J. W. BUCKHART.

CUTTER HEAD FOR BATTERY SPACER MAKING MACHINES.

APPLICATION FILED JULY 17, 1920.

1,369,391. **Patented Feb. 22, 1921.**

2 SHEETS—SHEET 1.

Fig. 1.

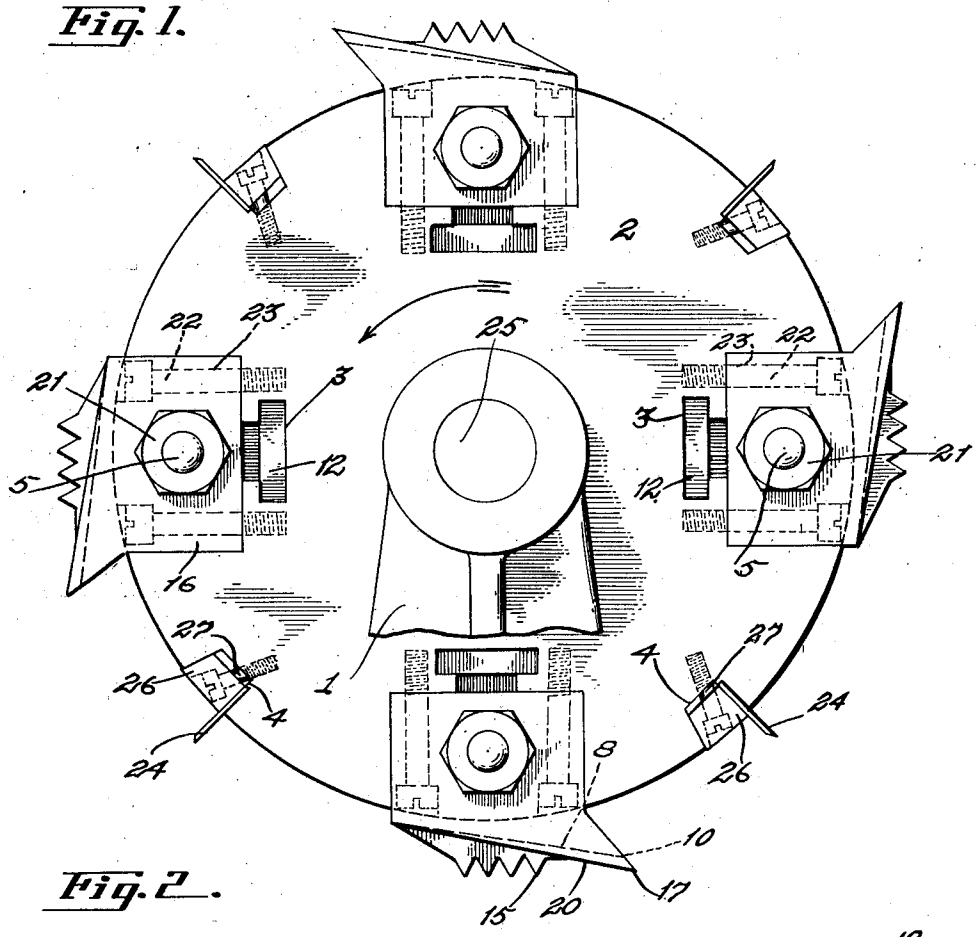
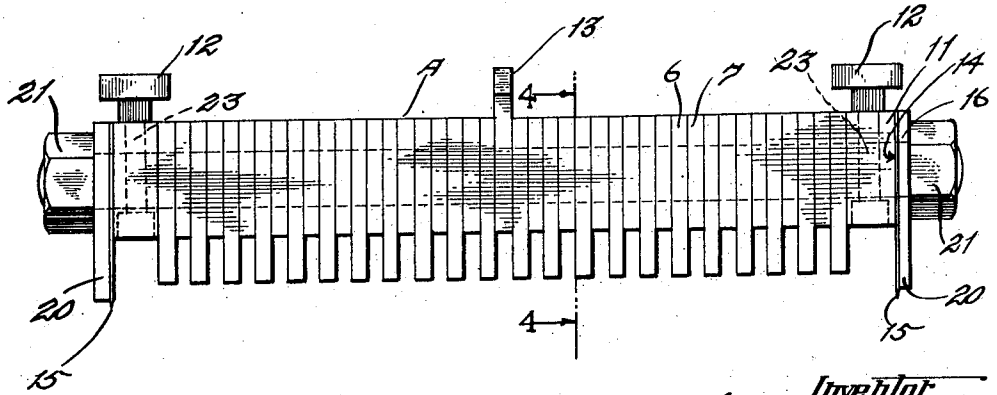


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

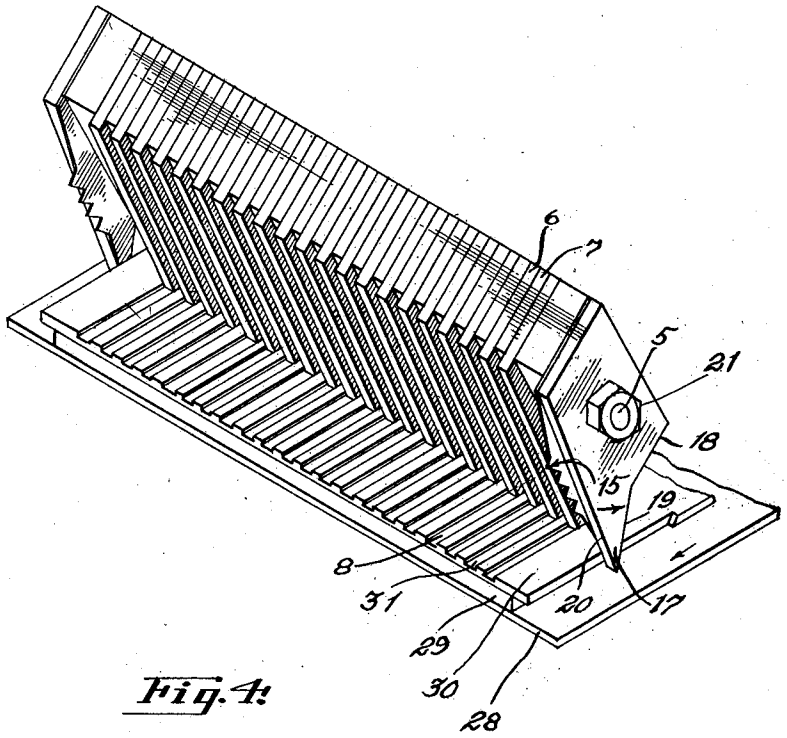
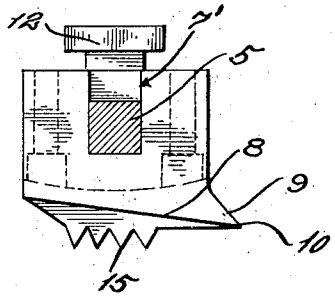


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CUTTER-HEAD FOR BATTERY-SPACER-MAKING MACHINES.

1,369,391. Specification of Letters Patent. Patented Feb. 22, 1921.

Application filed July 17, 1920. Serial No. 397,020.

To all whom it may concern:

Be it known that I, JAMES W. BUCKHART, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Cutter-Heads for Battery-Spacer-Making Machines, of which the following is a specification.

The present invention relates to a particular form of rotary cutter designed primarily for trimming, grooving and surfacing in a single operation a strip or sheet of fibrous material, particularly wood, for forming therefrom a separator or spacer primarily used in electric storage batteries.

The principal object of this invention is to provide a rotary cutter head at spaced points about its periphery with cutting units consisting of spaced grooving cutters arranged with their cutting points in alinement and having associated at opposite ends of the line means for sawing and trimming the side edges of the article operated on enabling the material to be simultaneously cut a given width, and provided with a plurality of parallel even spaced grooves.

A further object of the invention is to provide a cutter head having means for finishing or planing the upper surface of the material as trimmed and grooved enabling a finished article to be produced in a single operation.

A further object of the invention is to provide a cutter adapted for detachably positioning within a head and constructed in such a manner that the grooving cutters may be adjustably spaced transversely of the head and the trimmer knives and saws also adjustably spaced transversely of the head enabling the spacers to be formed of different width and having different width grooves by a simple adjustment of the cutter knives.

With the above mentioned and other objects in view, the invention consists in the novel construction and combination of parts hereinafter described, illustrated in the accompanying drawings, and set forth in the claims hereto appended, it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

To more fully comprehend the invention reference is directed to the accompanying drawings, wherein:—

Figure 1 is a view in end elevation of a cutter head disclosing the preferred embodiment of my invention.

Fig. 2 is a view in side elevation of one of the cutters removed from the head.

Fig. 3 is a view in perspective of a portion of one of the cutters acting on the material and forming a battery spacer therefrom, and

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2.

Referring more particularly to the several views of the drawings, wherein like characters of reference designate corresponding parts, the numeral 1 indicates one of the side supports for a rotatably mounted head 2 illustrated as cylindrical in form and provided with a plurality of longitudinally disposed T-head slots 3 opening radially of the head 2 and arranged in parallel spaced relation. The head 2 between said T-head slots 3 is provided with one or more longitudinal channels 4 also opening radially of the head.

Within each of the T-head channels 3 is adapted to be removably positioned cutter members for the hereinafter described purpose and formed and arranged in the hereinafter described manner. The cutter members being arranged in battery form as illustrated at A Fig. 2 of the drawings, consist of a mounting rod 5 preferably rectangular in cross section, and which mounts alternately the grooving cutters 6 and spacers 7, the cutters 6 being slotted downwardly from their upper edge as at 7′ to snugly receive and fit over the rod 5 and the lower ends of said grooving cutters are downwardly inclined toward their forward edge as at 8, and the forward edge of each cutter at its lower end projects outwardly a slight distance as at 9, the said edges 8 and 9 forming a cutting point or surface 10 at the forward lower edge of each member 6. The spacers 7 are each formed with a slot similar to the slot 7′ of the cutters 6, and the spacers for the non-cutting or operating space between adjacent grooving cutters enable, on the rotation of the head 2, the formation within a surface movable relative to

the head 2 of a plurality of parallel spaced grooves. At the ends of the series of alternating grooving cutters and spacers 7 is positioned over the rod 5 a suitable mounting block 11 carrying a T-head 12 for projecting in the T end of the respective slots 3, and at a point preferably midway of the length of the series of cutters and spacers 7, one of the spacers is provided with a T-head projection 13 for reception within the T-head slot 3 of the cutter head 2. Thus it will be apparent that on the insertion of the cutter battery A within one of the recesses in the head 2 that the heads 12 of the mounting members and the head 13 of the center spacer will serve as an anchoring medium for the battery and precludes the same from radial movement from the head 2. At a point preferably in contact with the outer surface of each member 11 are removably mounted on the rod 5 trimmer saw members 14, the teeth 15 of which are adapted to project slightly below the end surface 8 of the grooving cutters 6 whereby the same will assist in severing and trimming the opposite side edges of the sheet of material simultaneously with the grooving thereof. To further assist in the trimming of the opposite edges of the material grooved there is detachably mounted on the rod 5 adjacent the outer face of each saw 14, a trimmer knife 16, said knives being provided at their lower forward edge with a point 17 formed by forwardly extending the lower portion of the front wall 18 thereof at an angle as at 19, and downwardly and forwardly inclining the lower wall 20, the point of the respective trimmer knives at opposite ends of the battery extending a slight distance beyond and below the points 10 of the grooving cutters, whereby the points 17 will, on the rotation of the head, cut entirely through the relatively thin material worked on, and in connection with the saws 14 will provide a smooth, trimmed edge for the same. The members 6, 7, 11, 14 and 16 are removably mounted and held in their position on the rod 5 by the adjustment of the clamping nuts 21 associated with opposite ends of the rod. The formation of a cutter battery of a plurality of removable units enables the arrangement of the parts in such manner as to provide grooves to be formed in the material worked on, at different spaced parallel intervals and also enables the arrangement of the parts to form battery spacers of different widths.

To anchor the battery of cutters 7 within the respective T head slots 3, suitable anchoring screws 22 are passed through parallel openings 23 in the members 11, and are threaded into the body portion of the head 2, as in Fig. 1 of the drawings.

To surface and finish the material as the same is being trimmed and grooved, a surfacing knife or blade 24 is disposed in each of the channels 4 preferably adjacent one face thereof, the knives extending longitudinally of the head 2, with their cutting edge disposed in a plane slightly closer to the axis of rotation 25 of the head 2 than the plane of the points 10 of the grooving cutters 6, the difference in projection of the points 10 beyond the cutting edge of the blade providing the depth of the slots or grooves as formed in the material. The knives 24 are held in their respective recesses by blocks 26 secured in position by retaining screws 27 or other suitable means.

By observing Fig. 3, the operation of one of the batteries A on the material is as follows:— The cutter battery moving in the direction of the arrow Fig. 3 and overlying an endless conveyer 28 moving in the direction of its arrow, Fig. 3, and which carries a surfacing strip 29, mounts on said strip 29, a thin sheet of wood 30 approximately one-twelfth of an inch in thickness. The movement of the battery A and conveyer 28 in opposite directions causes the points 17 of the trimmer knives 16 and the teeth 15 of the trimmer saws 14 to trim excess material beyond a given width from the sides of the sheet 30 providing a member of a predetermined width. The points 10 of the grooving cutters 6, owing to the high speed of the head 2, form parallel grooves 31 in the upper surface of the member 30, and the cutting edge of the surfacing knives 24 plane or finish the upper surface of the member 30 so that on the member 30 passing completely beneath the cutter head, the same is trimmed to a given width, formed on its upper surface with parallel grooves, and its upper surface finished or planed so that said grooves will be of an even depth and an even surface will be provided for the finished battery spacer.

I claim:

1. A cutter for battery spacer making machines, the same consisting of a rotating head, a plurality of cutters arranged in parallel relation at spaced intervals about said head and each consisting of a plurality of spaced grooving cutter knives arranged in rows and disposed to extend radially of the head with their cutting edges in the same plane relative to the axis of rotation of the head, a trimmer knife disposed at each end of the respective rows of grooving cutter knives and arranged with their cutting edges in the same plane and projected slightly beyond the plane of the grooving cutter knives, a trimmer saw associated with each trimmer knife and a surfacing knife associated with said head between each row of cutters and disposed with its cutting edge in a plane closer to the axis of rotation of said head than the plane of the cutting edges of said grooving cutter knives.

2. A cutter for the described purpose comprising a support, a plurality of spaced grooving cutters removably mounted thereon and each consisting of a relatively flat plate provided with a cutting point at one lower corner, said points being arranged in alinement longitudinally of the support, a removable spacer associated with the support between each plate, a trimmer knife arranged at the opposite ends of the series of grooving cutters and each consisting of a relatively flat plate provided with a cutting point at one lower corner, said points projecting beyond the points of said grooving cutters, a trimmer saw removably carried by said support adjacent the inner face of each trimmer knife and disposed with their teeth projecting below the lower edge of said knives, and means for detachably securing said elements to said support.

3. A cutter for the described purpose comprising a supporting rod, a plurality of spaced grooving cutters arranged in a row and removably mounted thereon and each consisting of a relatively thin flat plate provided with an opening for receiving the support and provided with a cutting point at one lower corner, said plates being arranged on said support with said points in spaced parallel alinement, a spacer plate removably mounted on said support between each grooving cutter, a trimmer knife detachably mounted on said rod at opposite ends of said row of grooving cutters, and means for forcing said members together on said supporting rod to clamp the same thereon.

4. A cutter for the described purpose comprising a battery of spaced grooving cutters arranged in a row with their cutting edges in alinement, a pair of trimmer knives and saws arranged on the opposite ends of said row of cutters, a support for mounting said grooving cutters, trimmer knives and saws and means for detachably securing said elements in position on said support.

5. A cutter for the described purpose comprising a cutter head provided in its surface with an interlocking slot, cutter members for detachably mounting on said head through longitudinal movement in said slot, the same comprising a plurality of relatively flat slotted plates provided at one corner with a cutting point and adapted for arrangement in alinement with the cutting points of the other plates, a supporting rod extending through the slots in said plates, means associated with said rod for clamping the plates together, and means passing radially through certain of said plates for engaging said cutter head to prevent longitudinal movement of the secured series of cutter plates longitudinally of their associated interlocking grooves.

6. A cutter for battery spacer making machines, the same consisting of a rotating head, a plurality of cutters arranged in parallel relation at spaced intervals about said head and each consisting of a plurality of spaced grooving cutter knives arranged in rows and disposed to extend radially of the head with their cutting edges in the same plane relative to the axis of rotation of the head, a plurality of trimmer knives arranged with their cutting edges in the same plane and projecting slightly beyond the plane of the grooving cutter knives, and a surfacing knife associated with said head between each row of cutters and disposed with its cutting edge in a plane closer to the axis of rotation of said head than the plane of the cutting edges of said grooving cutter knives.

In testimony whereof I have signed my name to this specification.

JAMES W. BUCKHART.