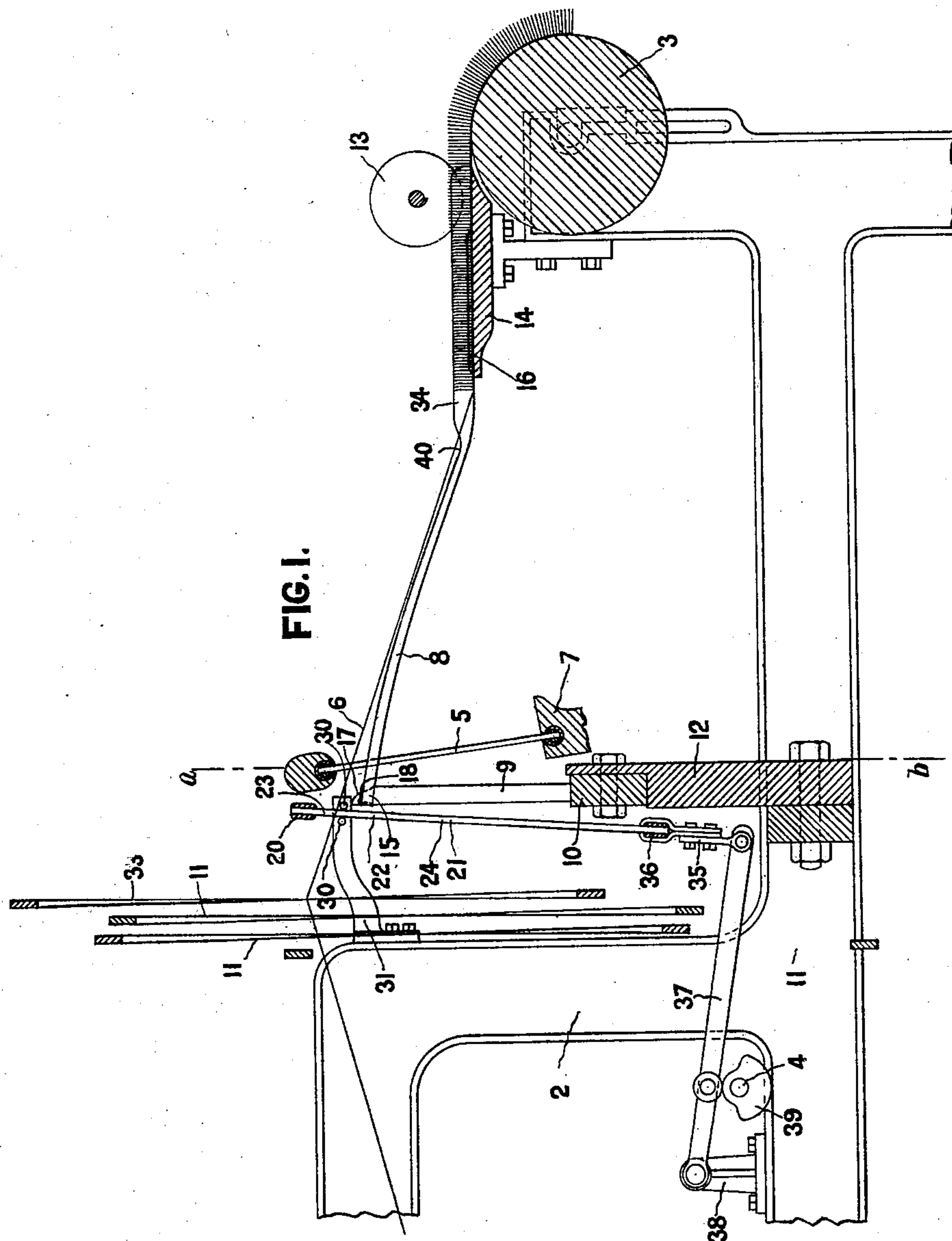


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2 SHEETS—SHEET 1.



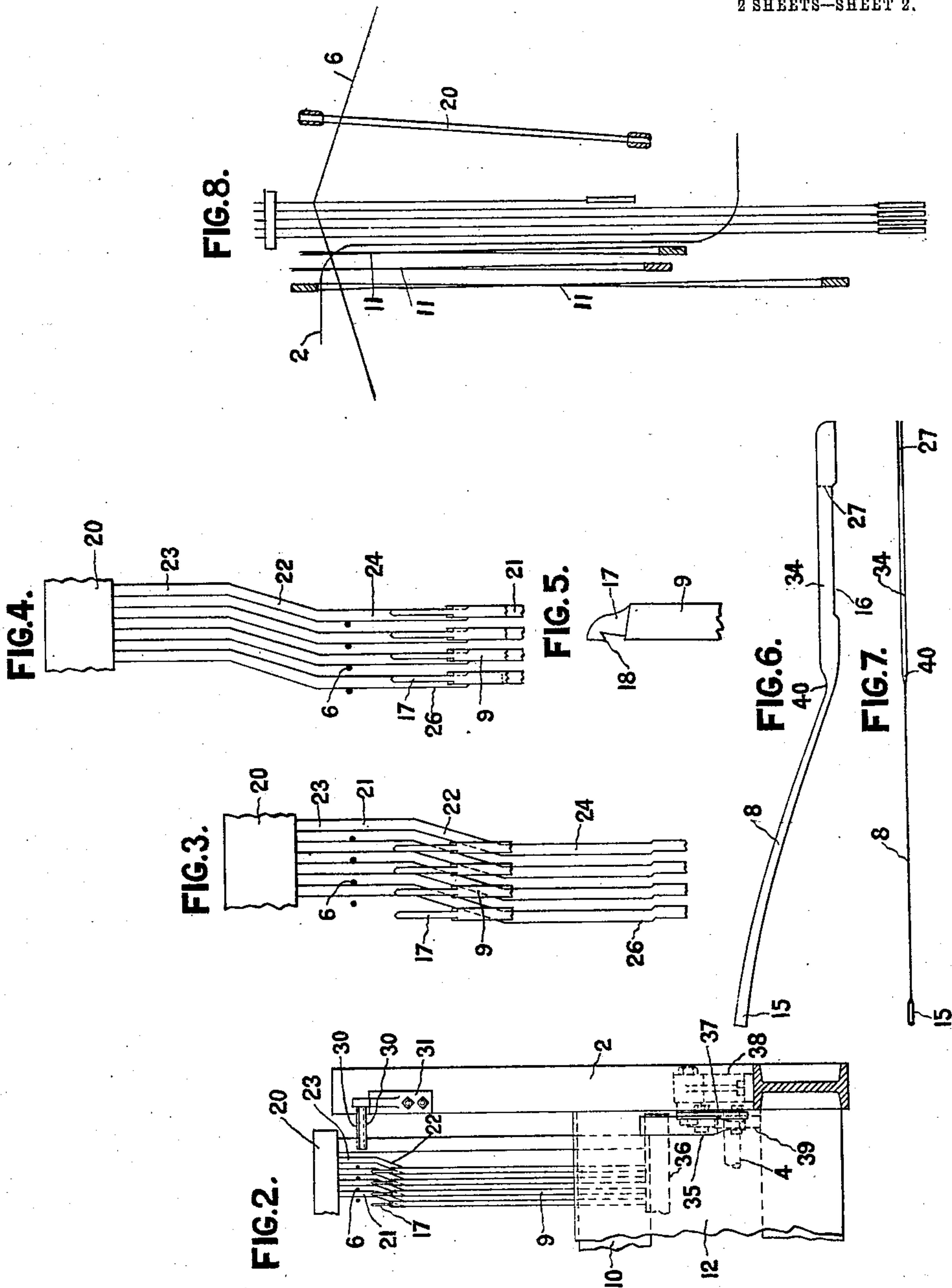
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B. WALKER & A. SPINK.
LOOM FOR WEAVING PILE FABRICS.
APPLICATION FILED OCT. 3, 1905.

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Patented Oct. 6, 1908.

2 SHEETS--SHEET 2.



WITNESSES.

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UNITED STATES PATENT OFFICE.

BENJAMIN WALKER, OF SHELLEY, NEAR HUDDERSFIELD, AND ALFRED SPINK, OF LEEDS, ENGLAND.

LOOM FOR WEAVING PILE FABRICS.

No. 900,136.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed October 3, 1905. Serial No. 281,154.

To all whom it may concern:

Be it known that we, BENJAMIN WALKER, a subject of the King of England, residing at Hawthorne Cottage, Shelley, near Huddersfield, England, and ALFRED SPINK, a subject of the King of England, residing at Tempest Road, Beeston Hill, Leeds, England, have invented certain new and useful Improvements in Looms for Weaving Pile Fabrics, of which the following is a specification.

This invention relates to improvements in that class of loom for weaving pile fabrics such as fabrics having high or low pile either cut (velvet) or uncut (terry or Brussels) or a combination of the above applicable to the production of Brussels and velvet pile carpets, terry and velvet plushes and imitation furs in which the pile is formed by pile forming wires mounted the warp way of the fabric, that is to say, longitudinally in relation to the fabric to be woven.

In the accompanying drawings Figure 1 represents a cross section of such parts of a loom as are necessary to illustrate our improvements. Fig. 2 is a section at right angles to Fig. 1 on the broken line *a. b.* Fig. 3 is a separate front view on a larger scale of part of the pile forming reed when in its lowest position. Fig. 4 is a similar view of the same in its highest position. Fig. 5 is a view on a larger scale of the hooked top of one of the uprights or pins. Figs. 6 and 7 are two views of one of the pile forming wires. Fig. 8 is a sectional view of the pile lifting heald shown in Fig. 1 replaced by jacquard harness.

The side frame 2, the take up roller 3, the crank shaft 4, the reed 5, the backing healds 11, the going part 7 and the rotary cutter 13 (Fig. 1) are of ordinary construction. The pile forming warp threads 6 (Fig. 1) are lifted higher than the ordinary ground or backing warp threads which latter are not shown to avoid confusion. In Fig. 1 the going part is shown fully back and the pile warp fully lifted.

The pile forming wires or needles 8 are mounted the warp way of the piece, they extend through the reed 5 and are secured immediately behind it by their eyes 15 to the

tops of the uprights or pins 9 fixed in a plate or bar 10 carried by a cross rail 12 the ends of which are secured to the side frames 2. By this method the pin bar 10 can be quickly changed. The uprights or pins 9 are of such a length that the plate 10 does not interfere with the shedding of the warp and the other ends of the wires 8 rest upon the cross plate 14.

The height of the pile is regulated by the thickness or depth of the front part 34 of the wires or needles 8 and the wires can be readily changed and the same upright plate or pin bar 10 used therewith, or a plate with the uprights of a different pitch may be used with a reed to correspond. The wires for cut pile having split ends 27 in which the cutters work cutting the loops into velvet pile, the wires for looped pile are without split ends, the loops not requiring to be cut.

In order to transfer the pile forming warp threads 6 from one side to the other of the pile forming wires or needles 8 we employ a reed 20 the dents 21 which are of the same pitch as the uprights or pins 9 and which have an incline or bend 22 formed in each of them in the same vertical plane so that the upper parts 23 of the dents would transfer the pile warp threads 6 when in the lifted position between them from one side to the other of the pile forming wires or needles 8 if the reed 20 were lowered in a vertical or approximately vertical direction. In this way the "ends" are made to cross the wires 8 and when the tying down weft is beaten up such ends form loops round the wires. In the raised position of the reed 20 the lower parts 24 of the dents 21 would re-transfer the pile warp threads or "ends" 6 to the former side of the wires or needles 8. The ends of the reed 20 work between the guide pins 30 projecting from the bracket 31 one of which is fixed to each side frame 2. Suitable provision is made for lifting and lowering the pile forming reed 20 for the purpose stated. As shown in the drawings this may consist of levers 37 pivoted to the standards 38 on each side frame. The front end of each lever is coupled by the rod 35 to the bottom "balk" 36 of the reed 20 and the levers are actuated by cams 39 on the

crank shaft 4. Each dent 21 of the pile forming reed 20 has preferably a slight bend 26 towards the left below the incline 22 Figs. 3 and 4 in order that the warp 6 clears the tops of the uprights 9 when the warp is lowered, and the reed is in its highest position. The incline 22 is continued a little to the right of the uprights so as to avoid catching their tops when the warp is lowered and the reed is in its lowest position.

The rear ends of the wires or needles 8 are preferably secured to the reduced parts 17 of the uprights or pins 9 by eyes made in the ends of the wires or needles and said eyes rest on the shoulders formed, the wires being kept from rising by the hooks 18 at the tops of the reduced parts of the pins.

We find the reed 20 with its inclined dents an important feature of the invention as by its use the pile warp is positively transferred from one side of the pile forming wires to the other without fear of mistake each time it is lifted by the pile warp heald 33. Other advantages are that the wires 8 are supported and terminate immediately behind the reed and do not extend to or near the healds or harness leaving a clear space betwixt the cranked reed and the healds or harness and therefore cause no obstruction to the operative taking up breakages in the ground warp or pile warp ends as would be the case if the wires extended through the healds or harness. Furthermore as the wires are readily detachable from the supporting uprights 9 they can be quickly changed from a wire producing cut or velvet pile to a wire producing looped or terry pile or to a set of wires giving different heights of pile without otherwise making any change in the working of the loom.

To allow for space betwixt the dents of the reed and pile forming wires and to allow of the pile warp threads working freely down each side of the wire we form that part of the wire which passes between the dents of flattened section and the end 34 of the wire in front of the reed when the reed is fully forward is made laterally thicker and with a split or divided end 27 in which the circular cutters work when the pile is required to be cut. But when the pile is required in loop form (not cut) the circular cutters are dispensed with and the pile comes from the wires as the cloth is woven in uncut or terry form, in this case we may use a wire with that portion on which the loop is formed of round or other suitable section according to the form of loop required. The under part of each wire from near the point where the loops are formed is cut away so as to leave a space 16 to receive any knot or irregularity in the yarn that would otherwise tend to lift the wire and so cause an unevenness in the height of the pile. We find in practice that if it were not for this cut away portion serious

defects would be caused in the material produced owing to irregularities in the height of the pile.

When producing deep pile goods we hollow out the wire at the part 40 where the pile warp crosses the wire when forming the pile previous to being beaten up by the weft so as to allow of the pile warp lying on the shuttle race or running board without causing any risk of shuttle coming in contact with the pile shed.

To avoid risk of damage to the pile forming wires 8 they are curved upwards as shown so that in the case of the loom knocking off and leaving the shuttle between the warps no damage is done to the pile forming wires.

Some other of the advantages of our improvements are that they can be applied to a loom without any interference with the working of the heald shafts or harness and the speed of the loom can be materially increased as it is not interfered with by the pile forming mechanism and such improvements are particularly applicable for weaving wide goods. The cranked reed acts as a false reed in separating the ground warps and consequently reducing breakages.

We claim:—

1. In a pile fabric loom the combination with a reed 5, of rigid uprights located immediately in rear thereof, pile forming wires secured to the tops of the uprights and extending through the reed to a point beyond where the weft is beaten up, and an approximately vertical reed mounted closely in rear of the uprights to have vertical reciprocating movement only, each of the dents of said reed having an upper and lower straight portion and an inclined portion connecting said straight portions together, substantially as described.

2. In a pile fabric loom the combination with a reed 5, of rigid uprights located immediately in rear thereof, pile forming wires secured to the tops of the uprights and extending through the reed to a point beyond where the weft is beaten up, and an approximately vertical reed mounted closely in rear of the uprights to have vertical reciprocating movement only, each of the dents of said reed having a single inclined portion and having also thickened portions above and below said inclined portions, substantially as described.

3. In a pile fabric loom the combination with a reed 5, of rigid uprights located in rear of said reed and having reduced ends with hooks thereon, and pile forming wires having eyes engaging the reduced ends and retained by the hooks, said wires extending through the reed to a point beyond the beat up of the lay, substantially as described.

4. In a pile fabric loom the combination with a reed of rigid uprights in rear thereof, pile forming wires having their rear ends supported at the upper ends of said uprights and

inclining downwardly and forwardly and having horizontally extending forward portions, a support for the forward ends thereof, said horizontal portions having recesses in their under sides which recesses extend above the level of the upper surface of the support, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

BENJAMIN WALKER.
ALFRED SPINK.

Witnesses:

CECIL A. S. BARCKER,
DAVID NORVELL.