

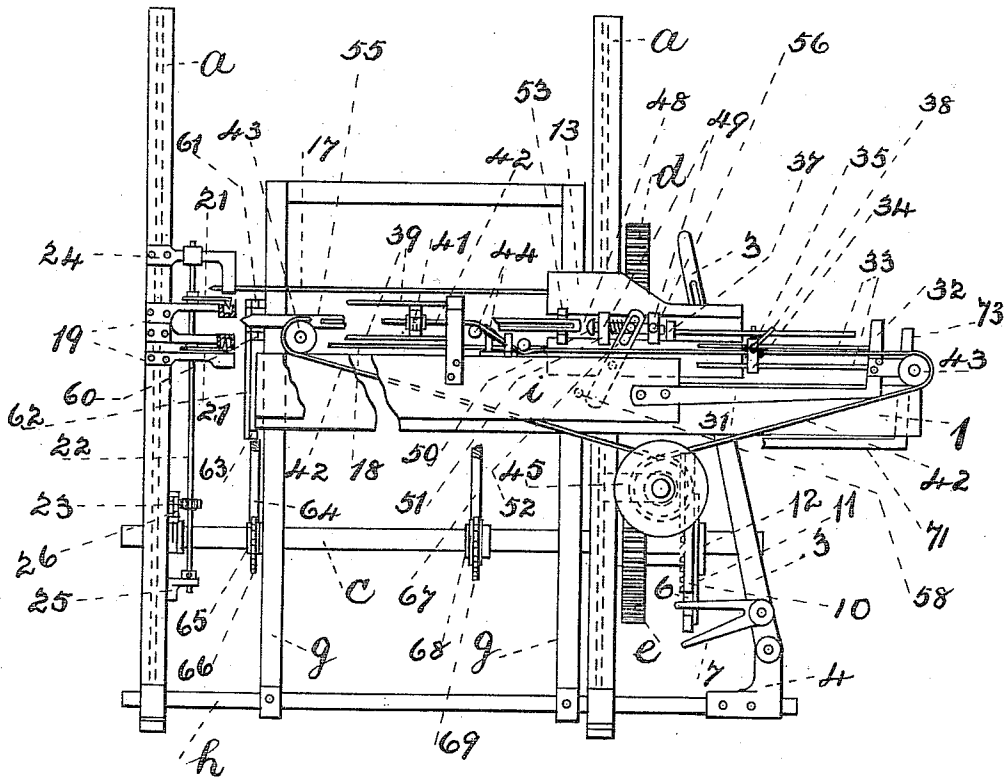
J. C. BROOKS.
 NEEDLE LOOM FOR WEAVING PILE FABRICS.
 APPLICATION FILED JAN. 21, 1909.

971,355.

Patented Sept. 27, 1910.

3 SHEETS—SHEET 1.

— FIG. 1 —



Witnesses.
A. Brooks
W. D. Brooks

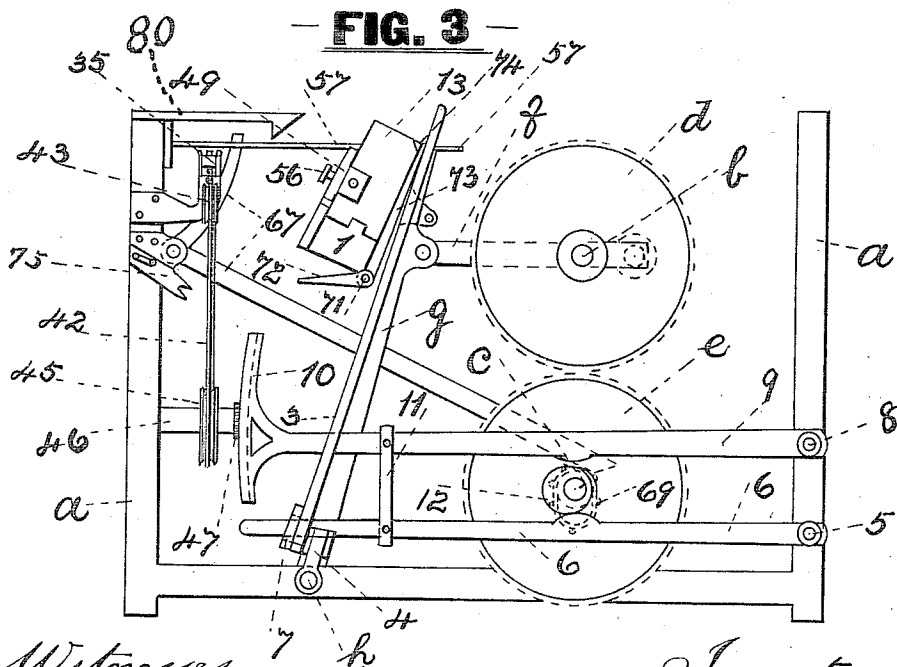
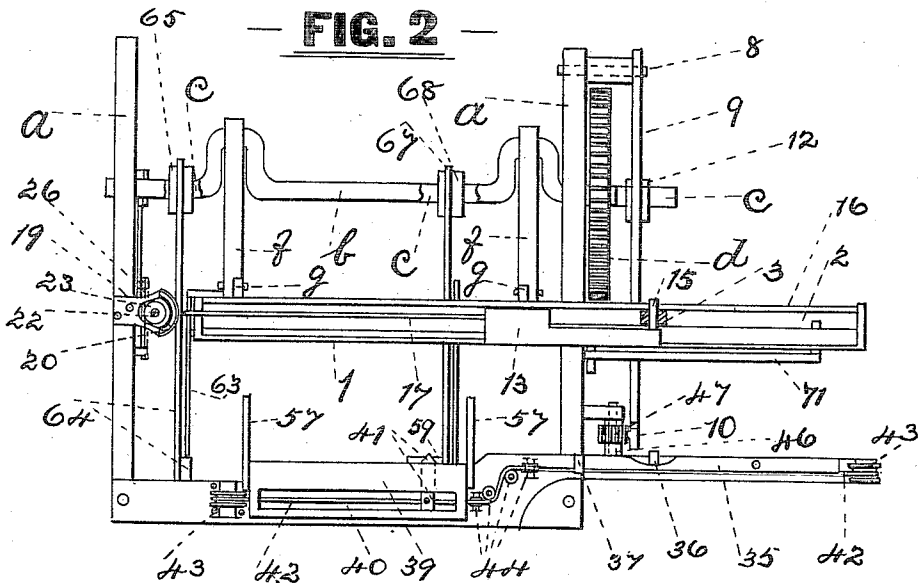
Inventor.
John C. Brooks

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3 SHEETS—SHEET 2.



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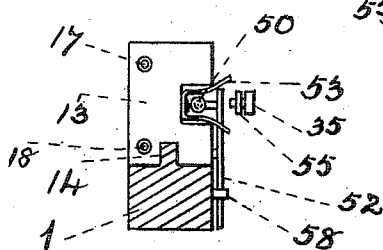
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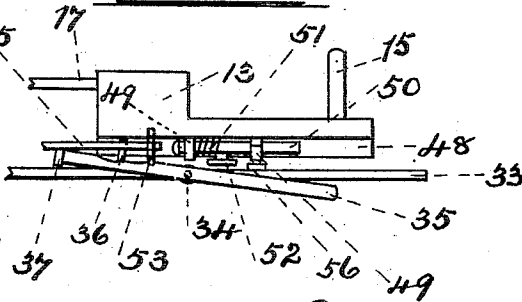
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3 SHEETS-SHEET 3.

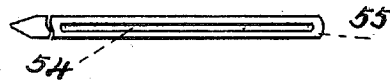
— FIG. 4 —



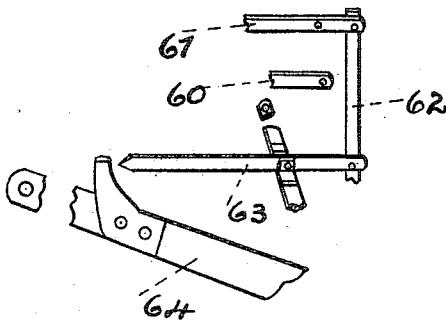
— FIG. 5 —



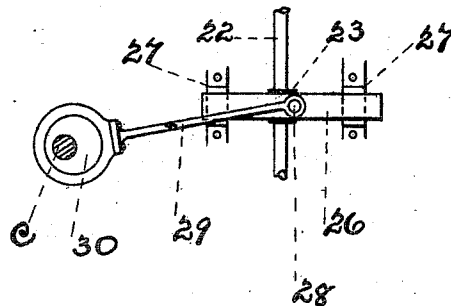
— FIG. 6 —



— FIG. 7 —



— FIG. 8 —



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN C. BROOKS, OF PATERSON, NEW JERSEY.

NEEDLE-LOOM FOR WEAVING PILE FABRICS.

971,355.

Specification of Letters Patent. Patented Sept. 27, 1910.

Application filed January 21, 1909. Serial No. 473,556.

To all whom it may concern:

Be it known that I, JOHN C. BROOKS, a citizen of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Needle-Loom for Weaving Pile Fabrics, of which the following is a specification.

My invention accordingly relates to such cut or uncut pile fabric looms, and has for its object to provide an improved needle loom therefor in manner hereinafter described.

Referring to the drawings accompanying my application, Figures 1, 2, and 3 represent respectively a front elevation, a plan view, and a side elevation, of parts of a loom with my improvements arranged therewith according to one form of same. Fig. 4 is an end view, partly in section, of picker with adjacent parts shown in connection therewith, while Fig. 5 is a plan view of said Fig. 4. Fig. 6 is a view of my pile wire or needle; Fig. 7 is an elevation, slightly in perspective, of parts involved in the automatic stopping of the loom should the pile wire fail to act; and Fig. 8 is a view in elevation, slightly in section, of one form of device for operating the edge shuttles of the loom.

Of the usual parts of the loom shown, *a* is the frame, *b* the crank shaft, *c* the bottom shaft, *d* and *e* gear wheels connecting said shafts, *f* the crank arms, *g* the lay swords, and *h* the rock shaft.

With regard to my improvements, I use a lay 1 provided at one end with a receptacle space or slot 2 (Fig. 2) as a guide for the picking stick 3, mounted upon a stud within the picking stick bracket 4. Upon the rear frame *a* is a stud 5 (Fig. 3) upon which is pivoted a lever 6, capable of engaging at its free end a forked lever 7 upon the picking stick 3. Another stud 8 upon the rear frame *a* is provided with a pivoted lever 9 terminating at its other end as a rack portion 10. Levers 6 and 9 are here shown connected together by means of link 11, and are operated by the action of cam 12 rotating with shaft *c* to which it is attached, for the purpose hereafter referred to. The levers, 6 and 9, have provided thereon cam engaging surfaces 6' and 9', which provides a quick inserting motion for the needles, a

short dwell, when inserted, and a quick retraction from the warp sheds. The picker 13, which in this case serves as a needle carrier, has a slot provided in its under surface engaging a rib 14 upon the lay, (Figs. 3 and 4), and such picker is provided with a projection 15 through which freely passes the spindle 16 here arranged to form the outer boundary of the slot or space 2 (Fig. 2). The said spindle 16 and rib 14 serve to retain the picker in correct position during its reciprocating movement along the lay. In the front end of the picker are the filling inserting needles, two of which, 17 and 18, are here shown. At the opposite end of the loom are mounted brackets 19 forming race-ways for the edge shuttles, one of which is indicated at 20, (Fig. 2). Engaging these shuttles are arms 21 (Fig. 1) attached to an upright shaft 22 operated by gear wheel 23 keyed or otherwise mounted thereon. The said shaft is here shown held in position by means of brackets 24 and 25. The gear wheel is here operated by a rack 26 capable of movement in guides 27 (Fig. 8), said rack being provided with a pin 28 engaged by rod 29 of the eccentric 30 upon the shaft *c*, and operated thereby. The rotation of shaft *c* causes the cam 12 thereon to raise and lower the levers 6 and 9, the movement of the former actuating the picking stick through the forked piece 7, and thereby causing the ends of the needles 17 and 18, due to the motion thus imparted to the picker 13, to pass within the edge-shuttle race-ways; also the eccentric 30 operating the arms 21 through shaft 22 and gears 23 and 26 actuates the shuttles within the race-ways of the brackets 19, so that they pass within the bight of weft thus inserted, and an edge is formed to the material or fabric being woven, as will be well understood.

Secured to the breast beam *i* (Fig. 1), is a bracket 31 provided with an upright 32, supporting the ends of spindles 33, upon which spindles a traveler 34 is capable of riding; pivoted on said traveler is a pile-wire extractor and transferrer 35 provided with a pin portion 36 (Figs. 2 and 5), and also provided with an end portion 37 projecting at right angles. The extractor 35 may be held in its normal position by a spring clip 38

secured to the traveler 34 (Fig. 1). Also secured to the breast beam *i* is a knife box 39 in this instance arranged for one knife only, and provided with longitudinal slots 40 (Fig. 2), in which to guide the said knife 41 during its reciprocation. Attached to or in connection with said knife and said traveler is a flexible connection, such as a belt or cord 42 guided by suitable pulleys, such as 43 and 44, and encircling a driving pulley 45 provided with a sleeve 46 mounted upon a stud in a bracket attached to the loom framing. A gear wheel 47 attached to said sleeve is in gear connection with rack portion 10 of lever 9, so that the movement of said lever due to the rotation of cam 12 gives the necessary motion of reciprocation to the knife 41 and extractor traveler 34.

Longitudinally within the front of picker 13 is a slot or receptacle space 48 (Figs. 1 and 5), and secured upon said picker are bearings 49 projecting within said slot. Also within this slot 48 is a "pusher" 50, provided with a helical spring 51, and a pin 25 upon said pusher is engaged by a slotted lever 52 pivoted upon the picker 13. Contained also within said slot 48 is a retaining device, here in the form of a clip spring 53.

In the operation of the loom, the first six, eight, ten, or desirable number of pile wires, one of which is shown in Fig. 6, necessary to bring the first in line with extractor 35 would be inserted by the operative, then as the loom operated, lever 9 through rack 10 would oscillate pulley 45, thus through cord 42 giving a motion of reciprocation to traveler 34 and knife 41. At each forward position of the traveler 34, the pin 36 thereon would engage with the slot 54 of the pile wire 55, and on its return movement would carry the pile wire with it, the knife 41 having previously freed the pile-wire from its loops. In this instance it would only be necessary for the knife to have one cutting edge, and to be capable of movement in a circular direction by turning upon a pivot, such as indicated in Fig. 2, according to one arrangement. With the knife point arranged to work within the slot of the pile wire 55, the knife being pivoted as above, the movement given to the said knife on reaching the end of the slot referred to, may be utilized to enable the knife edge to come in frictional contact with a sharpening stone, such as indicated at 59, Fig. 2. The withdrawn pile wire 55 would, in operation, be held at its butt end by the extractor pin 36, and at its pointed or free end by supporting wires 57 (Figs. 2 and 3) secured upon the breast beam and reaching beyond the traverse of the reed. As the lay approached the front center, the clip 53 would embrace the pile wire, and a projection or bunt screw 56

upon one of the bearings 49, would, by contact with the end portion of the pivoted extractor 35 cause the opposite end 37 to push the pile wire 55 into engagement with clip 53, the dimensions of the end 37 of the extractor being sufficient to push the pile wire home within, or transfer the same to, the slot 48 of the needle carrier and inserter 13, to retain said pile wire in its edge position, and to cause its pointed end to bear against the reed. The effect of contact with bunt screw 56 above described would also be to free the pile wire from pin 36 of the extractor. At the next forward movement of the needle carrier and inserter 13, the extracted pile wire 55 would be inserted between the provided warp threads, wire 57 guiding it in right elevation; and at the extreme forward movement of said needle carrier and inserter, lever 52 would engage with a stop 58 (Fig. 1) secured to the lay, causing the pusher 50 to expel the pile wire from between the clip 53 and slot 48.

At the terminating end of the lay and attached to the sword *g* of the loom, there is a lever arm 60, and above same a pivoted lever 61 carrying vertical link 62 engaging lever 63 pivoted beneath the lay (see more particularly Fig. 7). On the pile wire 55 being projected from the needle carrier and inserter 13 by the pusher 50, its pointed end enters between levers 60 and 61, said levers acting as a brake upon the pile wire and serving to retain same upon its edge during the beat up of the reed.

Pivoted under the breast beam of the loom is a loom stop lever 64 projecting over a sprocket wheel 65 secured upon shaft *c*, and provided with a pattern chain 66 having links or surfaces of two heights; the upper end of said lever 64 is capable of being in line of contact with lever 63, and is adapted to set in motion the usual loom stopping mechanism, which might be accomplished by pivoting the lever 63 upon an arm, as shown in Fig. 7, which is itself pivoted externally, and to which might be attached the connection with the loom stopping mechanism. At the opposite side of the loom is a similar lever 67, sprocket wheel 69, and pattern chain 69, but in this instance the upper part of lever 67 is formed as a curved extension (Fig. 3) so that when the high portions of chain 69 elevate lever 67 its curved part lies in line of travel of pile wire extractor 35, so that said extractor is thus displaced at certain periods, and fails to engage with the pile wire 55. The upper end of aforesaid lever 64 normally lies below the line of contact with lever 63, but on the pick in which a pile wire is inserted, a high part of chain 66 raises said upper end of lever 64 so as to bring it into line of con-

tact with lever 63, should it so happen that the pile wire 55 failed to project between levers 60 and 61, and so fail to raise front end of said lever 63 clear of projection on lever 64.

On the lower front portion of the needle carrier and inserter end of lay, is a protector rod 71, having a bunter or projection 72 (see more particularly Fig. 3), and actuation finger 73, the upper rear corner 74 of the needle carrier and inserter being here beveled. As after each pick the needle carrier and inserter returns home, said beveled corner by pressing against said finger 73 actuates rod 71 to which it is attached, thus raising bunter 72 from possible contact with means, such as arm or slidable device 75 capable of setting in operation the ordinary loom stopping mechanism, but should the needle carrier and inserter fail to return, then the bunter would actuate such means and cause the loom to stop.

In weaving certain fabrics, the tendency of the pile wire to fall flat as the reed recedes, could be overcome by use of a latch, as 80, (Fig. 3) to secure each wire as the reed beat it up.

In weaving uncut pile fabrics, the cutting knife and its mechanism would be omitted, as also in weaving fabrics in which a pile was inserted every pick of the loom, the chains 66 and 69 and levers 64 and 67 could be dispensed with.

I claim:

1. The combination, in a loom of filling inserting needles and pile forming wires with common means for operating the filling inserting needles and pile forming wires to produce fabrics.

2. In a needle loom, a combined weft-needle and pile-wire carrier and inserter, and means for operating the same, substantially as set forth.

3. In a needle loom and in combination, a weft needle carrier and inserter, a receptacle formed therein for receiving a pile wire within said needle inserter, and means for retaining said pile wire in such receptacle, substantially as set forth.

4. In a needle loom and in combination, a weft needle carrier and inserter, a receptacle formed therein for receiving a pile wire within said needle inserter, means for retaining said pile wire in such receptacle, and a pile wire extractor and transferrer, substantially as herein set forth.

5. In a needle loom, and in combination, a weft needle carrier and inserter, a receptacle formed therein for receiving a pile wire within said needle inserter, means for retaining said pile wire in such receptacle, and a pivoted tensionally operated pile-wire extractor and transferrer situated on the

breast beam of the loom, substantially as herein set forth.

6. In a needle loom, and in combination a weft needle carrier and inserter, a receptacle formed therein for receiving a pile wire within said needle inserter, means for retaining said pile wire in such receptacle, a pivoted tensionally operated pile-wire extractor and transferrer situated on the breast beam of the loom, and a lever operated pusher mounted upon the inserter for ejecting said pile wire, substantially as herein set forth.

7. In a needle loom, and in combination, a weft needle carrier and inserter; a receptacle formed therein for receiving a pile wire within said needle inserter, means for retaining said pile wire in such receptacle, a pivoted tensionally operated pile wire extractor and transferrer situated on the breast beam of the loom, a lever operated pusher mounted upon the inserter for ejecting said pile wire, pivoted levers upon the lay, for the pile wire to enter between, a link pivoted to one of said levers, a lever in connection with last named link and with the stopping mechanism of the loom, a loom stop lever pivoted upon the loom frame for possible engagement with last named lever, a variable height sprocket, or pattern, chain, for raising said loom stop lever, and a sprocket wheel, carrying and operating said chain, mounted upon the bottom shaft of the loom, substantially as herein set forth.

8. In a needle loom, and in combination, a weft needle carrier and inserter, a receptacle formed therein for receiving a pile wire within said needle inserter, means for retaining said pile wire in such receptacle; a pivoted tensionally operated pile-wire extractor and transferrer situated on the breast beam of the loom, a lever operated pusher mounted upon the inserter for ejecting said pile wire, pivoted levers upon the lay for the pile wire to enter between, a link pivoted to one of said levers, a lever in connection with the last named link and with the stopping mechanism of the loom, a loom stop lever pivoted upon the loom frame for possible engagement with last named lever, a variable height sprocket wheel carrying and operating said chain mounted upon the bottom shaft of the loom, a cam mounted upon said bottom shaft, a pair of pivoted levers in connection with the loom frame actuated by said cam, a picking stick operated by one of said levers, a rack upon the end of the other of said pair of levers, a pulley in gear connection with said rack, a flexible connection operated by said pulley, a cutting knife operated by said flexible connection, a traveler carrying the aforesaid extractor and transferrer also operated by

said flexible connection, a pivoted lever in
connection with the loom frame for engag-
ing said extractor and transferrer; a variable
height sprocket, or pattern, chain for operat-
5 ing said lever, a sprocket wheel for operat-
ing said chain and mounted upon the bottom
shaft of the loom, a protector rod on the lay,
a finger rod for contact with the needle in-
serter and attached to said protector rod, a
10 bunter or projection connected to and op-

erated by said finger rod, and for possible
engagement with the stopping mechanism
of the loom, substantially as herein set forth.

In testimony whereof I set my hand in the
presence of two attesting witnesses Jan. 15
20th 09.

JOHN C. BROOKS.

Witnesses:

J. NORMAN BALL,
A. BROOKS.