

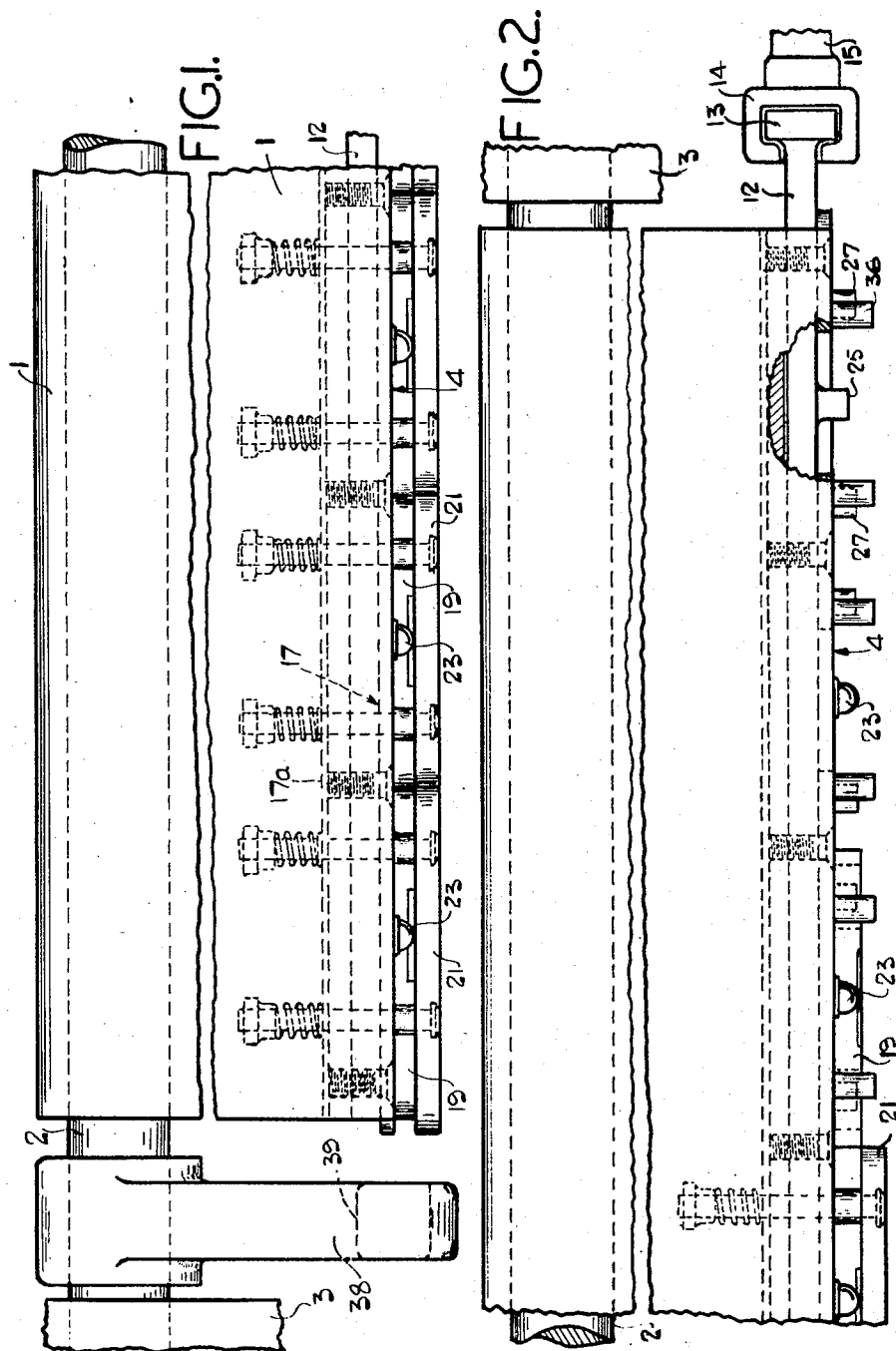
June 20, 1950

C. C. BRINTON
TUFT-CUTTING MECHANISM FOR AXMINSTER CARPET
AND OTHER TUFTED-FABRIC LOOMS

2,512,302

Filed Oct. 18, 1947

3 Sheets-Sheet 1



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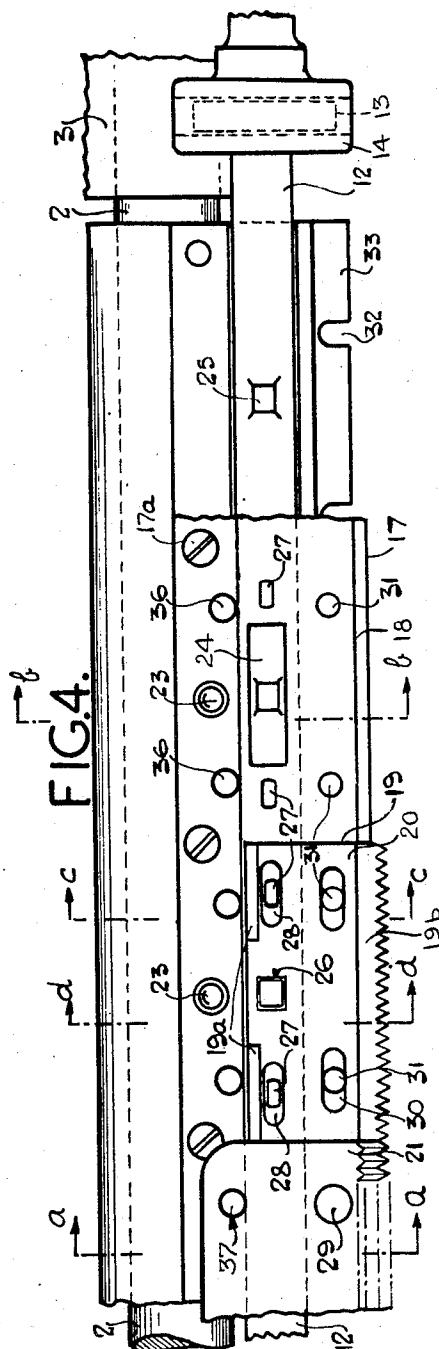
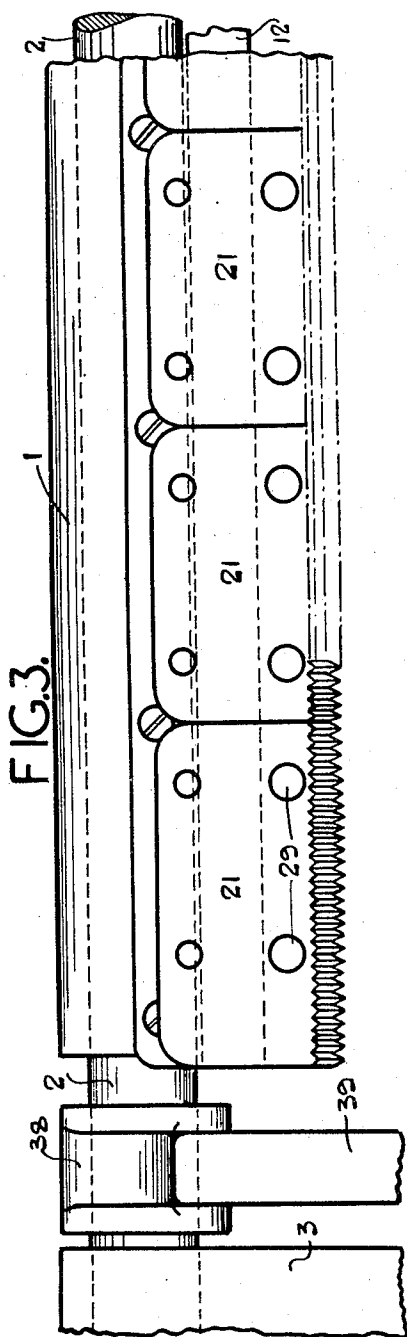
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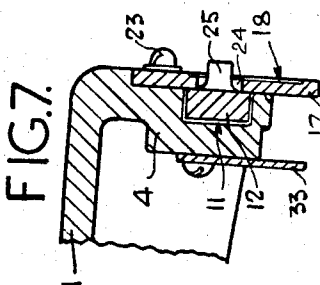
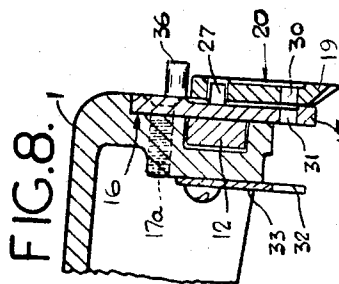
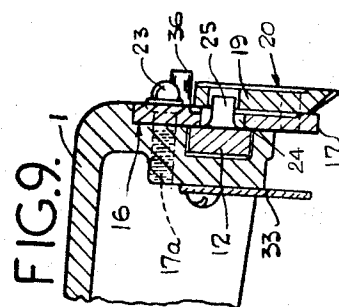
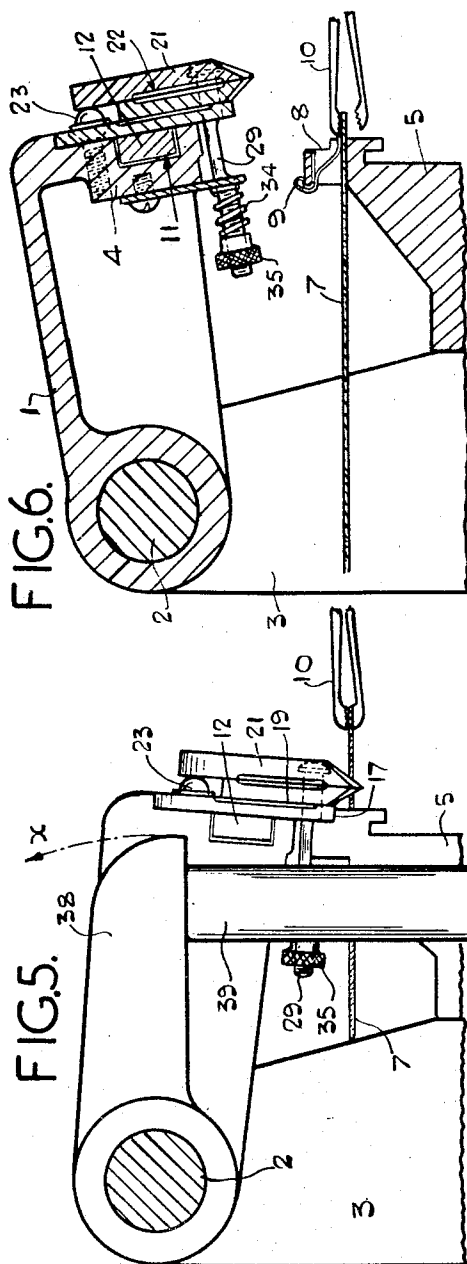
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UNITED STATES PATENT OFFICE

2,512,302

TUFT-CUTTING MECHANISM FOR AXMINSTER-CARPET AND OTHER TUFTED-FABRIC LOOMS

Cecil Charles Brinton, Worcester, England, assignor of one-half to Brintons Limited, Worcester, England

Application October 18, 1947, Serial No. 780,615
In Great Britain October 22, 1946

13 Claims. (Cl. 139-7)

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The tuft-cutting mechanism embodied in certain types of looms for weaving tufted fabrics, such as the Brinton Axminster-carpet loom, usually involves the use of one or more long-stroke cutting-knives which, during each cycle of the operations, are traversed along the face of a stationary knife-comb so that each operates to cut-off a number of tufts in succession from the ends of yarns which are resiliently held in a yarn carriage and which, previously, have been seized and pulled outwardly away from the yarn carriage between the teeth of the said knife-comb, by a system of grippers.

These traversing cutter-blades have, in some cases, a working stroke as long as three feet and not only do their cutting and return strokes occupy a considerable proportion of each cycle of operations and correspondingly slow down the working of the loom, but their actuation involves the use of complicated and bulky mechanism and demands the expenditure of considerable power. The long blades are, moreover, subject to heavy wear and stresses and the adjustments necessary for maintaining them in effective cutting relationship to the stationary knife-comb are difficult of performance.

With the object of obviating the disadvantages attending the use of long-stroke cutters and of speeding up the working of the loom, it has already been proposed in the specification of my United States Patent No. 1,828,921, to embody in a Brinton-type or similar loom, a tuft-cutting mechanism that comprises, in combination with a one-piece stationary knife-comb extending across the width of the loom, a moving cutter comb made up of a series or gang of separate and independently adjustable toothed plates assembled to move as a unit, the arrangement and operation of the mechanism being such that, when the moving unit is at rest, its teeth register with the teeth, or certain of the teeth, of the stationary comb whereas the lateral displacement of the moving cutter comb through only a short distance, such as the distance but slightly exceeding the pitch of its teeth, simultaneously severs or cuts off a row of tufts from the ends of yarns extending between adjacent teeth and held by the gripper system. In this prior proposal, each plate of the moving cutter comb assembly is urged towards and is carried by the stationary knife comb, by means of a corresponding keeper plate which, at its upper edge, abuts the knife comb and, at its lower edge, abuts the cutter comb plate to press both the upper and lower portions of the latter into face-to-

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face contact with the knife comb. The keeper plate is carried by two bolts projecting from the knife comb above the cutter comb plate and nuts, screwed on to the said bolts, compress spring washers between themselves and the keeper plate. It was found, in practice, that tuft-cutting mechanisms constructed in accordance with the above earlier proposals, cannot be made to function efficiently and the principal object of the present invention is to provide an improved short-stroke tuft-cutting mechanism which will operate rapidly and efficiently.

Another object of the invention is to minimise the frictional forces created between the moving cutter comb and stationary knife comb during each tuft cutting operation of the mechanism.

A further object of the invention is to facilitate the initial setting of the mechanism and any subsequent adjustments that may be necessary as a consequence of wear between relatively movable parts.

Still another object of the invention is to ensure that each yarn end is severed cleanly and quickly during each cycle of operations to produce a row of tufts held within the gripper system ready for transfer to the appropriate part of the loom preparatory to embodiment in a carpet or other tufted fabric.

Yet another object of the invention is to localise the pressure between the moving cutter comb and stationary knife comb in the region of the yarn cutting teeth of the said combs.

Yet another object of the invention is to enable the tuft-cutting mechanism to be removed temporarily from the vicinity of the yarn ends whilst the latter are being seized and pulled from the yarn carriage by the gripper system and to enable each yarn to be received between tuft cutting teeth when the said mechanism is returned to its operative position.

These and other objects and advantages of the invention will become apparent upon consideration of the following detailed specification and the accompanying drawings wherein there is specifically disclosed a preferred embodiment of the invention.

In the drawings:

Figure 1 is a plan of one end of a tuft cutting mechanism of a tufted-fabric loom.

Figure 2 is a plan of the other end of the mechanism shown in Figure 1, parts being removed to illustrate more clearly their assembly means.

Figure 3 is a front elevation of the mechanism end shown in Figure 1.

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Figure 4 is a front elevation of the mechanism end shown in Figure 2.

Figure 5 is an end elevation of Figure 1.

Figure 6 is a section along the line *a-a*, Figure 4.

Figure 7 is a section along the line *b-b*, Figure 4.

Figure 8 is a section along the line *c-c*, Figure 4.

Figure 9 is a section along the line *d-d*, Figure 4.

The cutting mechanism shown in the said drawings, comprises a support 1 which is fixed, along one side thereof, to a shaft 2 rotatably mounted in bearings in the loom frame 3.

The other or forward side of the support 1 is formed with a platform 4 which is located above a carriage 5 (see Figure 6). The free ends of yarns 7 are retained within compartments 8 in the said carriage, by springs 9, the yarns being spaced at the same pitch as the tufts in the finished carpet or other fabric to be produced, and their ends being arranged to protrude forwardly of the carriage compartments to enable them to be seized between the jaws of a gripper system 10 and withdrawn from the carriage through a distance equal to the desired length of the tufts (see Figure 5) preparatory to cutting a row of tufts from the yarns. Any suitable form of gripper system may be assembled in the loom for seizing and withdrawing the yarn ends and for conveying successive rows of tufts into position ready for embodiment into the carpet or fabric; preferably however, the gripper system is constructed, assembled and operated as described and claimed in the specification of my co-pending application for Letters Patent of the United States Serial No. 780,616, of even date herewith.

The platform 4 is formed along the length of its face, with a channel or groove 11 in which a cutter actuating bar 12 is slidably accommodated. This bar projects laterally of the support 1 and is formed on its outer end with a head 13 which is adapted to fit within a jaw 14 extending from top to bottom of the adjacent end of a rod 15; the said rod is itself adapted to be longitudinally reciprocated in the loom frame 3 by a cam or equivalent expedient (not shown) for imparting reciprocal movement to the actuating bar 12.

The face of the platform 4 is recessed at 16 along its length and a hard metal plate 17 is secured within the said recess by screws 17a. The outer face of the plate 17 is located flush with the platform face and is formed with a longitudinal depression 18, the face portion below the said depression being lapped or otherwise treated to provide a smooth bearing surface for plates 19 which are assembled in edge to edge contact lengthwise of the platform to provide the movable cutter comb. The upper edge of the depression 18 is level with or slightly above the upper edges of the plates 19 so that the latter, at the said upper edges, do not bear upon the facing plate 17.

The front face of each plate 19 is also formed with a longitudinal depression 20 to provide bearing surfaces 19a, 19b, above and below the said plate depression, for plates 21 which, likewise, are assembled in edge to edge contact lengthwise of the platform to provide a knife comb which is fixed relatively to the support. The rear face of each knife comb plate 21 is formed with a depression 22 which registers with the depression 20 in the cutter comb plates 19, to form top and

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bottom bearing surfaces which seat respectively upon the top and bottom bearing surfaces of the said cutter comb plates. The said bearing surfaces of the plates 19 and 21 are also lapped or otherwise made as smooth and flat as possible.

The plates 19 and 21 are toothed or serrated along their lower edges, the teeth being arranged at the same pitch as the yarns 7 in the carriage 5. The plates 21 are deeper than the plates 19 (see Figure 6), and their upper portions extend above the plates 19 where they bear upon domed studs 23 on the facing plate 17. A single stud 23 is provided for each knife comb plate and the former is so disposed upon the facing plate that it is located mid-way between the two ends of the complementary knife comb plate.

Thus, the plates 19 from which the cutter comb is built, are sandwiched between the facing plate 17 and the plates 21 of the knife comb and the upper portions are prevented, by the studs 23, from being gripped tightly between the said plate 17 and the said plates 21; also, the plates 21 are adapted to rock upon the said studs.

The facing plate is formed with elongated apertures 24 through each of which a complementary lug 25 on the cutter actuating bar 12, extends into engagement with a hole 26 in, and mid-way between the ends of, the complementary cutter comb plate 19. Consequently, reciprocal cutting movements can be imparted to the sandwiched plates of the cutter comb by the bar 12 through the lugs 25. Since the bearing surfaces between the plates 17, 19 and 21 are small compared with the areas of the said plates, due to the formation of the depressions 18, 20 and 22, the effort required to impart cutting strokes to the cutter comb is substantially reduced. This effort is still further reduced by making the depression 20 of such a height that no rubbing contact is made by the upper portions of the cutter comb plates with the facing plate.

The cutter comb plates are restricted against inadvertent up and down movement between the knife comb plates and the facing plate, by pegs 27 projecting from the latter plate into complementary elongated or slot-like apertures 28 in the said comb plates, one such aperture being formed adjacent each of the two opposite ends of each comb plate to eliminate any possibility of rocking movement taking place.

Each knife comb plate 21 is carried by a pair of pins 36 on the facing plate, which pins fit into holes 37 in the said comb plate 21, and the latter is clamped in position relatively to the support 1 by a pair of bolts 29 which extend through holes in the lower part, and adjacent the two opposite ends, of the said plate, elongated slot-like apertures 30 in the lower part of the complementary cutter comb plate 19, holes 31 in the facing plate 17, and further holes or apertures 32 in an anchor plate or lip 33 secured to the back of the platform 4. A spring 34, carried by each bolt on the side of the anchor plate remote from the platform, is compressed between the said plate and a milled nut 35 screwed upon the bolt. Thus the lower toothed portion of the knife comb plates 21 are pulled towards the facing plate thereby ensuring that the teeth on the individual plates 21 are held in face to face contact with the teeth on the cutter comb plates 19; the provision of two spring loaded bolts for each plate 21 and the complementary plate 19, permits even and uniform pressure to be exerted by the toothed edges of the plates 21 on the

toothed edges of the plates 19 along the entire length of the tuft cutting mechanism.

The application of the said spring initiated force to the lower portions of the toothed plates and the abutment of the upper portions of the plates 21 against the domed studs 23, also permits the majority of the said force to be localised at the toothed edges of the sandwiched plates 19, particularly as the upper portions of the latter make no actual contact with the facing plate. A further advantage of the localisation of the spring initiated force is that the friction between the plates 17, 19 and 21 is still further reduced.

A laterally extending arm or lever 38 is fixed to one end of the shaft, the outer or free end of the said arm being arranged to seat upon the crown of a cam-operated push rod 39 which is adapted to raise the arm in the direction of the arrow x (Figure 5) to rotate the shaft through a fraction of a revolution so that an upwards angular movement may be imparted to the support 1 to raise the platform supported cutting mechanism clear of the yarn ends 7 (see Figure 6). This upwards movement of the cutting mechanism enables the grippers 10 to have unobstructed access to the said yarn ends. After the yarns have been withdrawn from the carriage to the desired distance by the grippers (see Figure 5), the push rod is lowered with the consequence that the cutting mechanism is also lowered.

Since the yarns and the teeth are pitched apart by the same distance and since, after each cutting stroke, each tooth of the cutter comb registers with a tooth of the knife comb, the lowering of the cutting mechanism results in each yarn being located between two adjacent pairs of overlapping teeth. Consequently, by displacing the bar 12 lengthwise within the platform groove 11, an equal movement is imparted to the cutter comb causing the teeth of the latter to slide over the teeth of the knife comb and to cut off the withdrawn yarn ends in the form of a row of tufts; these tufts remain gripped within the jaws 10 and can therefore be carried by the latter into the necessary position to enable them to be embodied in a carpet or fabric.

The stroke of the bar 12 and of the cutter comb may be equal to the pitch of the teeth; preferably however it is equal to a multiple of the said pitch to ensure that the tufts are completely severed from the yarns. It is found, in practice, that a stroke equal to double the pitch of the teeth is fully effective for severing a row of tufts by a single longitudinal movement of the bar and cutter comb, a second row of tufts being severed by the return movement of the said bar and comb.

To prevent the cutter comb ends projecting beyond the complementary ends of the knife comb when the cutter comb has completed a tuft-cutting stroke, the end plates 21 of the said knife comb are preferably somewhat longer than the intermediate plates (see Figure 3).

The above-described construction and operation permits of successive rows of tufts being severed quickly and cleanly from the yarns with a minimum of effort, in a simple and efficient manner and with a minimum of wear upon each cutting edge. The provision of a multiplicity of plates in each of the cutter and knife combs and the ability to adjust the pressure exerted by each individual knife comb plate on the complementary cutter comb plate enables the mechanism to be set quickly and accurately and also enables

any wear that may take place, to be taken up without difficulty.

The above specifically described embodiment of the invention should be considered as illustrative only as, obviously, many changes may be made in the mechanism described without departing from the spirit or scope of the invention; for example, the anchor plate or lip 33 may be an integral part of the platform 4 and alternative means may be provided for raising the support 1 or for permitting of the automatic make and break connection of the bar 12 with the rod 15. Reference should therefore be had to the appended claims in determining the scope of the invention.

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

1. Tuft-cutting mechanism for Axminster carpet and other tufted fabric looms, comprising a support, a knife comb mounted on a face of the said support, a movable cutter comb sandwiched between the said support and the said knife comb, the cutter comb and knife comb each being built up from a gang of plates arranged in end-to-end contact, each plate being formed along one edge with a series of teeth, the toothed edge of each knife comb plate registering with the toothed edge of a cutter comb plate and adjustable spring pressure acting on each knife comb plate in the locality of its toothed edge and in the direction of the support, the said comb supporting face and the adjacent faces of the two comb assemblies being formed with depressions along the length thereof for minimising friction between the movable cutter comb, the said face and the knife comb, and means for reciprocating the cutter comb assembly lengthwise of the support for effecting its tuft cutting strokes.

2. Tuft-cutting mechanism for Axminster carpet and other tufted fabric looms, according to claim 1, wherein the depression in the comb supporting face of the support is of such dimensions that the cutter comb assembly contacts the said face only in the locality of the toothed edge of the said assembly.

3. Tuft-cutting mechanism for Axminster carpet and other tufted fabric looms, comprising a support having a longitudinal depression in one face thereof, and a longitudinal channel in the base of the said depression, a reciprocable bar slidably accommodated in the said channel and projecting beyond at least one end thereof, a plurality of equally spaced studs projecting from the said face above said channel and an equal number of similarly spaced lugs projecting from said bar, a gang of identical plates each having a series of teeth formed along one edge thereof, arranged in end-to-end contact to form a continuous movable cutter comb, each plate being carried by a complementary lug fitting into an opening thereon mid-way between its ends and by a pair of pegs projecting from the base of the said depression and engaging separate elongated apertures in the plate on either side of the said stud-receiving opening, the plates being of such dimensions that their edges opposite to the said toothed edges do not project beyond the said depression, and a second gang of plates, each having a series of teeth along one edge which are at the same pitch as, and register with, the cutter comb teeth, arranged in end-to-end contact to form a stationary knife comb, the said knife comb plates, with the exception of the two end and longer plates, being of identical dimensions

and the dimension between the toothed edges and the edges opposite to the latter being greater than the same dimension of the cutter comb plates, so that the said knife comb plates project beyond the cutter comb plates and, each seats, mid-way between its ends, upon a complementary stud on the support, each knife comb plate being assembled to the support on the side of the cutter comb plates remote from the said support, by a pair of bolts anchored thereto in the locality of its toothed edge and on either side of the said complementary stud, each of the said bolts extending through an additional elongated aperture in a cutter comb plate, a hole in the said support and an aperture in an abutment fixed to the said support on the side of the cutter comb assembly remote from the knife comb assembly, a coil spring carried on the bolt portion extending beyond said fixed abutment, being compressed between the latter and an abutment adjustable axially of the bolt, the adjacent faces of the cutter and knife comb assemblies having registering longitudinal depressions therein.

4. An Axminster carpet or other tufted fabric loom comprising a shaft journaled in the loom frame, a support fixed along one edge upon the said shaft and having a platform formed along its opposite edge, the stationary knife comb of a tuft cutting mechanism being assembled to the said platform, and a movable cutter comb being sandwiched between the platform and the said knife comb, each of the said combs being built up from a gang of plates arranged in end-to-end contact, and having a series of yarn cutting teeth of the same pitch along registering edges thereof, a yarn carriage fixed within the loom frame and having an aligned series of compartments at the same pitch as the said yarn cutting teeth and a length of yarn being resiliently retained by its end in each carriage compartment, a gripper system for seizing and withdrawing the said yarn ends from the carriage, between the teeth of the cutter and knife combs and means for displacing the cutter comb assembly endwise of the platform for severing the said withdrawn yarn ends.

5. An Axminster carpet or other tufted fabric loom comprising a shaft journaled in the loom frame, a support fixed along one edge to the said shaft and having a platform formed along its opposite edge, the stationary knife comb of a tuft cutting mechanism being assembled to the said platform and a movable cutter comb being sandwiched between the platform and the said knife comb, each of the said combs being built up from a gang of plates arranged in end-to-end contact and having a series of yarn cutting teeth formed along registering edges thereof, and each of the knife comb plates being spring urged, in the locality of the toothed edge of the knife plate assembly, towards the said support, a yarn carriage fixed within the loom frame and having therein a series of compartments, in each of which the end of a yarn is resiliently retained, arranged at the same pitch as the said teeth, a gripper system for seizing and withdrawing said yarn ends from the said compartments between the teeth of the cutter and knife combs, means for raising and lowering the platform relatively to the yarn carriage and means for displacing the cutter comb assembly endwise of the platform for severing the withdrawn yarn ends.

6. An Axminster carpet or other tufted fabric loom comprising a shaft rotatably journaled in the loom frame, a support fixed along one edge

to the said shaft and having a platform along its other edge, an arm secured to said shaft endwise of the said support and seating upon a reciprocable rod mounted in the loom frame for imparting reciprocable rotational movement to the shaft to raise and lower the platform, tuft-cutting mechanism mounted upon the said platform and comprising a stationary knife comb clamped to and spring urged towards the said platform and a movable cutter comb sandwiched between the platform and the said knife comb, each of the said combs being built up from a gang of plates arranged in end-to-end contact and depending below the platform, their depending edges registering with one another and being formed with yarn-cutting teeth of the same pitch, a yarn carriage disposed below the support and on the side of the platform adjacent the shaft, the said carriage having a system of compartments, in each of which a yarn end is resiliently retained, spaced at the same pitch as the said teeth, a gripper system for seizing and withdrawing the yarn ends from the carriage, the teeth of the cutting mechanism being located clear of the yarn ends when the platform is raised and bridging each withdrawn yarn end when the platform is lowered, and means for displacing the cutter comb endwise of the platform, through a distance not less than the pitch of the tufts, when the latter is lowered, for severing the withdrawn yarn ends.

7. An Axminster carpet or other tufted fabric loom, according to claim 6, wherein the means for imparting endwise movement to the movable cutter comb comprises a bar reciprocally mounted in the platform of the support, and having a plurality of lugs each of which engages a plate of the said cutter comb.

8. An Axminster carpet or other tufted fabric loom, according to claim 6, wherein the means for imparting endwise movement to the movable cutter comb comprises a bar reciprocally mounted in the platform of the support, and having a plurality of lugs each of which engages a plate of the said cutter comb, the said bar extending beyond at least one end of the platform, each projecting end being brought into automatically detachable engagement with a second reciprocable rod mounted in the loom frame as the platform is lowered.

9. An Axminster carpet or other tufted fabric loom, according to claim 6, wherein the means for imparting endwise movement to the movable cutter comb comprises a bar reciprocally mounted in the platform of the support, and having a plurality of lugs each of which engages a plate of the said cutter comb, the said bar extending beyond at least one end of the platform, each projecting end being formed with an enlargement which, as the platform is lowered, enters an open-ended slot formed in the adjacent end of a second reciprocable rod mounted in the loom frame, and which, as the platform is raised, automatically passes out of the said slot to sever driving connection between the said rod and the said bar.

10. Tuft cutting mechanism for Axminster carpet and other tufted fabric looms comprising a support having a depression formed in and lengthwise of one face thereof, domed studs on the said support arranged in alignment to one side and lengthwise of the said depression, a stationary knife comb mounted on said support in spaced relationship to the said face, the said comb seating adjacent one edge upon the said studs and being formed with teeth along its op-

posite edge, a movable cutter comb consisting of a gang of plates arranged in end to end contact, sandwiched in the space between the support and the knife comb, one edge of the said cutter comb which registers with the toothed edge of the knife comb, being also formed with teeth and its opposite edge being located between the edges of the said depression, adjustable resilient means for pressing together the toothed edges of the knife and cutter combs, and means for reciprocating the cutter comb to displace its toothed edge lengthwise of the toothed edge of the knife comb.

11. Tuft cutting mechanism for Axminster carpet and other tufted fabric looms comprising a support having a depression formed in and lengthwise of one face thereof, domed studs on the said support arranged in alignment to one side and lengthwise of the said depression, a stationary knife comb mounted on said support in spaced relationship to the said face the said comb consisting of a gang of plates each seating adjacent one edge upon a complementary domed stud and being formed with teeth along its opposite edge a movable cutter comb, also consisting of a similar but shallower gang of plates arranged in end-to-end contact, sandwiched between the said support and knife comb, the toothed edge of each cutter comb plate registering with the toothed edge of a complementary knife comb plate and the opposite edge of each of the said cutter comb plates being located between the edges of the said depression, adjustable resilient means for pressing together the toothed edges of the knife and cutter combs, and means for reciprocating the cutter comb to displace its toothed edge lengthwise of the toothed edge of the knife comb.

12. Tuft cutting mechanism for Axminster carpet and other tufted fabric looms comprising a support having a depression formed in and lengthwise of one face thereof, domed studs on the said support arranged in alignment to one side and lengthwise of the said depression, a stationary knife comb mounted on said support in spaced relationship to the said face, the said comb seating adjacent one edge upon the said studs and being formed with teeth along its opposite edge, a movable cutter comb consisting of a gang of plates arranged in end to end contact, sandwiched in the space between the support and the knife comb, one edge of the said cutter comb which registers with the toothed edge of the knife

comb, being also formed with teeth and its opposite edge being located between the edges of the said depression, spring loaded bolts carried by the said knife comb adjacent its toothed edge and extending through elongated apertures in the said movable cutter comb so that the toothed edge of the knife comb is pressed resiliently against the toothed edge of the cutter comb, and means for reciprocating the cutter comb to displace its toothed edge lengthwise of the toothed edge of the knife comb.

13. Tuft cutting mechanism for Axminster carpet and other tufted fabric looms comprising a support having a depression formed in and lengthwise of one face thereof, domed studs on the said support arranged in alignment to one side and lengthwise of the said depression, a stationary knife comb mounted on said support in spaced relationship to the said face the said comb consisting of a gang of plates each seating adjacent one edge upon a complementary domed stud and being formed with teeth along its opposite edge a movable cutter comb, also consisting of a similar but shallower gang of plates arranged in end-to-end contact, sandwiched between the said support and knife comb, the toothed edge of each cutter comb plate registering with the toothed edge of a complementary knife comb plate and the opposite edge of each of the said cutter comb plates being located between the edges of the said depression, two spring loaded bolts carried by each plate of the knife comb adjacent its toothed edge and extending through elongated apertures in the complementary plate of the movable cutter comb so that the toothed edges of the said complementary plates are pressed resiliently together, and means for reciprocating the cutter comb to displace its toothed edge lengthwise of the toothed edge of the knife comb.

CECIL CHARLES BRINTON.

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The following references are of record in the file of this patent:

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Number	Name	Date
1,828,921	Brinton	Oct. 27, 1931

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