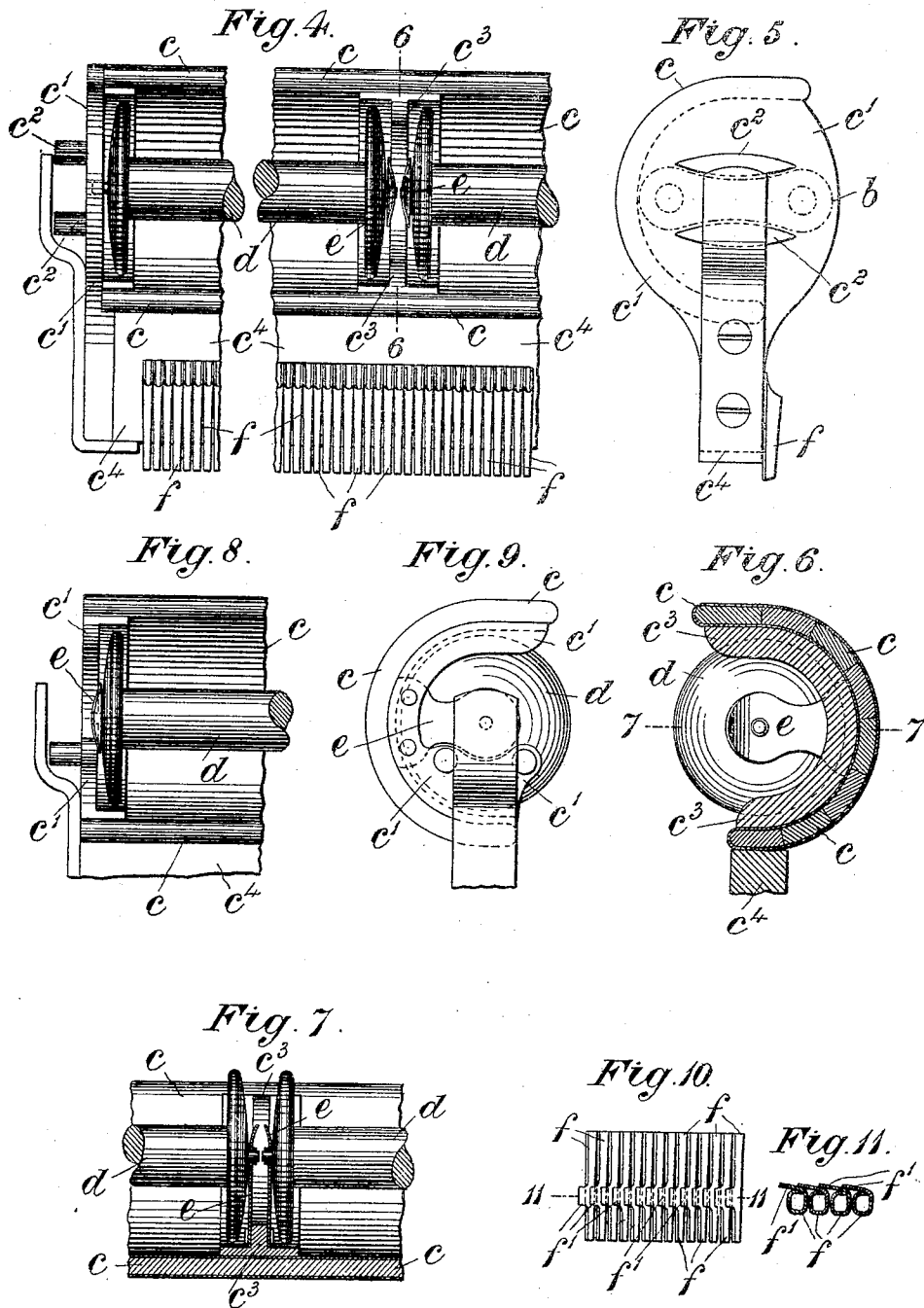
James P. Humphries
 By *James L. Norris*
Atty.

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Witnesses;—
[Signature]
[Signature]

Inventor;—
 James P. Humphries
 By *[Signature]*
 James L. Norris

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4 SHEETS—SHEET 4.

Fig. 15

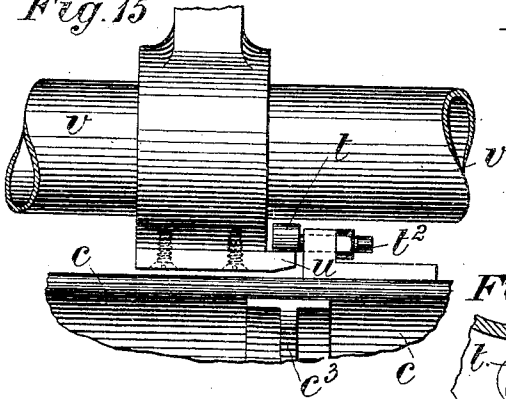


Fig. 16.

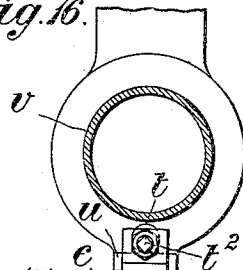


Fig. 17.

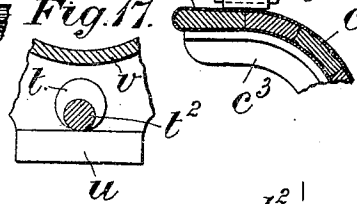


Fig. 13.

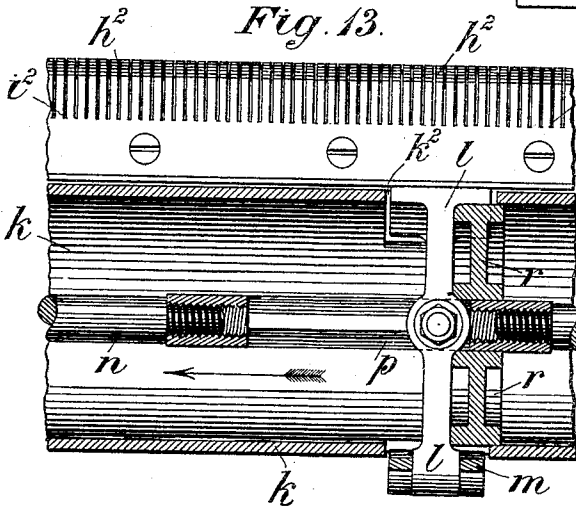


Fig. 12.

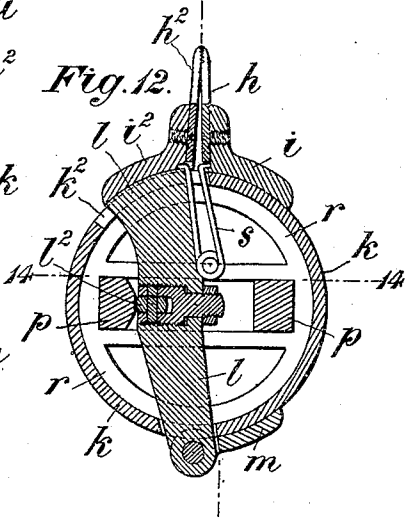
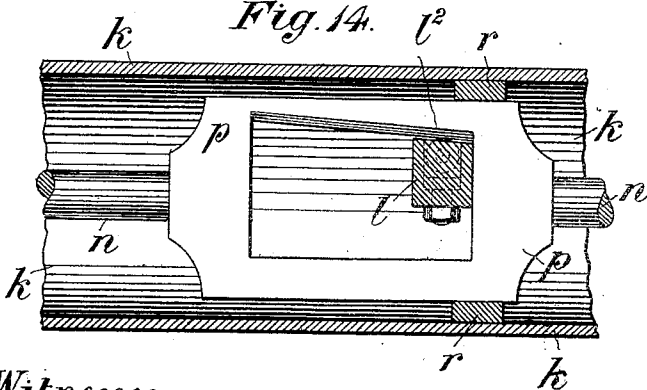


Fig. 14.



Witnesses:—

[Signature]
[Signature]

Inventor:—

James P. Humphries
By James L. Norris

UNITED STATES PATENT OFFICE.

JAMES PERCIVAL HUMPHRIES, OF KIDDERMINSTER, ENGLAND.

LOOM FOR WEAVING TUFTED PILE FABRICS.

940,531.

Specification of Letters Patent.

Patented Nov. 16, 1909.

Application filed January 11, 1909. Serial No. 471,736.

To all whom it may concern:

Be it known that I, JAMES PERCIVAL HUMPHRIES, a subject of the King of Great Britain, residing in Mill street, Kidderminster, Worcestershire, England, have invented certain new and useful Improvements in or Relating to Looms for Weaving Tufted Pile Fabrics, of which the following is a specification.

My invention relates to looms for weaving tufted pile fabrics, such for example as Axminster carpets, in greater widths than is usual and consists of the construction and arrangement hereinafter described of certain of the parts of Axminster carpet looms, the said construction and arrangement of parts having for their principal objects to impart the requisite rigidity to the said parts of the loom and to prevent flexure or sagging of the same.

According to my invention I employ spools or bobbins for the tuft yarns having a combined length somewhat greater than the width of the carpet to be made and mount the said spools or bobbins in a nearly semi-cylindrical shield-like or troughed case or cover hereinafter called the spool carrier, which carrier covers preferably somewhat more than one half of the bobbins arranged therein. Each spool carrier is preferably made of a series of wooden strips glued together so as to form a nearly semi-cylindrical trough which may be covered both internally and externally with canvas, but I wish it to be understood that I do not limit myself to this method of making the spool carriers as they may be made of bent wood, papier mâché or the like; or of metal. From the lower edge of the semi-cylindrical trough of the spool carrier depends the bar to which the quills or tubes are fixed through which the ends of the tuft yarns are threaded.

In the operation of a loom provided with my improvements, the spool carrier is not detached from the operating chains as is usual when inserting the ends of the tuft yarns into the warps, the carriers of my invention being incapable of detachment from the carrier chains during the working of the loom. I obtain the necessary length of tuft yarns to form the pile and insert the same in the fabric in the manner hereinafter particularly described.

Figure 1 of the accompanying drawings represents in side elevation so much of an

Axminster carpet loom, to which my improvements are applied as is necessary to the understanding of my invention. Fig. 2 is a vertical section of a portion of the loom looking from the opposite side to that represented in Fig. 1. Fig. 3 is a fragmental side elevational view illustrating the mechanism for rocking and swinging the gripper shaft. Figs. 4 to 17 both inclusive represent detail views of the parts of the loom hereinafter particularly described drawn to a larger scale than Fig. 1.

The same letters of reference indicate the same parts in the several figures of the drawings.

a is the frame of the loom which frame has a width somewhat greater than the width of the carpet to be made in the loom.

b, b are portions of the chains by which the intermittent traveling motion is given to the spool carriers *c*, two chains only being employed as in an ordinary Axminster loom weaving the usual width of fabric.

As will be seen by reference to Figs. 1, 4, 5, 6, 7, 8 and 9, the spool carriers *c* are trough shaped the trough having a length slightly greater than the combined length of the spools *d* to be accommodated therein, there being preferably four spools to a carrier. I wish it to be understood however that the carrier may be of a length proper to carry fewer or more than four spools. The ends of the carrier *c* may be provided with closing disks *c'* as will be understood by reference to Figs. 4 and 5, Fig. 4 representing in front elevation portions of the carrier *c* and spools *d* therein and Fig. 5 representing the same in end elevation; on the outer faces of the end closing disks *c'* are lugs *c²* with convex presented edges which receive and fit the concave edges of the links of the endless carrier chains *b* as will be understood by reference to Fig. 5, where the links of the chains *b* to which the carrier *c* is attached are indicated in dotted lines. By the attachment of the carriers *c* to the chains *b* in the manner hereinbefore described and illustrated the possibility of any angular or oscillating motion of the spool carrier *c* with respect to the links of the chains *b* is prevented.

The nearly semi-cylindrical trough of the spool carrier *c* is strengthened at equidistant parts by ring-like diaphragms or inwardly projecting ribs or flanges *c³* best seen

in Figs. 4, 6 and 7; Fig. 6 being a cross-section on the dotted line 6 . . . 6 Fig. 4, and Fig. 7 being a horizontal section on the dotted line 7 . . . 7 Fig. 6. Each strengthening flange c^3 has fixed thereto a pair of spring-like arms e of thin sheet metal, holes in which constitute bearings for the axes or spindles of the spools d as will be best understood by reference to Figs. 6 and 7.

10 Instead of making the end disks c' to completely close the ends of the trough c they may be shaped as is represented in Figs. 8 and 9, one of the spring arms e being combined therewith to support the axis or spindle of the outer spool at its outer end.

15 The quills or tubes f through which the ends of the tuft yarns on the spools d are threaded as is usual, are fixed on the bar c^4 of the carrier c . The said quills or tubes f may be of the ordinary kind, but I prefer to strengthen them by forming each quill or tube with a projecting flap or ear piece f' as is illustrated in Figs. 10 and 11, Fig. 10 representing in rear elevation and Fig. 11 in cross section on the dotted line 11 . . . 11 Fig. 10, a few of the improved quills or tubes. Each quill or tube f is soldered to the projecting flap f' of the adjacent quill or tube and thus the series of quills are rigidly connected near their lower ends throughout the length of the series.

20 As the spool carriers c are not detachable from the chains b the knives g for cutting the tuft yarns must be arranged to cut the said yarns a little below the ends of the quills as is illustrated in Fig. 1. The knives g are fixed to lugs g' on the tubular knife carriers g^2 .

25 For the purpose of obtaining the necessary lengths of the tuft yarns and inserting them into the open shed, I employ a pair of toothed grippers h, h^2 best seen in Fig. 12 which is a cross section through the grippers h, h^2 and the parts by which they are carried. The gripper h is fixed to lugs, or a bar, i on the tubular shaft k and the gripper h^2 is fixed to lugs i^2 secured to the free ends of a series of levers l which cross and work in equi-distant slots h^2 in the tubular shaft k the levers being pivoted to lugs m secured to the tubular shaft k . The levers l are moved in the direction proper for closing the grippers h, h^2 on the ends of the tuft yarns depending from the quills or tubes on the bar c^4 of the spool carrier by an axial rod n and series of frames p connecting the sections of the rod n as will be best understood by reference to Figs. 13 and 14, Fig. 13 representing in longitudinal section a portion of the gripper carrying shaft and Fig. 14 being a section on the dotted line 14 . . . 14 Fig. 12. The frames p embrace the levers l as is best seen in Figs. 12 and 14 one of the inner edges of each frame being inclined and supporting the rear edge of the

adjacent lever l the said levers being preferably furnished with rollers l^2 against which said inclined edges work when the rod n receives an endwise motion. The opening of the grippers h, h^2 when the rod n and frames p receive their reverse endwise movement is effected by springs s . The frames p when moving in the direction proper for closing the grippers h, h^2 , that is, in the direction indicated by the arrow in Fig. 13, pass through and work in slots or ways in ring-like diaphragms r which act as side supports for the levers.

When the grippers h, h^2 are in action, that is to say, are drawing the requisite length of tuft yarns from the spools d to form the pile, the spool carrier is temporarily provided with an additional support or supports of the kind illustrated in Figs. 15, 16 and 17, the said support consisting of a cam shaped head or projection t on the pin t^2 which is brought on to a lip or flange u depending from a hanger through which passes the shaft v of the lower chain or sprocket wheels of the loom. By making the heads or projections t cam shaped they can be readily adjusted so as to insure them coming into actual contact with the lips or flanges u .

30 After the necessary length of tuft yarns has been drawn off the spools d the knives g, g are operated by mechanism differing in no essential respect from the operating mechanism for the knives of an ordinary Axminster loom. The gripper shaft is then swung bodily downward, and is at the same time given a half rotation, so as to reverse the grippers, which latter then occupy the position indicated in dotted lines in Fig. 1. The swinging and rotary movement just referred to is effected by means of the mechanism shown in Fig. 3, this mechanism including primarily a pair of cams x and x' secured to the cam shaft x^2 , (driven in any preferred manner from the main drive shaft of the machine), a lever w' , and a link z' . Link z' is provided with a roller w^2 , and link z' with a roller z^2 which rollers travel respectively upon cams x and x' . The roller w^2 carried by lever w' is located centrally thereof, and said lever is pivoted at its rear end to a bracket a^3 secured to frame a , and at its front end to a vertical link w^4 . At its upper end link w^4 is pivoted to one of a pair of arms w rigidly secured at their rear ends to a horizontal rock shaft w^5 journaled in brackets fastened to the upper portion of said frame. The gripper shaft k is loosely carried by these arms w at the forward ends thereof. Link z' is vertically arranged and extends between a pair of guide lugs a^4 secured to a frame a , said lugs having their inner faces convexed. The upper end of this link is pivotally connected to the rear end of a lever z whose front end is provided

with rack teeth z^2 which engage a pinion k^2 secured to the adjacent end of the gripper shaft. Intermediate its ends, the rack-lever z is formed with a longitudinal slot z^4 through which extends a supporting or pivot pin z^5 which is also secured to frame a . The rear end of lever z is normally depressed by the action of a spring z^6 connected at one end thereto and at the other end to the frame. The cams x and x' are so timed that the rotary movement of the gripper shaft and the swinging movement of the arms w occur simultaneously, as already stated.

When the grippers are in their reversed position, their teeth engage the fell of the fabric. They are then slightly raised, so as to leave the tuft yarns depending therefrom projecting through the open shed, the yarn ends being subsequently tucked up by the comb y in the ordinary manner.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a loom, the combination, with the carrier chains; of a series of trough-shaped carriers having their ends permanently connected to said chains; and a series of spools removably supported within each carrier.

2. In a loom, the combination of a trough-shaped carrier; a series of pairs of perforated spring arms arranged therein; and a series of spools arranged end to end in said carrier and provided at their ends with axial pins adapted for insertion in the perforations in said arms.

3. In a loom, the combination, with the carrier chains; of a trough-shaped carrier provided at each end with a pair of spaced lugs having their mutually-adjacent edges engaged with the links of the adjacent chain and conforming to the shape thereof, to prevent oscillation of the carrier with respect to said links; and a series of spools arranged in said carrier.

4. In a loom, the combination, with the carrier chains; of a trough-shaped carrier provided at each end with a pair of spaced lugs having their mutually-adjacent edges engaged with the links of the adjacent chain and conforming to the shape thereof, to prevent oscillation of the carrier with respect to said links; a series of pairs of perforated spring arms arranged therein; and a series of spools arranged end to end in said carrier and provided at their ends with axial pins adapted for insertion in the perforations in said arms.

5. In a loom, the combination, with a spool-carrier and its bar; of a series of tubes secured to said bar, each tube being provided with a strengthening member extending across and secured to the succeeding tube.

6. In a loom, the combination, with a spool carrier and its bar; of a series of tubes

attached to said bar and provided each with a lateral flap, the flaps being successively overlapped and connected together.

7. In a loom, the combination of a tubular shaft provided with a series of slots; a series of levers pivotally connected to said shaft and extending through the slots therein; a fixed gripper connected to said shaft; a gripper connected to said levers and movable therewith; means for normally holding said levers in one position; and a member movable within the shaft for shifting said levers out of such position.

8. In a loom, the combination of a tubular shaft; fixed and movable grippers mounted thereon; a series of levers pivoted to said shaft and connected to the movable gripper, for operating the same; means for normally holding said levers in one position; and a member movable within said shaft and arranged to engage said levers, for rocking them out of such position.

9. In a loom, the combination of a slotted tubular shaft; fixed and movable grippers mounted thereon; a lever pivoted to the shaft and extending through the slots therein and connected to the movable gripper, for operating the same; means for normally holding said lever in one position; a member movable within said shaft; and a frame carried by said member and provided with a cam edge arranged for engagement with said lever, for shifting the latter out of such position.

10. In a loom, the combination of a slotted tubular shaft; fixed and movable grippers mounted thereon; a lever pivoted to the shaft and extending through the slots therein, and connected to the movable gripper, for operating the same; a roller carried by said lever; means for normally holding said lever in one position; a rod movable within said shaft; and a frame carried by said rod and provided with a cam edge arranged for engagement with said roller, to shift said lever out of such position.

11. In a loom, the combination of a tubular shaft; fixed and movable grippers mounted thereon; a lever connected at one end to said shaft and at the other end to the movable gripper, for shifting the latter; means for yieldingly holding said lever in one position; an endwise movable rod located within said shaft; and a member carried thereby and arranged for engagement with said lever, for rocking said lever out of such position during the movement of said rod in one direction.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES PERCIVAL HUMPHRIES.

Witnesses:

JAMES MORTON,
FRED GADSBY.