To all whom it may concern:

Be it known that I, EDGAR BEERS, of Georgetown, in the county of Fairfield and State of Connecticut, have invented a new and Improved Hair-Picking Machine, of which the following is a full, clear, and exact description.

This invention relates to improvements in machines for picking curled hair; and the object is to provide a machine for economically and perfectly preparing the hair in sheet form as it comes from the rope, and, further, to so construct the machine that no damage can occur to the hair by breaking or tearing it.

I will describe a hair-picking machine embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a top plan view of a machine embodying my invention. Fig. 2 is a side elevation thereof. Fig. 3 is a rear end view. Fig. 4 is a section on the line 4 4 of Fig. 3, and Fig. 5 is a detail showing a yielding device for the feeding-rollers.

The frame of the machine comprises side uprights 1, connected by cross-bars 2. At the rear end of the frame is a feed-table 3, supported in standards 4 on the frame and forward of the feed-table 3 is a pair of feed-rollers 5 6, the lower feed-roller 5 being fixed as to vertical movement; but the upper roller 6 is designed to have a vertically-yielding movement. For this purpose the ends of the shaft of the roller 6 are journaled in blocks 7, movable vertically in the standards 4, and passing loosely through the top piece of each standard is an adjusting-rod 8, having screw-thread engagement with a block 9, arranged in the standard and engaging at its lower end with the bearing-block 7. Between the block 9, which is movable in the standard, and the top piece of the standard is a coiled spring 10, which serves to hold the roller 6 yieldingly toward the roller 5. Forward of the rollers 5 6 are three other sets of rollers 11 12, 13 14, and 15 16. These several rollers are supported in standards similar to the standards 4 before described, and the upper roller of each set has a vertically-yielding motion similar to that of the roller 6.

Mounted on a rock-shaft 17 forward of the rollers 5 6 is a picker-head 18. This picker-head 19 is connected to the rock-shaft by means of curved arms 19. The outer ones of said curved arms are connected to the picker-head by means of bolts 20; but in the inner ones of said curved arms are connected with the picker-heads by means of angle-irons 21, which are here shown as bolted to outwardly-extended portions of said arms and engaging the upper and lower edges of the picker-head. These angle-irons will prevent any lateral flexing of the picker-head, and longitudinal movement thereof will of course be prevented by the connection with the end arms. Connected to the picker-head is a series of picker-fingers 22, which picker-fingers are arranged in three rows, and the fingers in the rows are staggered, the pickers of one row as to those of another. By this arrangement a sufficient space is left between the picker-fingers to prevent clogging of the hair; but they will effectually engage with all portions of the hair passing underneath them.

A picker-head 23 forward of the rollers 11 12 is supported on curved arms 24, extended from a rock-shaft 25. A picker-head 26 is supported on curved arms 27, extended from a rock-shaft 28, and a picker-head 29 is supported on curved arms 30, extended from a rock-shaft 31. It is designed in the operation of the several picking devices that the arc of a circle through which they move will gradually diminish from the feed end to the outlet end of the machine—that is, the pickers at the feed end of the machine or adjacent to the first pair of rollers are designed to move to a point below the bottom plane of the bottom roller, the picker forward of the rollers 11 12 will move to a point substantially on a plane with the axis of the bottom roller, and the picker carried by the arms 27 will have a still less movement, and the picker carried by the arms 30 will have a still less movement. The object of this is that the hair which is fed to the machine in the form of a series of ropes laid side by side will be separated to a considerable extent, and while the material is passing the several other pickers...
it will be still more separated, but left in a fluffy condition.

Intermittent motion is designed to be given to the several sets of feed-rollers, and the picking devices for the rear two sets of rollers are operated alternately in opposite directions, as are also the picking devices for the two forward sets of feed-rollers. I will now describe a means for imparting motion to the picking devices and also to the feed-rollers. For operating the picking devices carried by the arms 13 24 a rock-lever consisting of oppositely-extended arms 32 33 is mounted on a rock-shaft 34, having bearings in boxes secured to the frame 1. From the arm 32 of the rock-lever a link 35 extends to a connection with one of the arms 19. This link 35 is made in two sections, so that it may be longitudinally adjusted, and it is adjustable lengthwise of the arm 19 by having its bolt or pivot head movable in a slot formed in an offset 36 on said arm 19. By this arrangement it is obvious that the throw of the picking roller may be adjusted. From the arm 33 a similar longitudinally-adjustable link 37 extends to an adjustable connection with one of the arms 24. A rock-lever consisting of the oppositely-extended arms 38 39 and mounted on a rock-shaft 40 is adapted for operating the pickers 26 and 29. The arm 38 has a longitudinally-adjustable link connection 41 with an arm 27 of the picker 26 and is adjustable thereon, while the arm 39 has an adjustable link connection 42 with an arm 30 of the picker 29 and is adjustable on said arm in the manner described. Extended downward from the rock-lever on the shaft 31 is an arm 43, from which a pitman 43 extends to a crank-pin on a disk 44, mounted on a shaft 45. The pitman 43 has adjustable connection with the arm 43, as plainly shown in the drawings. From the rock-shaft 40 or from the rock-lever thereon an arm 46 extends downward, and adjustably connected to this arm is a pitman 47, which connects with the wrist-pin on a crank-disk 48, mounted on a shaft 49. The shafts 45 and 49 have bearings in suitable pillow-blocks mounted on the base of the machine. On one end of the shaft of the lower roller 5 is mounted a ratchet-wheel 50, and loosely mounted on this shaft is an arm 51, carrying a dog 52, which engages with the ratchet-wheel 50. Adjustably connected to the arm 51 is a link 53, which also connects with a crank 54 on the shaft 17. A ratchet-wheel 55 is mounted on one end of the shaft of the lower roller 11, and an arm 56, mounted loosely on this shaft, has a dog 57 engaging said ratchet-wheel 55, and adjustably connected to this arm 56, and also connected with a crank 58 on the rock-shaft 25, is a pitman 59. A ratchet-wheel 60, mounted on the shaft of the lower roller 13, is engaged by a dog 61, carried by an arm 62, loosely mounted on said shaft, and from which a link 63 extends to a crank 64, secured to the rock-shaft 38, and engaging with a ratchet-wheel 65, mounted on the shaft of the lower roller 15, is a dog 66, carried by an arm 67, from which a link 68 extends to the crank 69 on the rock-shaft 31. By making the links adjustable on the arms mounted on the several shafts it is obvious that the distance of rotation of the feed-rollers may be regulated, and it is further obvious that during an upward movement of a picker the arm will be drawn forward, so that the dog engaging with the ratchet-wheel will operate the feed-rollers a certain distance. A gear-wheel 70, mounted on the shaft 45, meshes with a pinion 71, mounted on a counter-shaft 72, and on the shaft 49 is a gear-wheel 73, which meshes with a pinion 74 on a counter-shaft 75. Loosely mounted on the shaft 75 is a clutch-pulley 76, from which a band 77 extends to a band-wheel 78 on a drive-shaft 79, and loosely mounted on the counter-shaft 72 is a clutch-pulley 80, which has a band connection with a band-wheel on the shaft 79 and similar to the band-wheel 78. A clutch-section 81 is movable on the shaft 79 but is designed to rotate therewith, so that when placed in engagement with the clutch-pulley 80 the said pulley will rotate the shaft. This clutch-section 81 is moved into engagement with the pulley by means of an arm 82 engaging with a sleeve 83, movable on the shaft 72 and having connection with a shifting bar 84, with which a shifting lever 85 engages. A similar clutch member 86 is designed for engaging with the pulley 76, and this section is operated through the medium of an arm 87 on a shifting bar 88 and operated by a lever 89, the arm 87 engaging with a sleeve 88, movable on the shaft 70. On the shaft 45 is a balance-wheel 90, and on the shaft 49 is a balance-wheel 91. These balance-wheels are weighed on one side and are rotatively adjustable on the shafts, so that they may be readily adjusted to assist in throwing or moving the picking devices through the hair.

I employ endless feed-aprons for carrying material forward from one set of rollers to another, and also for discharging the finished product from the rollers at the discharge end. These feed-aprons are each inclined downward and rearward. For carrying material from the rollers 5 6 to the rollers 11 12 I employ an endless apron 92, which at its lower portion engages around a roller 93 and at its upper portion around a roller 94, and on the shaft of this roller 94 is a sprocket-wheel from which a chain 95 extends to a sprocket-wheel on the shaft of the lower roller 11.

An endless apron 96 carries the material from the rollers 11 12 to the rollers 13 14, and at its lower end this apron 96 engages around a roller 97 and at its upper portion around a roller 98, which is driven from the lower roller 13 in the manner before described. An apron 99 for carrying material from the rollers 13 14 to the rollers 15 16 has its lower portion engaging a roller 100, and its upper por-
tion engages with a roller 101, driven from the lower roller 15, and a take-off endless apron 102 passes around a roller 103, arranged below the outlet or discharge rollers, and this apron 102 also extends around a roller 104, having journal-bearings in the frame of the machine, and motion is imparted to this apron 102 by means of a chain 105 engaging with a sprocket on the shaft of the roller 103 and also with a sprocket on the shaft of the lower roller 15.

The several aprons are made of canvas or other suitable material and are provided with transverse slats at the top, and extended over each apron and at each end thereof is a guide-board 106. These guide-boards are mounted on suitable brackets secured to the main frame of the machine.

In operation the hair in the form of ropes is fed over the table 3 to the first pair of feed-rollers. As it passes between the same the vertically-swinging picker will separate the fibers comprised in the several ropes to a certain extent, then the material will be carried between the next set of rollers and operated on by the next picker, and so on to the end, where it may be discharged in a finished state—that is, in the form of a sheet adapted for use in mattresses or the like. By having several pickers, as described and shown, the operation may be carried on rapidly, but without danger of breaking the hair. By the clutch connections for the shafts 45 and 49 it is obvious that the pickers and feeding devices operated by the rotary shafts may be thrown out of operation when desired.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a hair-picking machine, a series of pairs of feed-rollers, a rock-shaft for operating each two pairs of rollers, pickers operating forward of the feed-rollers and longitudinally-adjustable link connections between the pickers with the same rock-shaft that operates said two pairs of rollers, substantially as specified.

2. In a hair-picking machine, a series of feed-rollers, a rock-shaft for operating each two pairs of feed-rollers, pickers operating forward of the feed-rollers, longitudinally-adjustable links connecting the pickers with the same rock-shaft that operates said two pairs of rollers and endless carriers for conveying material from one pair of feed-rollers to another, substantially as specified.

3. A hair-picking machine, comprising a frame, a series of pairs of feed-rollers mounted in the frame one pair forward of another pair, rock-shafts in the frame, rock-levers mounted on said shafts and consisting of oppositely-extended arms, a rock-shaft forward of each pair of rollers, curved arms extended from each rock-shaft, picker-heads carried by the arms, and link connections between the arms of the rock-levers and arms of the pickers, substantially as specified.

4. In a hair-picking machine, a pair of feed-rollers, a picker forward of said feed-rollers, a rock-shaft carrying said picker, a rock-lever, means for operating said rock-lever, and a longitudinally-adjustable link extended from said rock-lever to an adjustable connection with the picker, and means operated from the rock-shaft carrying the picker for imparting a step-by-step rotary movement to the feed-rollers, substantially as specified.

5. A hair-picking machine, a pair of feed-rollers, a vertically-moving picker forward of the rollers, curved arms on which the picker is mounted, a rock-shaft from which the arms are extended, a rock-lever, means for operating the rock-lever, a link connection between said rock-lever and one of the arms of the picker, a ratchet-wheel on the shaft of one of the feed-rollers, an arm loosely mounted on said shaft, a dog on said arm connecting with the ratchet-wheel, and a link connection between said arm and a crank on the rock-shaft, the said links being adjustable on the arms, substantially as specified.

6. In a hair-picking machine, a pair of feed-rollers arranged one above the other, the upper one having yielding vertical movement, a picker forward of said feed-rollers, arms on which the picker is mounted, a rock-shaft from which said arms extend, a rock-lever, an adjustable link connection between said rock-lever and one of the arms carrying the picker, a crank on a drive-shaft having pitman connection with the rock-lever, and means operated from the rock-shaft carrying the picker for imparting a step-by-step rotary movement to the feed-rollers, substantially as specified.

7. In a hair-picking machine, a pair of feed-rollers, a rock-shaft forward of the feed-rollers, means for operating said rock-shaft, a series of arms extended from the rock-shaft toward the feed-rollers, a picker-head bolted to the outer arms, angle-plates bolted to the inner arms and engaging the upper and lower sides of the picker-head, and picker-fingers on said picker-head, substantially as specified.

8. In a hair-picking machine, a series of pairs of feed-rollers, pickers operating in conjunction with the feed-rollers, comprising shafts for operating the rollers and pickers, and balance-wheels rotatively adjustable on said shaft, substantially as specified.

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Witnesses:
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