

Nov. 30, 1926.

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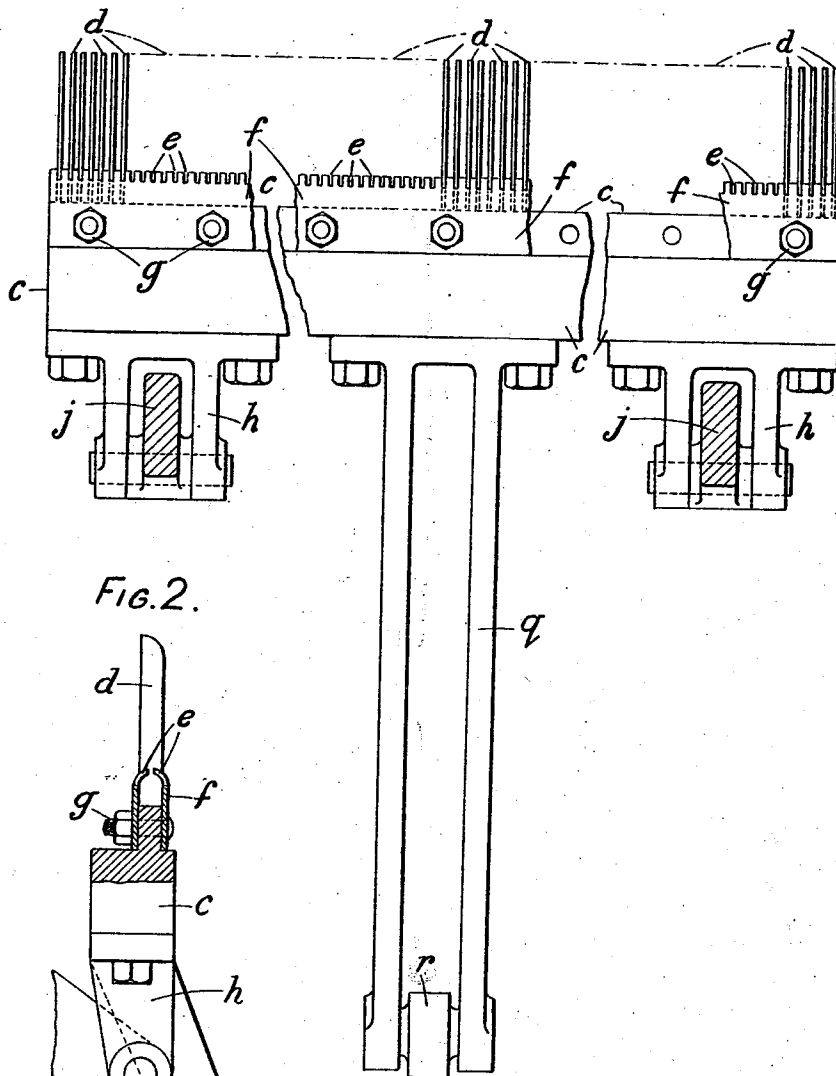
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MEANS FOR BEATING UP THE PILE FORMING MATERIAL IN THE WEAVING OF TUFTED
FABRICS SUCH AS CARPETS AND THE LIKE
Filed Dec. 10, 1925 2 Sheets-Sheet 1

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Fig. 1.



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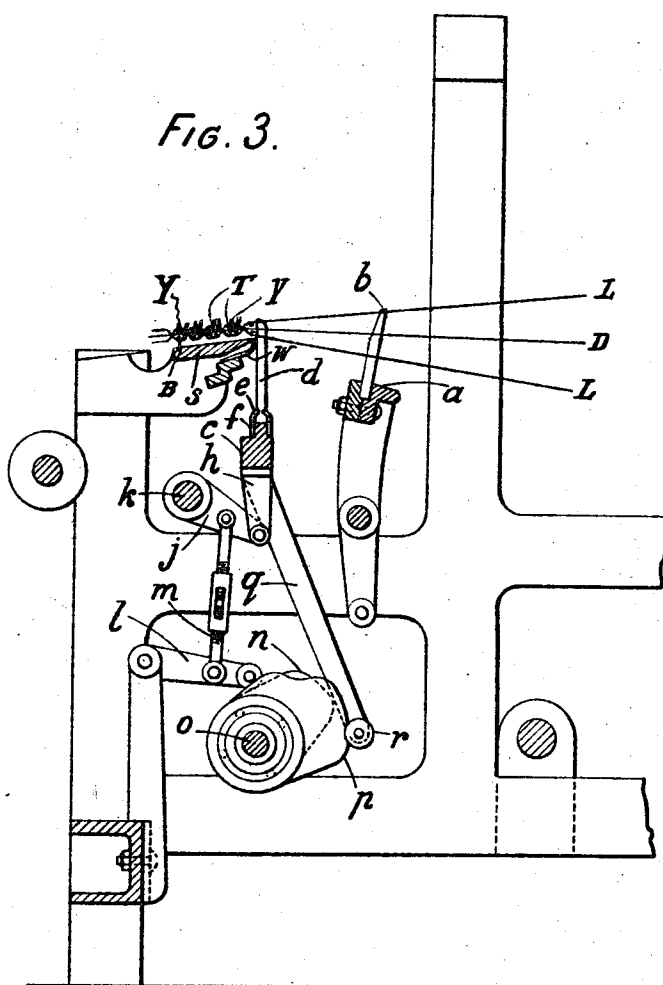
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2 Sheets-Sheet 2

FIG. 3.



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UNITED STATES PATENT OFFICE.

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MEANS FOR BEATING UP THE PILE-FORMING MATERIAL IN THE WEAVING OF TUFTED FABRICS SUCH AS CARPETS AND THE LIKE.

Application filed December 10, 1925, Serial No. 74,586, and in Great Britain November 3, 1924.

This invention relates to the means for beating up the pile forming material in the weaving of fabrics of the kind in which the pile forming yarns or tufts are inserted between the warp threads and then bound in after being partly or completely doubled round the weft threads.

The object of this invention provides an improvement in means whereby that portion of the weft or wefts constituting the binding weft after coming into position across the fell of the fabric, and in front of the row of downward hanging tufts, may be beaten up before the tufts are turned up and the remainder of the weft is beaten up. For this purpose I provide (in addition to the usual lay—hereinafter referred to as the main lay) a supplementary lay having its own cams and operating levers for producing the requisite rising and falling and beat-up movements.

I find my invention to be superior in that it is applicable to looms of any width—the support or supports of the supplementary lay being always within the width of the loom—and it does not involve needless sacrifice of time in each cycle, this being a valuable consideration. My invention is furthermore distinguished by its simplicity and compactness.

By adopting the present improvement a considerable saving of pile forming material can be effected owing to the weft being brought into close alignment with the fell and an appreciable increase in production obtained in a given time, owing to the shortness of the time interval between the supplementary and the main beat ups, the first of which as mentioned, acts only upon part of the wefts supplied by one insertion, whilst the remainder is beaten up immediately afterwards by the main lay. But the first (i. e. supplementary) beat up is done not only in the minimum interval of time, but in such a thorough manner, owing to its general design and that of its controlling mechanism, as to ensure that it shall always beat the binding wefts close to the fell no matter how wide the loom may be.

In order to explain my present invention clearly, I will refer hereinafter to the accompanying drawings which illustrate diagrammatically a convenient manner of carrying out the same, but are not intended to restrict the scope of my invention as regards details.

Fig. 1 is a front elevation of a supplementary lay embodied in the invention, and Fig. 2 an end elevation partly in section.

Fig. 3 is—on a smaller scale—a side sectional elevation of a portion of a loom to which my invention has been applied, many of the ordinary parts of the loom being omitted for the sake of clearness.

The same letters of reference repeated in the several figures indicate the same or corresponding features.

Referring to the accompanying drawings, I provide in addition to the main or ordinary lay *a* a supplementary lay *c* whose dents are preferably the same in number as they are in the main or ordinary reed *b*. The dents *d* which collectively form the supplementary reed are held and spaced apart in slits *e* cut in a base or holder conveniently formed by metal plates or strips *f* lying along the back and front of the reed or dents *d* at their lower ends, the plates *f* and dents *d* being soldered or otherwise fastened together. These plates *f* extend below the ends of the dents *d* and are secured to the lay *c* by bolts *g*, the bolt holes being slotted to provide lateral adjustment to enable the reed *d* to be brought into register with the spaces between the warp threads.

The lay *c* carries lugs *h h* which are hinged to short radial arms *j* mounted on a bearing shaft *k* extending across the loom, the said shaft being well known on all double needle looms as it carries the levers for operating the curved knife blade and also the bell crank lever for raising and lowering the comb *w* which turns up the tuft ends.

The lay *c* is raised and lowered by levers *l* and connecting rods *m* which connect to the said radial arms *j* and are operated by cams

n working on the lower front shaft *o* which shaft is also well known on the double needle loom.

The beating up motion of this supplementary or special lay *c* is operated from the said lower front shaft *o* by a cam or cams *p* acting upon the lay *c* through an extension or extensions solidly fastened underneath the latter in the form of a lever or levers *q* having a roller *r* on the lower end of same.

The lugs *h h* through which the rising and falling of the special lay is performed can readily be located at any desired part of the length of the lay and more than two can be employed, if desired. The same remark applies also to the lever *q* which may be duplicated at other points. Thus the stresses set up against the special reed *d* and lay *c* owing to the counter pressure of the fell of the fabric are distributed in such a manner as to prevent them from bending, which would be inevitable if the lay *c* were supported only at its two extremities. Furthermore, the attachment of the lugs *h* and levers *q* as described will itself increase the rigidity of the lay *c*.

This additional lay *c* works preferably in combination with the placers as specified in my Patent No. 1,341,417, but it is not limited to this combination.

The operations of the supplementary lay *c* are as follows:—

During the beat up by the main lay *a* the supplementary one *c* is in a vertical position underneath the breast plate *s* and comb *W*.

As the main lay *a* moves away from the fell of the cloth, the comb *W* and supplementary lay *c* move at the same time. On the lay *c* reaching the desired position, the comb *W* rises to turn up the ends of the tuft yarns, whereupon the main lay *a* moves to its furthestmost position, while the supplementary lay *c* moves a little further from the fell, and below the sheds formed by the heddles.

The wefts *T, B* are then inserted by the needles passing in and out of the sheds and on their complete withdrawal the placers mentioned in my said patent come into operation as may be required for the various weaves.

When the said placers have brought forward to the fell the necessary portions of wefts *T, B*, the supplementary reed *d* rises up in the spaces between the warp threads, and behind the weft threads operated on by the placers, but which owing to the distance between the placers have not been moved towards the fell sufficiently.

When the supplementary reed *d* has been raised up to a suitable height through the warp threads, it is moved forward towards the fell and lowered at the same time so that the tops of the dents of the reed *d* are

nearly level with the body of the fabric, and so bring the wefts in front of it up to the comb. On this being done the comb falls to its position under the breast plate *s* and the supplementary reed *d* then moves the wefts up to the upturned ends of the tufts of the previous row.

The main reed *b* now will have come partly forward and the pile yarns to form the next row of tufts *Y* are inserted in position in front of the previous line of wefts. As the insertion is finished, the supplementary reed *d* descends down to its position underneath the breast plate *s* and below the comb. The main reed *b* then beats up the remaining wefts, and the shed changes ready for the next insertion of wefts and pile yarns, these operations being repeated in the manner and order as described.

The weave illustrated in Figure 3 is of the known type comprising active warps *L* and a dead warp *D*. The weft threads are indicated by *T* and *B*, the former being the top wefts (or those lying upon the top of the dead warp *D*) and the latter the bottom wefts (or the wefts which are below the said warp *D*). The pile yarns or tufts are denoted by *Y* and consist of U-shaped loops which are caught and held bound by top wefts *T*. This kind of weave is given by way of illustration in Figure 3 and is not a part of the present invention. The method of inserting the pile yarns *Y* is well known in connection with Axminster looms and need not, therefore, be described. The fabric cannot conveniently be illustrated excepting on the large scale in Figure 3 in which, for the sake of clearness, the fabric is shown spread out upon the breast plate *s* and is seen to consist of the warps *LDL*, the wefts *TB* and the tufts *Y*. When these wefts and tufts are beaten up, they become compacted into the fabric, only the pile material *Y* being visible upon the tread or upper surface.

I claim:

1. In a loom of the character set forth, means for binding a row of tufts which are inserted in two sheds simultaneously, means for beating up the wefts prior to the insertion of said tufts, and a main lay for beating up the later inserted wefts.

2. In a loom for weaving tufted fabrics operating to cause the pile forming yarns or tufts to be inserted between the warp threads and then bound in by being partly doubled about the wefts, a supplemental lay for beating up a portion of the weft before the remaining portion thereof is beaten up by the usual lay, the supplemental lay being provided with supports, cams for actuating the supports to give a rising and falling motion thereto and operating as the beating up movement of the supplemental lay.

3. In a loom for weaving tufted fabrics,

means for binding a row of tufts between two sheds, means for beating up the wefts placed prior to the insertion of the said tufts, and means associated with the main lay for 5 beating up the wefts. up some of the wefts, such lay having the same number of dents as the main lay, means for folding the tufts about the wefts, and a 10 main lay for beating up the wefts.

In testimony whereof I have signed this specification.

ARTHUR DAVIS.

4. A loom for weaving tufted fabrics provided with a supplemental lay for beating