Jan. 27, 1953 G. H. CHAMBERLAIN 2,626,665

DEVICE FOR TRIMMING SHEET MATERIAL

Filed Jan. 30, 1948 2 SHEETS—SHEET 1

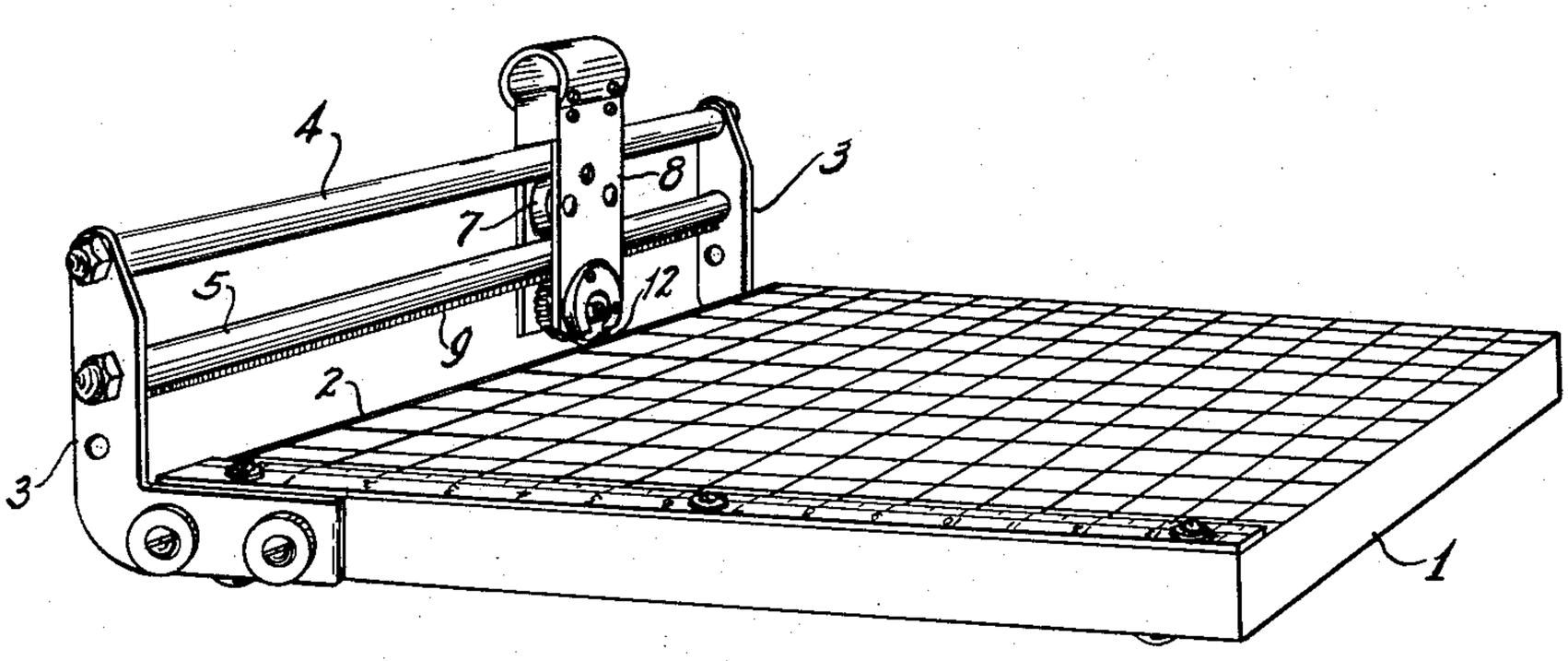

FIG. 1

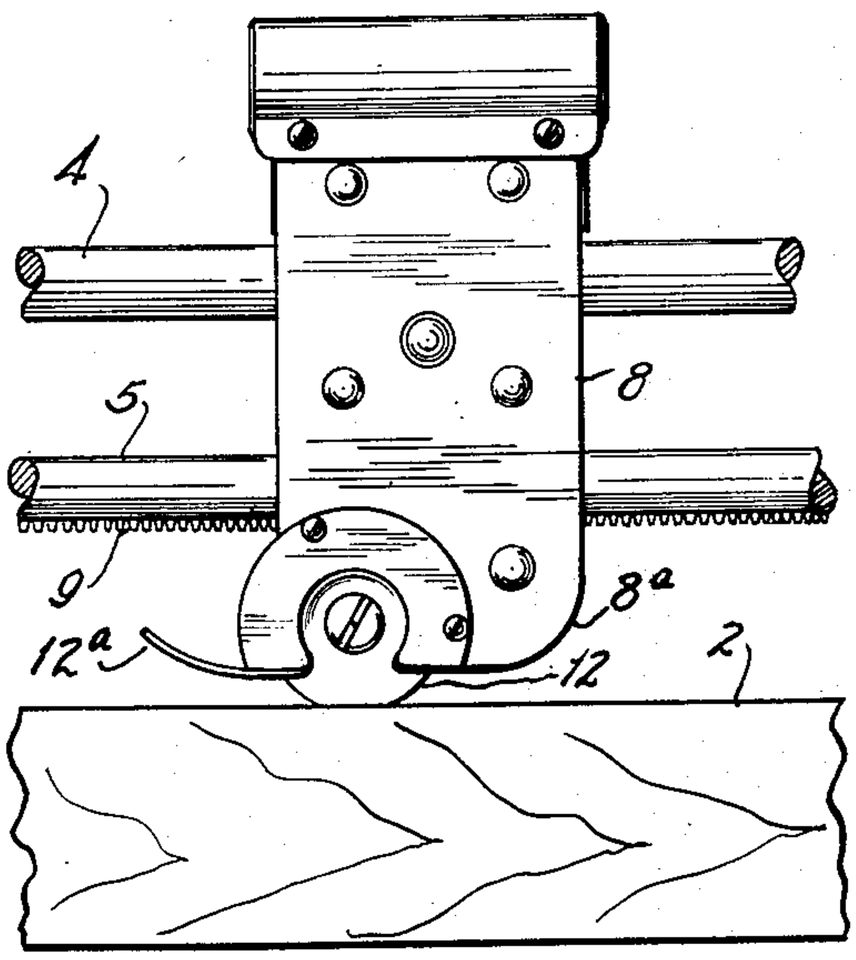

FIG. 2

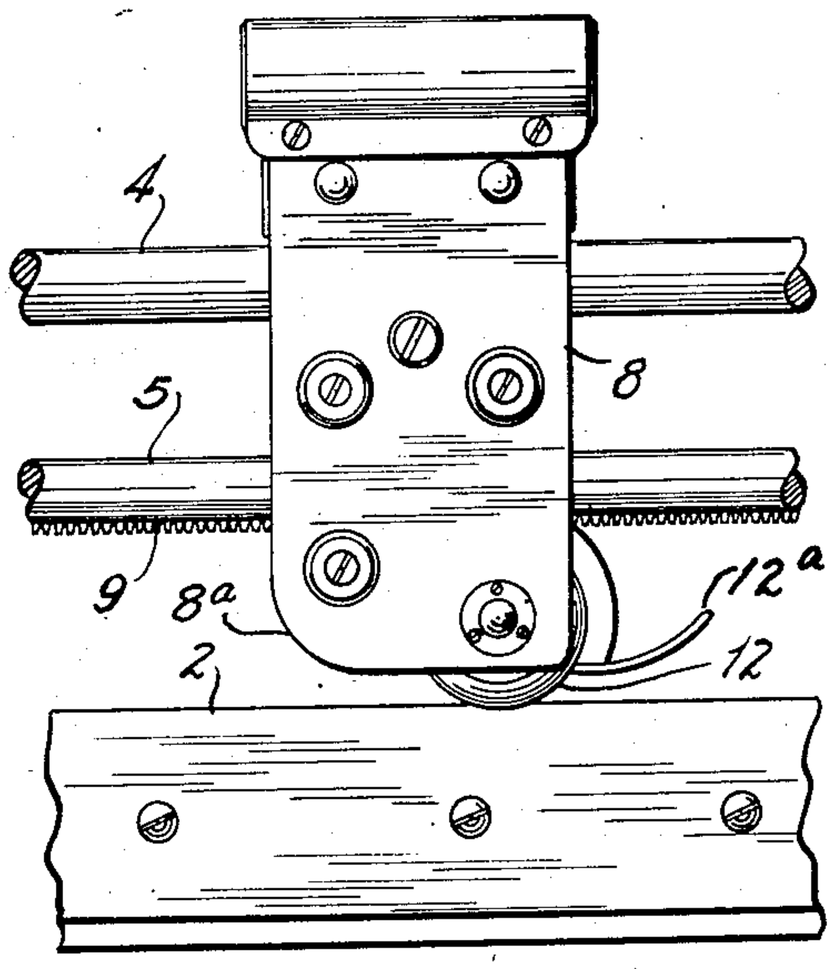

FIG. 3

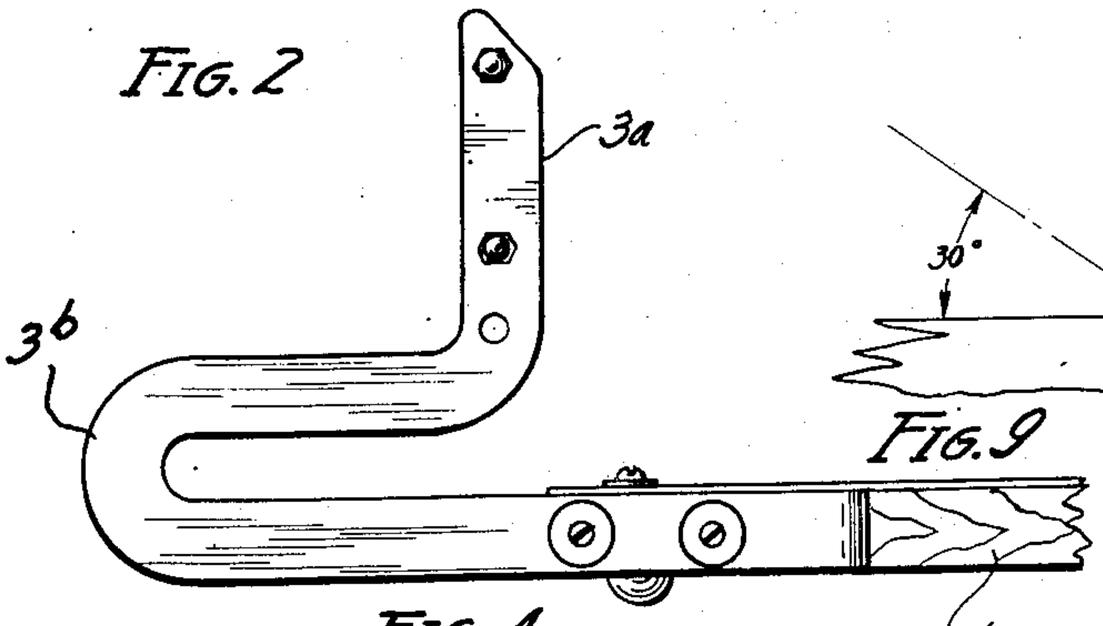

FIG. 4

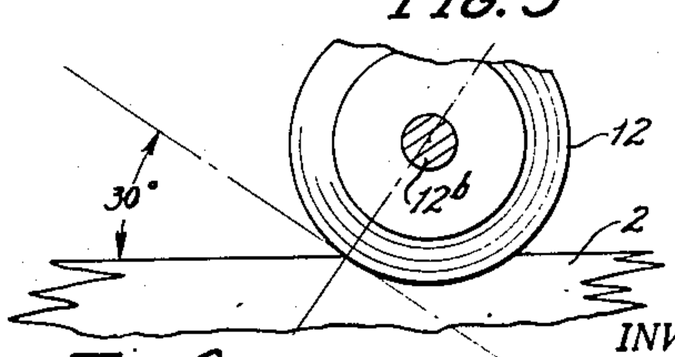

FIG. 9

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DEVICE FOR TRIMMING SHEET MATERIAL

Filed Jan. 30, 1948 2 SHEETS—SHEET 2

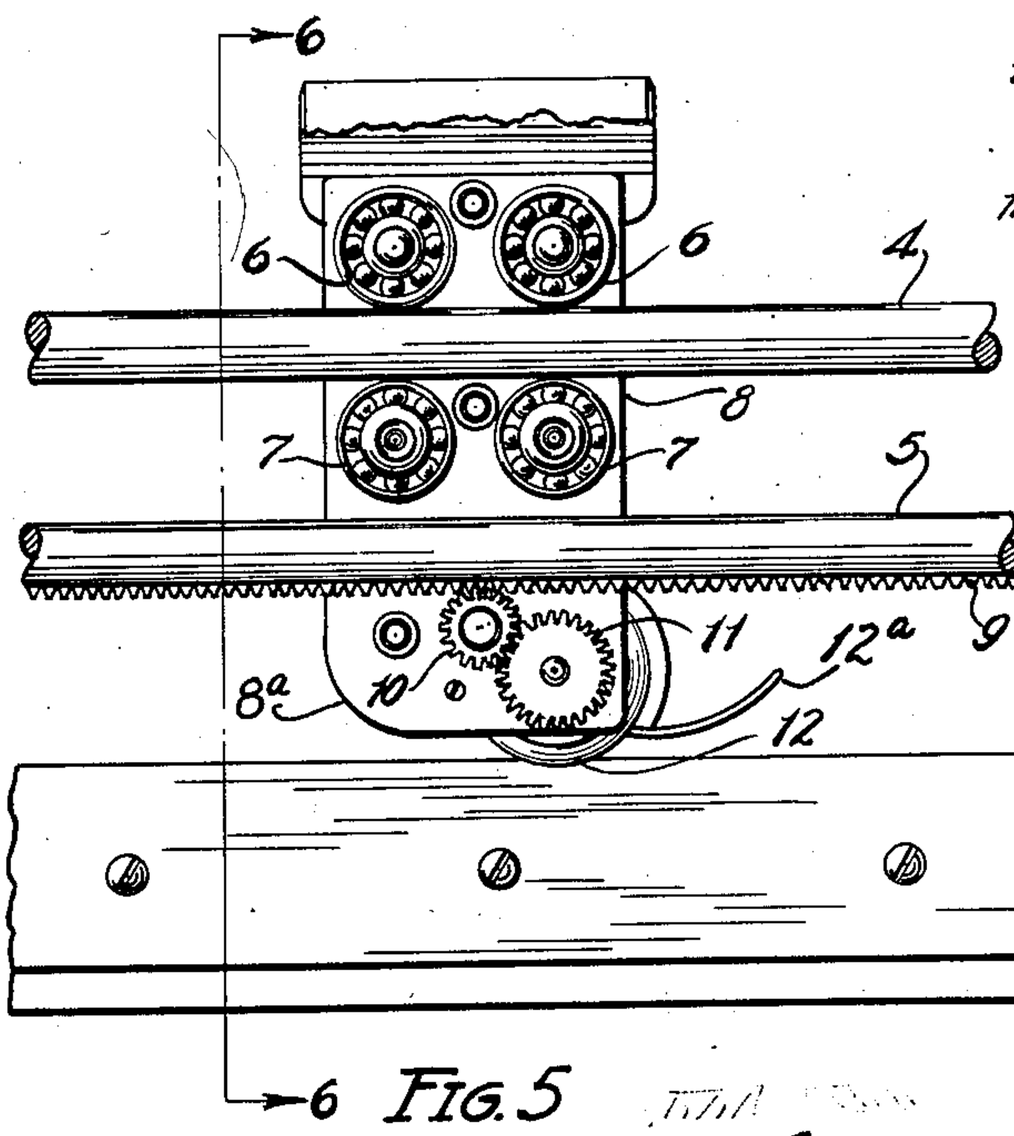

FIG. 5

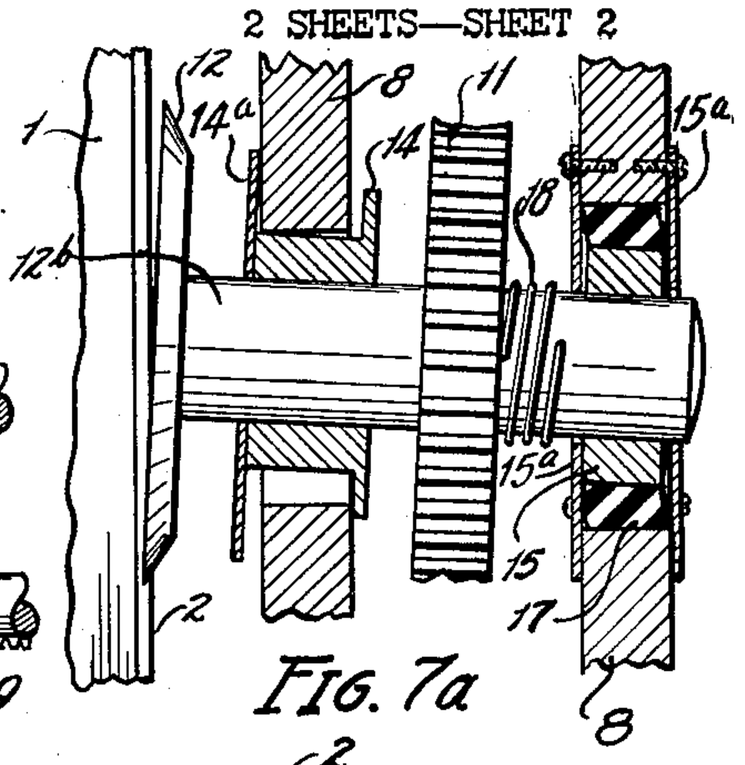

FIG. 7a

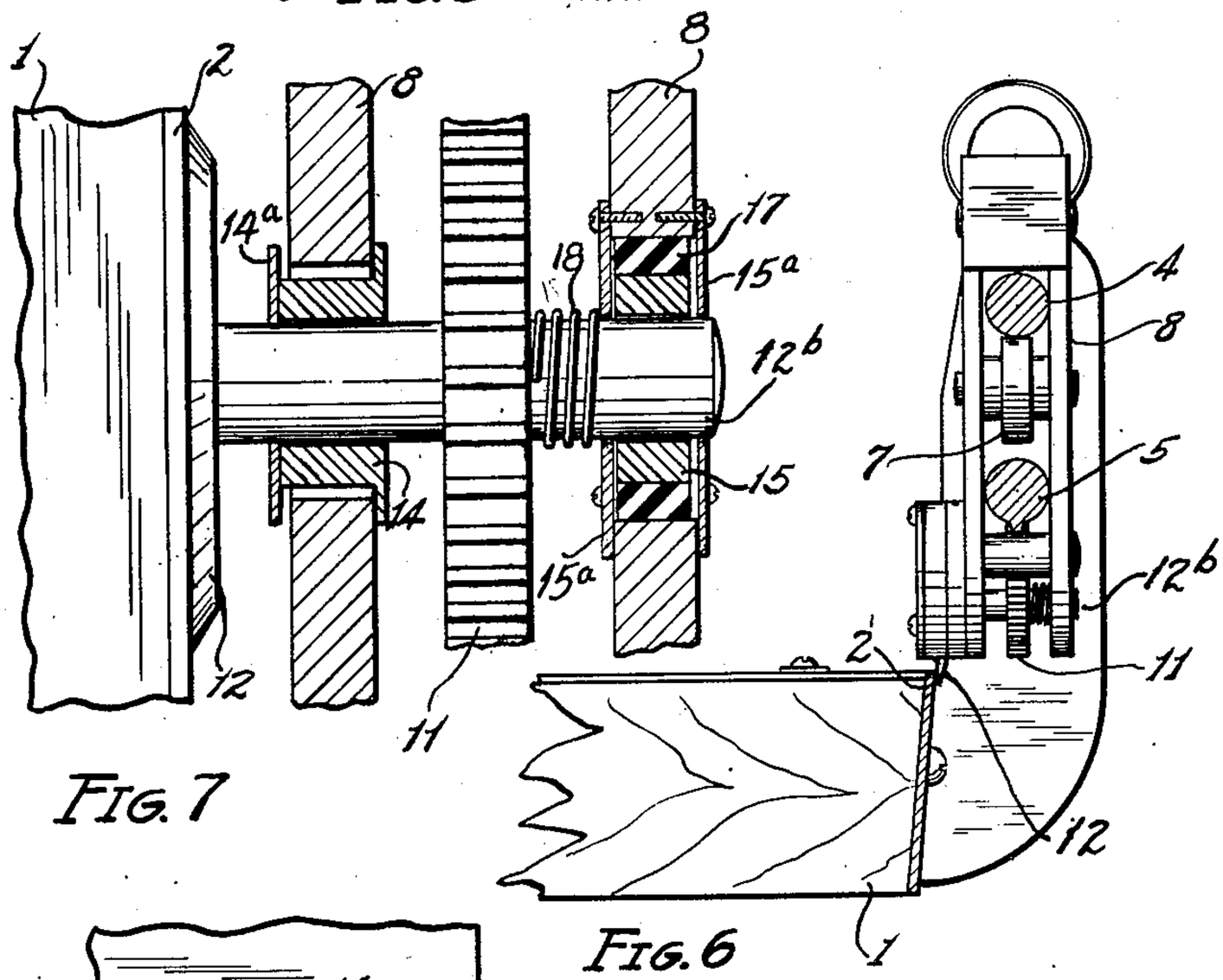

FIG. 7

FIG. 6

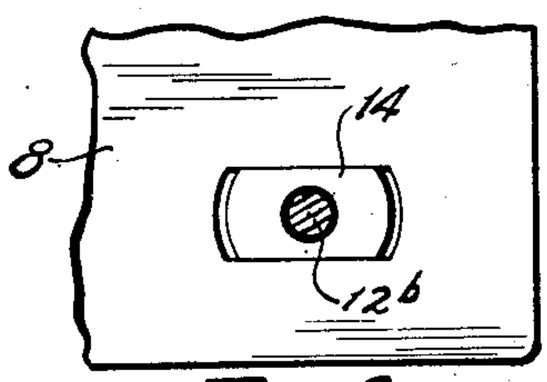

FIG. 8

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UNITED STATES PATENT OFFICE

2,626,665

DEVICE FOR TRIMMING SHEET MATERIAL

George H. Chamberlain, San Jose, Calif.

Application January 30, 1948, Serial No. 5,237

8 Claims. (Cl. 164—77)

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This invention relates to the art of devices for trimming paper and other sheet material.

My present device is an improvement upon the old and familiar type of paper trimmer in which a cutting blade is pivotally mounted at one corner of a trimming board and which is adapted to be lowered along the cutting edge of the board for the trimming operation, the paper being received between the edge of the board and the edge of the cutting blade. Such a device has proved rather dangerous to the fingers of the user and, too, the cutting action is not constant throughout the entire operation because of the varying angle which the cutting blade bears to the cutting edge of the board as the knife is lowered towards the board. There are other deficiencies or limitations which characterize this type of trimming device, as may appear by comparison with my present improved form of invention.

There have already been attempts to provide a device for trimming paper and other sheet material, in which the cutting member may be moved in a straight line along the cutting edge of the board, as instanced in the patent to Silver, No. 2,327,223, August 17, 1943, and my present invention is an improvement upon this particular type of device.

One object of my present invention is to devise such a trimmer with improved means for mounting the carriage upon which the rotary cutter is supported.

Another object is to devise such a trimmer with means whereby a long or continuous strip of sheet material may be passed through the device in such manner as to permit a substantial width of the material to be cut therefrom.

Another object is to devise such a trimmer with means whereby there may be obtained an angular relation between the rotary cutter and the cutting edge of the board in either direction of movement of the carriage upon which the cutter is mounted.

Another object is to devise such a trimmer which is adapted to ensure the proper introduction of the sheet material into effective engagement between the cutter and the edge of the board so as to thereby overcome the natural tendency of the sheet material to curl in some instances.

Another object is to devise such a trimmer in which the rotary cutter bears most efficient shear angle with respect to the straight edge of the board.

Another object is to devise such a trimmer in which the rate of circumferential speed of the rotary cutter is substantially the same as the rate of rectilinear movement of the cutter bodily along the straight edge of the board.

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Other objects will appear from the following description and claims when considered together with the accompanying drawing.

Fig. 1 is a perspective view of my present form of device;

Fig. 2 is a front elevation of a part of the device;

Fig. 3 is a rear elevation of the same part of the device;

Fig. 4 illustrates a goose-neck form of bracket which is a modification of the form illustrated in Fig. 1;

Fig. 5 is a view corresponding to Fig. 3 but with part of the carriage broken away in order to show more clearly the interior construction;

Fig. 6 is a view taken on line 6—6 of Fig. 5;

Fig. 7 is an enlarged transverse sectional view of the lower part of the carriage and indicates the position of the parts in idle condition;

Fig. 7*a* is a view similar to Fig. 7 except that it indicates the angular relation of the cutter disk with respect to the straight edge as the carriage is moved therealong;

Fig. 8 indicates the form and manner of mounting the front bearing of the shaft of the cutter disk; and

Fig. 9 illustrates the shear angle between the cutter disk and the straight edge upon the board.

It is to be understood that the present form of disclosure is merely for the purpose of illustration and that there might be devised various modifications thereof without departing from the spirit of my invention as herein set forth and claimed.

In one form of my present invention, the graduated trimming board 1 has the straight cutting blade 2 mounted thereupon with a slight pitch outwardly and upwardly; and upon the upright parts of the brackets 3 there are fixedly mounted the two rails 4 and 5 which extend parallel to each other and to the cutting edge 2, the brackets 3 being mounted at the two ends of the straight edge 2. The slight pitch of the blade 2 is illustrated in Fig. 6 of the present drawing, the idea being to ensure proper clearance for the cutting operation. The upper rail 4 is plain and is adapted for supporting engagement as well as rolling engagement by the pairs of rollers 6 and 7 above and below the rail, these rollers being provided with bearings within the same for ease of operation. These rollers are mounted upon the carriage 8 which is supported entirely upon

the upper rail 4 and not upon the lower rail 5.

The lower rail 5 serves to maintain the carriage in upright position and the lower side of the lower rail 5 is provided with a rack 9 for cooperative engagement with the pinion 10 which is rotatably mounted upon the carriage 8 and which has meshing engagement with the gear 11 which, in turn, is rotatably mounted upon the carriage 8. Upon the shaft of the gear 11 there is fixedly mounted the cutting disk 12 which is adapted for operative engagement with the straight edge 2 of the board 1. The curved shoe 12*a* will serve to lead the sheet material into proper engagement with the cutter 12 so as to overcome the tendency of the material to curl, as for instance paper. Also, the bottom corners of both plates of the carriage 8 are curved so as to serve the same purpose upon the other side of the cutter 12, as indicated by reference numeral 8*a*.

The carriage 8 comprises front and rear walls between which the rollers and rotary cutter are mounted. The shaft 12*b* of the rotary cutter 12, near the cutter end thereof, is capable of lateral adjustment so as to permit the cutter shaft to assume a slight angle or inclination with respect to the straight edge 2, as illustrated in Fig. 7*a*; and the rear end of the cutter shaft is mounted in such manner in the rear wall of the carriage to permit such angular adjustment. The bronze bearing 14 of the front end of the cutter shaft is mounted in a rectangular opening in the wall of carriage 8 in such manner as to be capable of lateral movement, as indicated in Fig. 8; while the bronze bearing 15 at the rear end of the cutter shaft may be mounted in an annular rubber housing or bushing 17 in the wall of carriage 8 so as to permit such adjustment. This adjustment, in all probability, will amount to not more than approximately .005 inch which is not enough to interfere with proper mounting of the cutter shaft and yet is sufficient to permit the desired angular adjustment of the rotary cutter when the carriage is moved in either forward or rearward direction. In order to maintain the parts in proper assembly during such adjustment in either direction, the bearing 14 has a flange at the rear side thereof and an annular retainer disk 14*a* at the front side thereof; and the other wall of carriage 8 has thrust washers or disks 15*a* secured thereto for the bearing 15.

A coil spring 18 may be provided upon the shaft of the rotary cutter 12, within the carriage 8, so as to tend to force the flat surface of the cutter forwardly into operative engagement with the cutting edge 2 of the board 1. One end of this spring has abutment against one of the disks 15*a* while the other end of the spring abuts against gear 11 on the shaft of the rotary cutter 12. Thus the shaft 12*b*, so far as its manner of engagement is concerned, has a virtually floating arrangement.

I have found that the maximum shearing efficiency is obtained when the circumferential speed of rotation of the cutter 12 is equal to the rate of horizontal travel of the cutter disk bodily along the straight edge 2. Or, the rotation of the cutter disk 12 may be geared up a little in order to produce a slight climbing effect with respect to the sheet material which is being trimmed, although it may be said to be substantially the same as that of the horizontal travel of the cutter disk.

Also, I have mounted the cutter disk 12 in such

manner that it will make a shearing angle of approximately thirty (30) degrees with respect to the straight edge 2, as illustrated in Fig. 9 of the present drawing. This feature, together with that last referred to herein, constitutes means of producing the maximum shearing efficiency. The cutter disk may have a beveled edge, as shown.

Instead of the regular form of brackets 3, as illustrated in Fig. 1 of the present drawing, I may substitute the brackets 3*a* each of which has a goose-neck 3*b*, the edge portion of the sheet material being placed in the slots afforded by the goose-neck shape of these brackets. This is for the purpose of cutting long or continuous strips of sheet material up to the depth of the goose-neck slots. That is to say, when the sheet material is longer than the board 1, it can be conveniently cut with my present device and the depth of the slots afforded by the goose-neck determines the width of the cut.

With my present device, effective trimming may be performed with equal degree of efficiency by moving the carriage either forwardly or rearwardly and with the rotary cutter disk bearing the desired and effective angle of inclination with respect to the straight edge 2 of the board as the cutter travels in either direction. The goose-neck will permit a substantial width of cut from a long or continuous strip of sheet material. The mounting of the carriage 8 entirely upon the upper rail and the operative connection between the rotary cutter and the lower rail exclusively, constitutes a substantial improvement which ensures efficient and dependable operation. Other marked improvements reside in the angle of the rotary cutter with respect to the straight edge 2 and the relative rates of travel of the rotary cutter itself and the carriage upon which the cutter disk is mounted, these features serving to produce the maximum shearing efficiency.

What I claim is:

1. A trimmer comprising the combination with a board and a shear strip thereon, of upper and lower parallel rails, the one above the other, extending parallel to the edge of said shear strip, a carriage with rotatable means for slidably supporting the same upon the upper one of said rails, a rack upon the lower one of said rails, a pinion rotatably mounted upon said carriage and having operative engagement with said rack, a rotatable cutter adapted for operative engagement with said cuting edge, a bearing mounted upon said carriage for said cutter, said cutter having a shaft mounted for rotatable adjustment about a vertical axis within said bearing so as to effect an inclination of said cutter with respect to said shear strip in either direction of its movement along said shear strip, said cutter having a gear mounted upon its shaft for meshing enagement with said pinion.

2. A trimmer comprising the combination with a board and a shear strip thereon, of brackets mounted at the ends of said shear strip, rail means mounted upon said brackets and extending parallel to the cutting edge of said shear strip, a carriage slidably mounted upon said rail means, a rotatable cutter mounted upon said carriage and being adapted for operative engagement with said cutting edge, and said brackets being formed with goose-neck portions beyond and away from the cutting edge of said shear strip so as to permit the sheet material which is to be cut, to be extended beyond the cutting edge

of said shear strip a distance corresponding to the depth of the goose-neck portions.

3. A trimmer comprising the combination with a board and a shear strip thereon, of upper and lower parallel rails, the one above the other, extending parallel to the edge of said shear strip, a carriage with rotatable means for slidably supporting the same upon the upper one of said rails, a rack upon the lower one of said rails, a pinion rotatably mounted upon said carriage and having operative engagement with said rack, a rotatable cutter adapted for operative engagement with said cutting edge, means rotatably adjustable about a vertical axis for mounting said cutter in said carriage so as to effect an inclination of said cutter with respect to said shear strip in either direction of its movement along said shear strip, said cutter having a gear mounted upon its shaft for meshing engagement with said pinion.

4. A trimmer comprising the combination with a board and a shear strip thereon, a carriage, means for mounting said carriage for slidable movement along a path parallel to said shear strip, a rotatable cutter adapted for operative engagement with said shear strip, and means rotatably adjustable about a vertical axis for mounting said cutter in said carriage so as to effect an inclination of said cutter with respect to said shear strip in either direction of its movement along said shear strip.

5. A trimmer comprising the combination with a board and a shear strip thereon, bracket means mounted upon said board in the region of said shear strip, rail means mounted upon said bracket means and extending parallel to said shear strip, a carriage slidably mounted upon said rail means, a rotatable cutter mounted upon said carriage and being adapted for operative engagement with said shear strip, and said bracket means being of goose-neck form beyond and away from the edge of said shear strip so as to permit the sheet material, which is to be cut, to be extended beyond the edge of said shear strip a distance corresponding to the depth of the goose-neck of said bracket means.

6. A trimmer comprising the combination with a board and a shear strip thereon, of upper and lower parallel rails, the one above the other, extending parallel to the edge of said shear strip, a carriage having slidable supporting engagement with only the upper one of said rails, a rack upon only the lower one of said rails, a rotatable cutter mounted in said carriage and being adapted for operative engagement with said shear strip, said cutter having operative connection with said rack for rotation of said cutter, and said mounting for said cutter including means for movability about a vertical axis so as to effect an inclination of said cutter with respect to said shear strip in either direction of its movement along said shear strip.

7. A trimmer comprising the combination with a board and a shear strip thereon, a carriage, means for mounting said carriage for slidable movement along a path parallel to said shear strip, a rotatable cutter mounted upon a shaft in said carriage for operative engagement with said shear strip, the mounting of said shaft including forward bearing means in the region of said cutter for permitting only lateral adjustment so as to permit said cutter to assume angular relation to said shear strip in either direction of operative movement of said carriage along said shear strip, and automatically adjustable bearing means in the region of the other end of said shaft for permitting such lateral adjustment of the forward end thereof, and spring means for effecting yieldable engagement of said cutter with said shear strip at all times.

8. A trimmer comprising the combination with a board and a shear strip thereon, of brackets mounted at the ends of said shear strip, rail means mounted upon said brackets and extending parallel to the cutting edge of said shear strip, a carriage slidably mounted upon said rail means, a rotatable cutter mounted upon said carriage and being adapted for operative engagement with the cutting edge of said shear strip, and the lower parts of said brackets in the plane of said board being laterally off-set beyond the cutting edge of said shear strip so as to permit the sheet material, that is to be trimmed, to be extended beyond the cutting edge of said shear strip a distance corresponding to the extent of said off-set.

GEORGE H. CHAMBERLAIN.

REFERENCES CITED

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

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Number	Name	Date
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