

[54] **CUTTING DEVICE FOR ELASTOMERIC SHEET MATERIAL**

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[52] U.S. Cl. **83/409; 83/451; 83/527; 83/562; 83/564; 83/614; 83/581**

[51] Int. Cl.² **B26D 5/10**

[58] Field of Search **83/614; 83/581; 83/409, 83/451, 527, 562, 564**

[56] **References Cited**

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Primary Examiner—J. M. Meister

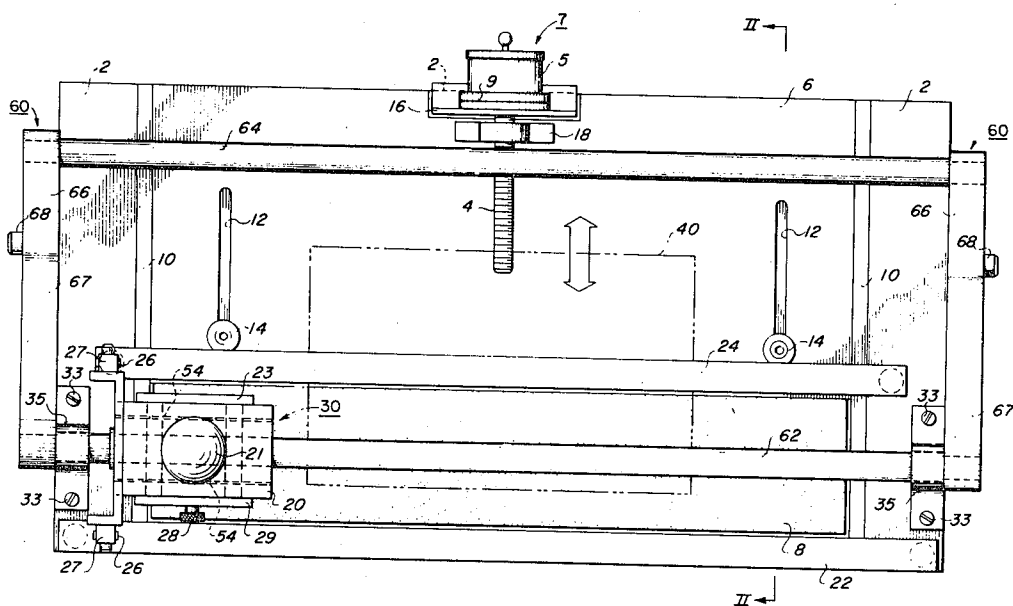
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[57]

ABSTRACT

A cutting apparatus for elastomeric sheet material is disclosed. It is adapted to cut the sheet material along a linear cut and is so constructed that the elastomeric material cut thereby is free of waves, nicks and other deformities. The apparatus comprises a frame, a base plate attached to the frame and having means for securing sheet material to be cut thereto and a cutting blade assembly slidably mounted on a support shaft, said shaft preferably being movable so that the heavy cutting head can be placed in a cutting position relative to the sheet material and the cutting members in the cutting head can thereby engage and disengage the sheet material as desired. Spaced guide members are mounted upon the cutting assembly and engage suitable guide rails mounted upon the frame of the cutting device.

15 Claims, 8 Drawing Figures



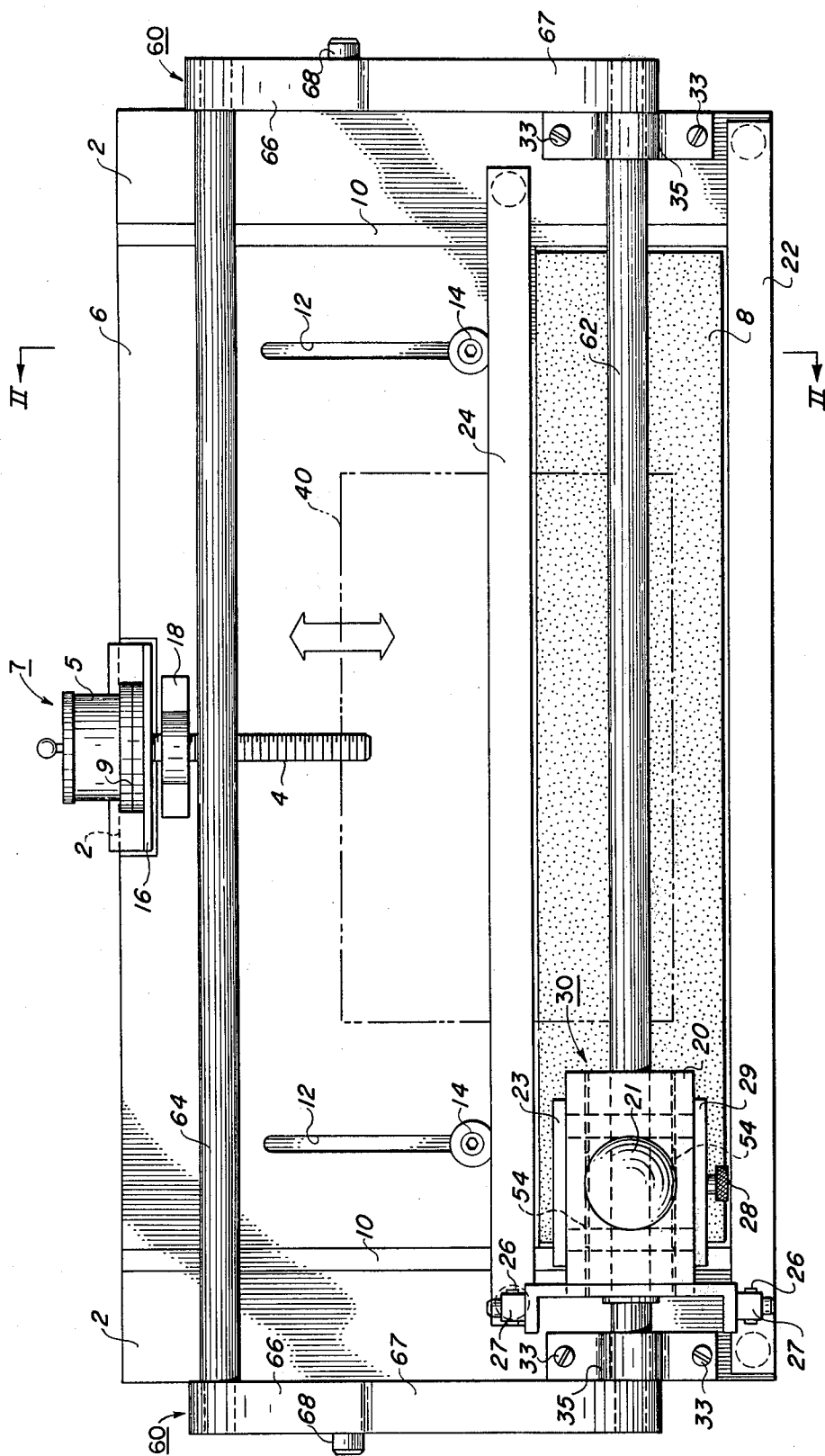


FIG. 1

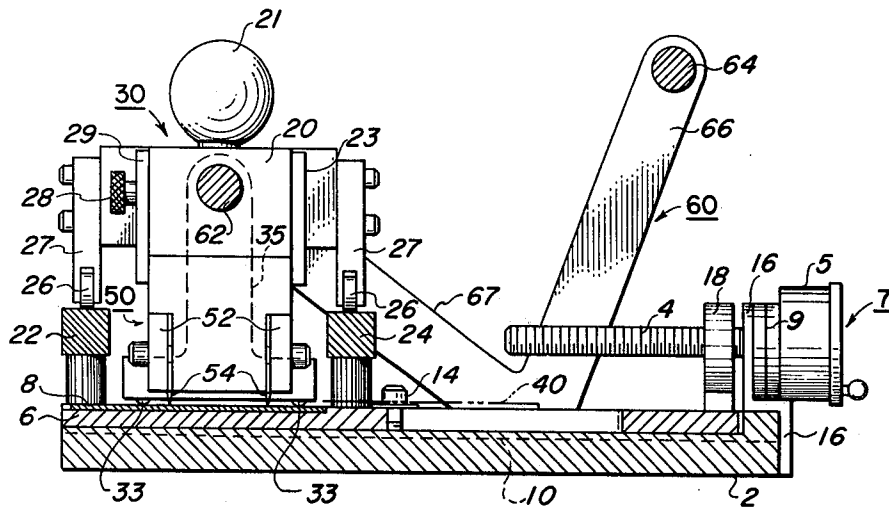


FIG. 2

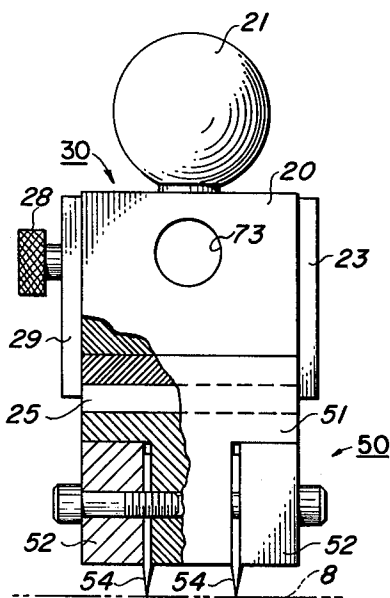


FIG. 7

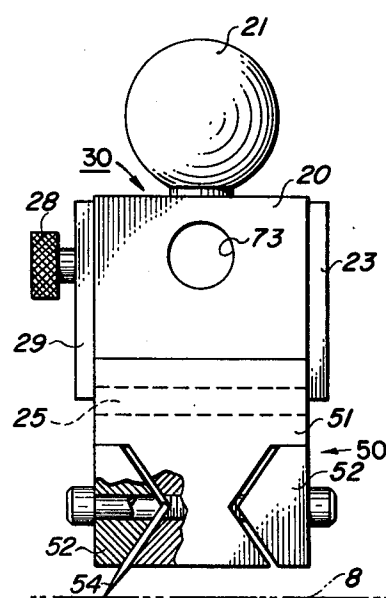


FIG. 8

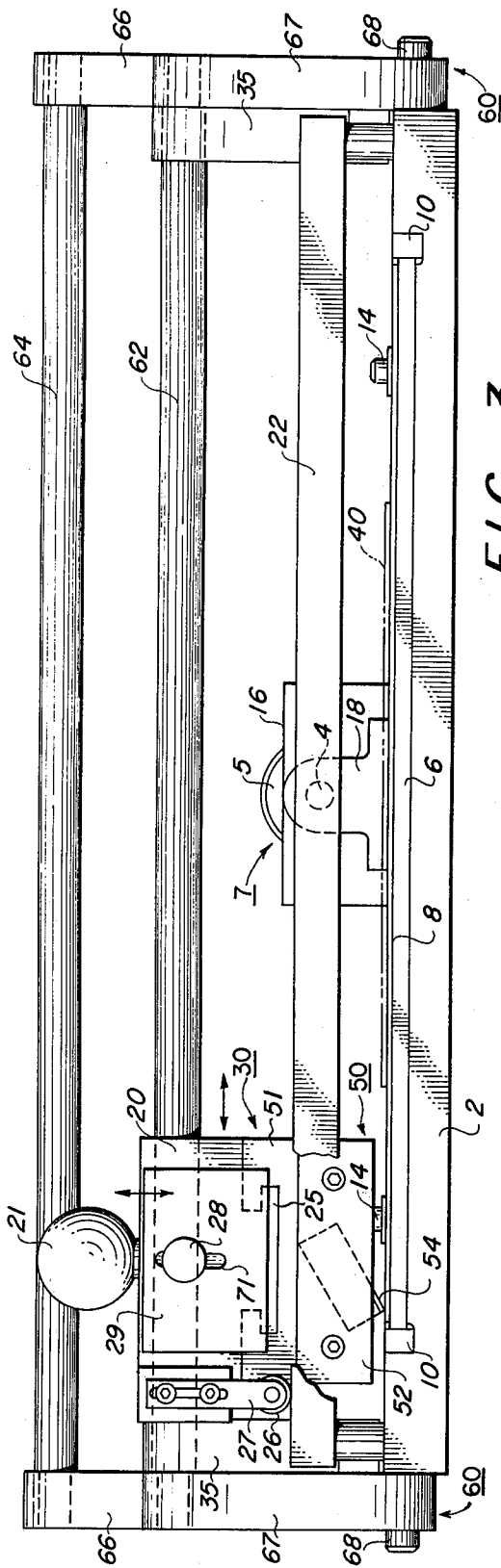


FIG. 3

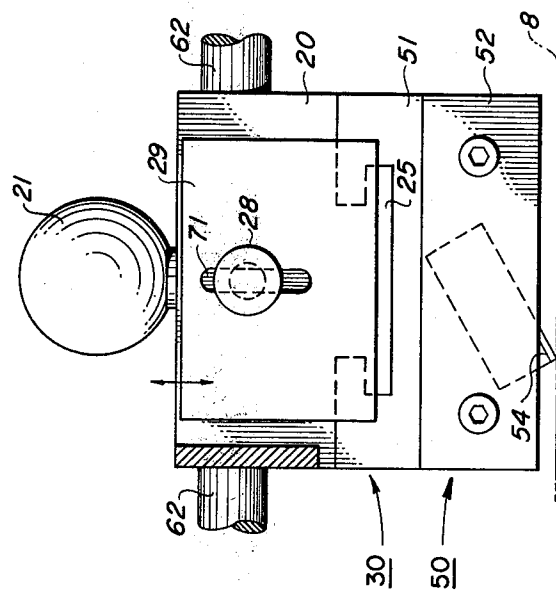


FIG. 6

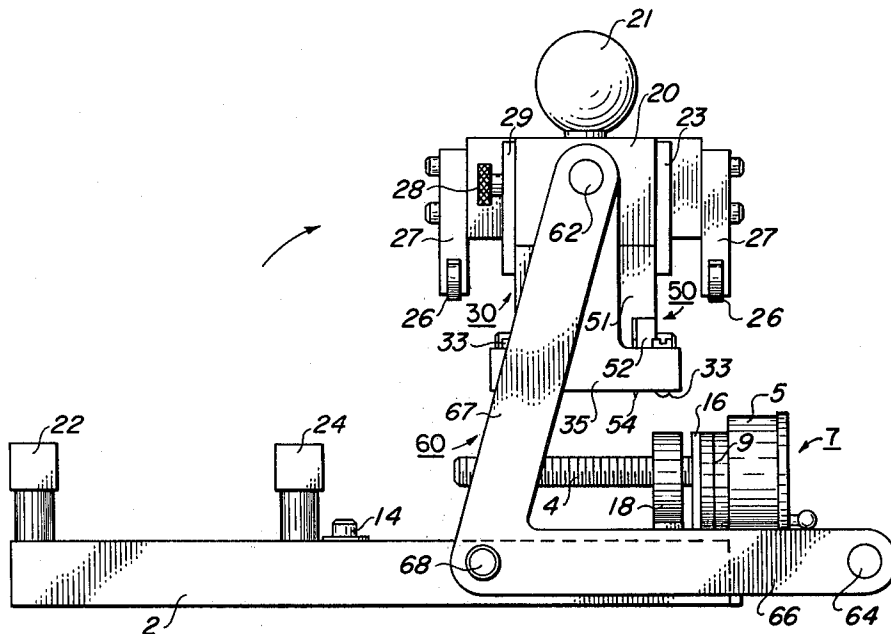


FIG. 4

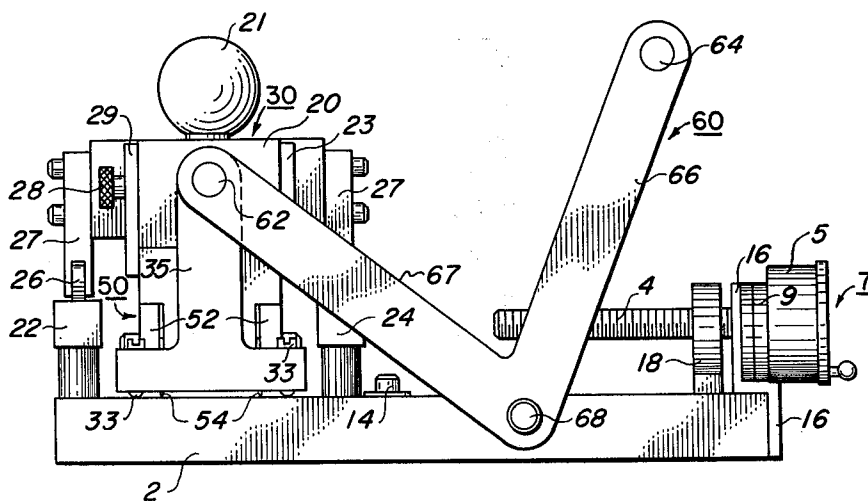


FIG. 5

CUTTING DEVICE FOR ELASTOMERIC SHEET MATERIAL

BACKGROUND OF THE INVENTION

This invention relates to an apparatus for cutting sheet material and more particularly to a device for cutting relatively thick sheets of elastomeric material along a linear cut. In a preferred embodiment the device is particularly directed to cutting wiper, cleaning and doctor blades for sheets of flexible elastomeric material.

Wiper, cleaning and doctor blades useful in xerographic copiers are generally made of flexible elastomeric material and have thicknesses ranging from about 1.0 mm to 2.0 cm or more. The blades must have a working edge with a very small radius of curvature and must be free of nicks, wavy cut lines and other deformities so that they can be used in the removal of residual toner and developer in xerographic devices. Blades are currently made by various molding techniques, for example, compression molding, by cutting from flexible sheet materials of the desired thickness, and the like, however, present techniques and devices do not fulfill all of the standards imposed for the manufacture of such blades. For example, molding blades formed in molds in a conventional molding press have a considerable end-to-end variation in thickness, and edge molding radius (radius of curvature) of about 0.009 inch (0.23 mm), and a deformed surface due to "flash" occurring at the top surface in the mold.

Cutting devices of the prior art are insufficient because they promote uneven or wavy working edges on the sheet materials which they cut, and they create nicks, grooves and other deformities on the cut edge. Furthermore, it is difficult to cut the cleaning edge of the blade parallel, and the cleaning or working edge of the blade has a very large radius of curvature when the prior art cutting devices are used. Most of the prior art cutting devices are insufficient because they are designed for cutting such sheet materials as wall paper, plastic wall covering, upholstery fabric and the like. These devices lack the stability to provide working edges free of wavy cut lines, nicks and other deformities in the precision working edges required for elastomeric blades. One such sheet material cutting apparatus is described in U.S. Pat. No. 3,779,121 issued Dec. 18, 1973, where there is described a cutting blade detachably secured to a movable member which is arranged for movement over a rectilinear guide member that is fixed to a support, and this movable member is comprised of a double piston which is mounted to slide in a tube. In the cited patent the tube is longitudinally slotted to receive a part of the movable member and this part extends outside the tube and carries the cutting blade. In another form, the guide member in the cited patent is constituted by a rail on which slides a carriage that comprises the movable member and carrying the double piston for alternate engagement by its two ends in two cylinders that are arranged at the two ends of the rail. The above described device is suitable for cutting a sheath of plastics materials used for manufacturing bags, but is deficient in the necessary stability required for manufacturing cleaning, doctor and wiper blades having a minimal radius of curvature and free from nicks, wavy cut lines and other deformities.

OBJECTS OF THE INVENTION

Accordingly, it is the principal object of this invention to provide a cutting apparatus for cutting sheet material along a linear line.

It is another object of this invention to provide a cutting apparatus for cutting wiper, doctor and cleaning blades from elastomeric sheet material for use in xerographic copiers.

A further object of this invention is to provide a sheet cutting device which is capable of cutting an elastomeric sheet material so that the cut, working edge has a very small radius of curvature.

A further object of this invention is to provide an elastomeric sheet cutting apparatus which cuts a relatively thick sheet of elastomer so that the cut edge is free of wavy cut lines or vibration lines, nicks and other deformities.

A further object of the instant invention is to provide a cutting device for cutting doctor blades, wiper blades and cleaning blades from a sheet of elastomeric material so that the cleaning edge of the resultant blade is cut parallel, is free of waves and nicks and has a very small radius of curvature.

A further object of this invention is to provide a cutting device for the manufacture of blades from elastomeric materials, which device eliminates end-to-end variation in thickness, unsuitable molded edge radius and deformities on the top surface of the blade.

SUMMARY OF THE INVENTION

These and other objects are accomplished by providing an apparatus having a frame; mounting means on said frame for securing a material to be cut; and a relatively heavy cutting assembly slidably mounted on a linear support shaft, said linear support shaft being affixed to said frame and extending in a direction parallel to the direction of the desired cut. Spaced guide members are mounted upon the cutting assembly and engage suitable guide rails mounted upon the frame. In another embodiment, the cutting head is pivotally mounted on the shaft, and the shaft is mounted upon support arms which are pivotally attached to the frame so that the cutting head having at least one cutting member can be placed in a cutting position relative to the sheet material to be cut, and the cutting member can thereby engage and disengage the sheet material as desired. The apparatus is unique in that there is provided a cutting device which can cut elastomeric sheet material not only at right angle edges but also at beveled angles in thicknesses of up to 0.250 inch (6.35 mm) or greater while retaining precision cut edges, even though the device comprises many movable and retractable parts. By "precision cut edge" is meant an edge free of nicks, wavy cut lines or vibration lines, and other deformities and a cut working edge having a radius of curvature of a few microns or less and preferably less than 1 micron.

The device is designed to make linear cuts and as used herein "linear cuts" is defined as straight line cuts. The cutting assembly can make rectilinear cuts, that is cuts which are perpendicular to the surface of the sheet materials, or straight-line bevel-edged cuts, that is, cuts which are less than or greater than 90° relative to the surface of the sheet material.

Other objects and advantages of the present invention will become apparent when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of the cutting apparatus wherein the cutting assembly is disposed in a cutting position for cutting sheet material attached to a sliding table.

FIG. 2 is an end view representing a transverse sectional view taken on the line II—II of FIG. 1.

FIG. 3 is a front sectional view of the cutting apparatus showing the cutting assembly with a cutting blade in the cutting position.

FIG. 4 is a side cross-sectional view showing the cutting assembly with the cutting member in the disengaged position with a view of the pivoted support arms.

FIG. 5 is a side cross-sectional view with the cutting member engaged in the cutting position and showing the pivoted support arms of the carriage mounting assembly.

FIG. 6 is a front cross-sectional view of the cutting assembly showing the details of the cutting head mounted upon the cutting head carriage.

FIG. 7 is a partial cut-away end cross-sectional view of the cutting head carriage with dual cutting members positioned to cut sheet material at a 90° (right) angle.

FIG. 8 is a partial cut-away end cross-sectional view of a cutting assembly having a cutting member mounted in the cutting head to cut sheet material at a beveled angle.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In a preferred embodiment, there is described a cutting apparatus for making precision linear cuts of elastomeric sheet material comprising a frame; a movable base plate within the frame and having mounting means thereon for securing sheet material on the surface thereon in a cutting position so that a linear cut can be made in the sheet material secured thereto; means for moving base plate; at least two spaced apart guide rail members attached to the frame and extending parallel in the linear direction of the cut to be made in sheet material mounted upon the movable base plate; a cutting assembly slidably and pivotally mounted upon a cylindrical support shaft; and means for moving the cutting assembly on the support shaft. Preferably, the cutting assembly comprises a cutting head having at least one cutting member (a blade) therein; a cutting head carriage adapted to mount pivotally and slidably upon the cylindrical support shaft, the cutting head carriage being adapted to receive and secure the cutting head. The cylindrical support shaft extends parallel with the linear cut to be made in sheet material mounted upon the base plate and located in a position to support and guide the cutting member along the linear cut to be made in sheet material mounted upon the movable base plate when the cutting assembly is in a cutting position. The cylindrical support shaft is secured to the frame by two pivoted support arms attached to a pivot point to the frame one at each end of the support rod. An orifice or opening is provided in the cutting head carriage so that the cutting head carriage can be pivotally and slidably mounted upon the cylindrical support shaft. In its preferred form, the cutting head carriage in contact with the cylindrical support shaft comprises a metal different from the metal of the support shaft thereby forming a bimetallic bearing. Additional rigidity is imparted to the movable support shaft by having at least one support foot pivotally

mounted at each end of the support shaft and adapted to engage the frame when the cutting assembly is in a cutting position, the support foot having adjustment means for raising and lowering the cylindrical support shaft relative to the movable base plate. At least two guide wheels are adjustably secured to the cutting head carriage and adapted to engage the spaced apart guide rail members when the cutting assembly is in a cutting position.

Referring to the drawings in which the various elements are indicated by numerals, there is illustrated the cutting apparatus of the present invention adapted to be used in making precision linear cuts of sheet materials, preferably elastomeric sheet materials used in making wiper, cleaning and doctor blades. Examples of the sheet materials which can be precision cut by the apparatus of the present invention include polyurethane, synthetic and natural rubber, neoprene, high molecular weight polyethylene, and other polymeric and copolymeric elastomeric materials. Precision cuts can be made in sheet materials at almost any desired thickness, however, in the cutting of elastomeric sheet materials for cleaning, doctor and wiper blades the preferred thickness of the sheet material is about 0.020 inch (0.50 mm) to about 0.250 inch (6.35 mm).

Referring to FIG. 1, frame 2 is essentially a stationary base plate. Within frame 2 and supported thereby is movable base plate 6 which may also be described as a sliding table. Mounting means 8 is provided on movable base plate 6 for securing at least a portion of sheet material 40 to movable base plate 6, preferably at least that portion of sheet material 40 which is being cut by cutting assembly 30. Mounting means 8 may be a material having an adhesive surface to which sheet material 40 will adhere, or it may be any suitable mechanical means for securing the sheet material in a cutting position upon the movable base plate without causing stress or uneven pressures upon the sheet material 40. Movable base plate 6 is mounted to frame 2 and adapted to move thereon by providing elongated slide grooves or portions cut out of the movable base plate and designated by the numeral 6 adapted to engage screw 14 having a washer thereon as a vertical stop for the movable plate. In FIG. 1 movable base plate 6 may be moved horizontally by sliding plate 6 within the limits of grooves 12 as secured by the screws designated by numeral 14 which are fixed to frame 2, the stationary base plate.

Movable base plate 6 is adapted to slide or move upon frame 2 by means of slide guide or movable plate guide bearings designated by the numeral 10 in FIG. 1. Preferred bearing material for slide guide 10 is nylon or other suitable low friction material.

Any suitable means may be provided for moving movable base plate 6. As shown in the drawings, movable base plate 6 is moved by movable plate adjustment control device 7 which comprises a threaded guide mounting member 18 affixed to movable plate 6 and a mounting member 16 fixed to stationary base plate or frame 2 to support a threaded adjustable member for controlling the position of threaded guide mounting member 18 fixed to movable base plate 6. Threaded member 4 rotatably secured to mounting member 16 and engaging threaded guide mounting member 18 can be rotated by wheel 5. Calibration scales are shown by numeral 9 in FIG. 1. In a preferred embodiment, adjustment control device 7 comprises a micrometer-type

adjustment to enable the cutting of blades of any dimension to very close tolerances.

Two spaced apart guide rail members are shown in FIG. 1. First guide rail member 22 is spaced from second guide rail member 24 and both guide rail members 22 and 24 respectively, are secured to frame 2 by suitable means. Both first guide rail member 22 and second guide rail member 24 extend parallel in the linear direction of the cut to be made in sheet material 40 mounted upon movable base plate 6. Both rail members as shown are elongated and form a track adapted to receive and guide guide members 26 of cutting assembly 30. As shown in FIG. 1, second guide rail member 24 is located adjacent mounting means 8. Guide rails 22 and 24 are preferably constructed of a rigid material such as stainless steel, ground stock (steel) and the like.

Sheet material 40 is cut by a suitable cutting member designated by numeral 54 in the drawings, cutting member 54 being securely mounted in cutting assembly 30. Cutting assembly 30 is designed to produce linear cuts in sheet material 40 by moving upon support shaft 62 which is securely mounted to frame 2 by mounting assembly 60. Cutting assembly 30 may be adapted to cut from left to right, right to left or both depending upon the type and position of the cutting blade or blades mounted therein. Support shaft 62 in the embodiment shown in the drawings is a cylindrical rod extending longitudinally in a direction which parallels the linear cut to be made in sheet material 40 mounted upon movable base plate 6. Although it is not shown in the drawings, more than one support shaft may be adapted to control and guide the movement of cutting assembly 30 and such support shafts do not have to be cylindrical. Support shaft 62 is preferably a rigid metallic shaft. Mounting assembly 60 for securing support shaft 62 to frame 2 may be stationary or it may be movable. In the embodiment shown in the drawings, mounting assembly 60 is the movable type and comprises support arm 67 mounted to support shaft 62 at both ends of support shaft 62, said support arms 67 being pivotally mounted to frame 2 at pivot point 68. Support arm 66 located on the opposite side of pivot point 68 from support arm 67 supports a shaft 64 which gives the movable cutting mechanism rigidity and prevents misalignment of the cutting assembly. Shaft 64 may also be used as a handle to pivot the mounting assembly 60 about pivot point 68 and it may also be used as a stop when cutting assembly 30 is disengaged from the cutting position. Cutting assembly 30 is shown in FIG. 1 in the cutting position. Support arms 66 and 67 respectively are preferably perpendicular to support shaft 62 and handle 64.

Support foot 35 is mounted to support shaft 62 at both ends of support shaft 62 and is adapted to engage frame 2 when cutting assembly 30 is in the cutting position. Support foot 35 comprises adjustment means shown as screws 33 for raising and lowering the cylindrical support shaft relative to the movable base plate. When support shaft 62 is cylindrical, support foot 35 is adapted to pivot upon support shaft 62.

As seen in the drawing in FIG. 1 where the top view is shown, cutting assembly 30 has knob 21 mounted thereon for grasping with the hand to slide cutting assembly 30 upon support shaft 62. The support shaft 62 is shown passing through cutting assembly 30 by means of dotted lines. Cutting member 54 is also shown in cut-

ting assembly 30 by means of dotted lines. Details of the cutting assembly 30 are better illustrated in other drawings described infra. Two guide members or guide wheels designated by numerals 26 are adjustably mounted upon cutting assembly 30 by adjustable members 27 and are adapted to engage the spaced apart guide rail members 22 and 24 respectively when the cutting assembly 30 is in the cutting position. Cutting assembly 30 has an orifice therethrough to engage support shaft 62, and when support shaft 62 is cylindrical rods, cutting assembly 30 is rotatable upon support shaft 62 and is therefore described as being pivotally mounted upon support shaft 62. This configuration promotes disengagement of cutting assembly 30 from sheet material 40 and the removal of cutting assembly 30 from the cutting position to a rest position shown in FIG. 4.

As described supra in regard to the general description of the invention, a preferred low-friction bearing which promotes the sliding action of cutting assembly 30 upon support shaft 62, is a bimetallic bearing wherein support shaft 62 comprises one metal and that area of cutting assembly 30 in contact with support shaft 62 comprises a metal different from the metal of support shaft 62. A preferred bimetallic bearing in accordance with the present invention is one wherein the support shaft 62 is stainless steel and cutting assembly 30 is brass. Other combinations for bimetallic bearings are well known in the art and may be substituted for the cutting assembly 30 and support shaft 62.

Stop or abutment member 61 may be used on support shaft 62 to prevent cutting assembly 30 from passing beyond a desired limit on support shaft 62.

Referring to FIG. 2 there is shown a side elevational view of FIG. 1 taken along lines II—II wherein the cutting assembly is shown in a cutting position. In FIG. 2 details of cutting assembly 30 show that the cutting assembly comprises cutting head 50 fixedly mounted to cutting head carriage 20. Support shaft 62 is shown as a cylindrical shaft passing through cutting blade carriage 20. Plates 52 are used to secure blades 54 and mount blades 54 in cutting head 50. Numerals 23, 28 and 29 are described in detail infra and are elements which are used to secure cutting head 50 to cutting blade carriage.

In FIG. 3 there is shown a front view of the cutting apparatus of the present invention. The front view depicts movable base plate 6 within frame 2 adapted to slide or move over frame 2 within slide guides 10. The cutting assembly is in the cutting position and shows a cutting blade being used as a cutting member 54. Parts of the cutting blade mounted within cutting head 50 are shown by dotted lines. Cutting blade 54 is mounted to cutting head 50 by means of plate 52 which is fixed to cutting head 50 by suitable means, for example, by screws or bolts.

FIGS. 4 and 5 depict side views of a preferred apparatus of the present invention, FIG. 4 depicting cutting assembly 30 in the raised position and disengaged from the cutting position with mounting assembly 60 in a position where support arm 66 rests upon the frame and support arm 67 is elevated so that support shaft 62 is sufficiently elevated from the movable base plate to maintain the cutting assembly 30 in a disengaged position which promotes the changing of cutting head 50 and/or cutting member 54. Support foot 35 pivotally connected to support shaft 62 is also shown in a rest po-

sition in FIG. 4 wherein that portion of support foot 35 distal support shaft 62 is disengaged from frame 2 as shown in FIG. 4.

In FIG. 5, support foot 35 pivotally mounted upon cylindrical support shaft 62 engages frame 2 at the tips of screw members 33 which provide means for adjusting the height of support shaft 62 from frame 2. Cutting head 30 is shown in a cutting position wherein cutting member 54 engages sheet material 40 (not shown), and adjustable guide wheels 26 mounted to cutting head carriage 20 by adjustable mounting means 27 are shown in a position wherein guide wheel 26 engages guide rail member 22. The pivotal mounting assembly is shown in the cutting position in FIG. 5 wherein support arm 66 is in an elevated position and support arm 67 adapted to pivot at pivot point 68 is shown in its lowered position.

FIGS. 68 illustrate views and types of cutting assemblies which may be used upon support shaft 62 in accordance with the present invention.

In FIG. 6 there is shown a front view of the cutting assembly 30 showing knob 21 for grasping the cutting assembly 30 to provide sliding motion upon support shaft 62. As shown in FIG. 6, cutting head 50 is adapted to mount upon cutting head carriage 20 by means of a female member in cutting head 50 which slides over male mounting slide member 25. In this manner the main body 51 of cutting head 50 is mounted upon cutting head carriage 20 and is secured by movable plate 29 which moves in groove 71 and is secured in position by a knurled knob 28 which screws into cutting head carriage 20. Cutting blade 54 is shown mounted in cutting head 50 by means of retention plate 52.

In FIG. 7 there is shown an end view of cutting assembly 30 showing opening 73 adapted to receive support shaft 67. Opening 73 is of suitable diameter to snugly receive support shaft 62 to form a rotatable, slidable fit of the cutting head carriage 20 upon support shaft 62. Stop plate 23 is mounted upon cutting head carriage 20 to secure main body 51 of cutting head 50 to cutting head carriage 20. Plates 52 are adapted to secure cutting blades 54 to main body 51 of cutting head 50 by suitable means shown in the drawing as screw members which are fixed to main body 51. Cutting blades 54 in FIG. 7 provide a rectilinear cut, that is a cut which is perpendicular to the surface of the sheet material.

In FIG. 8 there is shown a partial breakaway view of cutting assembly 30 wherein cutting head 50 is adapted to retain cutting members 54 to provide a beveled cut upon sheet material which is 130° relative to the surface of the sheet material. Thus, the main body 51 of cutting head 50 in FIG. 8 is designed to provide this specific cut.

The cutting apparatus operates by mounting the elastomeric material upon the base plate by the means provided. Precision cutting is promoted if the blade material is uniformly and evenly mounted upon the base plate. Blade height is suitably adjusted and the cutting assembly is placed in a cutting position. The elastomeric material is cut by moving the cutting assembly from right to left or left to right depending upon the position of the cutting blade in the cutting head. Cuts may be made in either direction as desired if suitable cutting blades are mounted within the cutting head. One skilled in the art will be able to provide and manipulate various cutting blades and to alter cutting blade posi-

tions without undue experimentation to cut elastomeric material in one direction only, left to right or right to left or in both directions.

Cutting heads may be designed to produce any desired angular cut in the sheet material, and accordingly, the apparatus of the instant invention is easily adaptable to cutting not only rectilinear cuts in sheet material but also precision beveled cuts in sheet material. In accordance with the present invention the cutting means may be mounted in the cutting assembly to provide at least one linear cut right angle edge on sheet material mounted upon the base plate or the cutting means may be mounted in the cutting assembly to provide at least one linear cut beveled edge on sheet material mounted upon the base plate. It is also within the purview of one skilled in the art to design cutting assemblies which provide for multiple cutting members which may cut at right angles and/or any other desired angle or configuration.

In accordance with the present invention, an important design feature is encompassed in the ability of the device to rigidly support a massive or relatively heavy cutting head even though the cutting head is slidably and pivotally mounted and may be engaged and disengaged from the cutting position as desired. The relatively heavy cutting assembly provides the necessary mass to evenly propel the cutting members of blades through the sheet material being cut and is instrumental in providing precision cut edges of the sheet material.

The cutting apparatus of the present invention also is adaptable and can be adjusted to cut sheet material of various thicknesses. The height of the cutting blade may be adjusted by adjusting the height of the guide members on the cutting assembly which engage the guide rails and by adjusting the screws of the support feet mounted upon the support shaft or by raising and lowering the cutting member (blade) itself or by any combination of the above. Thus, the apparatus of the present invention is easily adaptable to cutting sheet material of various thicknesses.

The drawings illustrate cutting devices which are of substantially simple design and are adapted to operate by manual propulsion. However, it is within the purview of one skilled in the art to easily adapt the moving members to mechanised control so that the sheet cutting operation may be carried out semiautomatically or automatically by use of mechanical propulsion means such as electrical motors and driving devices. The apparatus is designed to hold the sheet material firmly and rigidly as the linear cut is made in the sheet material.

A working model of the device has shown that sheet material cut by the apparatus of the instant invention has a radius of curvature less than 1 micron. The overall dimensions of the working model approximately 91 cm long by 91 cm wide by 25 cm high with a cutting assembly weighing approximately 2.0 kilograms. Elastomeric blade material cut by the apparatus of the instant invention was securely mounted upon the movable base plate by means of a double-sided adhesive material secured to the movable base plate. Stress and strain in the elastomeric sheet material was prevented by evenly applying pressure over the entire surface of the sheet material when mounting the sheet material to the movable base plate.

Unless otherwise specified, all parts of the apparatus of the instant invention are preferably metal, such as

aluminum, stainless steel, brass, various alloys and the like.

Although the present invention has been described with reference to a preferred embodiment thereof, wherein the cutting assembly is not only slidably but also pivotally mounted upon the support shaft and wherein the support shaft is movable by pivotally mounted support arms, the apparatus of the instant invention also encompasses those embodiments wherein the cutting assembly is merely slidably and is not pivotally mounted on the support shaft. The instant invention also encompasses cutting devices which have a stationary base plate and mounting means thereon for securing the sheet material thereto, and to cutting devices wherein the cutting assembly cannot be disengaged from the cutting position as by providing a non-movable support shaft fixedly mounted to the frame.

While the invention has been described with respect to a preferred embodiment it will be apparent that certain modifications and changes can be made without departing from the spirit and scope of the invention and it is therefore intended that the foregoing disclosure be limited only by the claims appended hereto.

What is claimed is:

1. A cutting apparatus for making linear cuts of sheet material comprising a frame; a base plate within the frame having mounting means for securing the sheet material in a cutting position without causing stress of uneven pressures upon the sheet material so that a linear cut can be made in the sheet secured thereto; at least two spaced apart guide rail members, attached to the frame and extending parallel in the linear direction of the cut to be made in sheet material mounted upon the base plate; a cutting assembly having at least two guide members and cutting means, the cutting assembly being slidably mounted upon at least one support shaft, said support shaft being suitably secured to the frame and extending parallel with the linear cut to be made in sheet material mounted upon the base plate and located in a position to support and guide the cutting means in a cutting position along the linear cut to be made in sheet material upon the base plate, the guide members of the cutting assembly engaging the spaced apart guide rail members; and means for moving the cutting assembly on the support shaft.

2. The apparatus of claim 1 wherein the base plate is movable and further comprises means therefor for controlling the movement.

3. The apparatus of claim 1 wherein the mounting means for securing the sheet material to the base plate comprises a surface adhesive to the sheet material.

4. The apparatus of claim 1 wherein the two guide members of the cutting assembly are wheels suitably spaced to engage the respective guide rails.

5. The apparatus of claim 1 wherein the guide members of the cutting assembly are adjustable and thereby provide means of adjusting the height of the cutting member from the surface on the base plate.

6. The apparatus of claim 1 wherein the cutting assembly comprises a cutting head carriage slidably mounted upon said at least one support shaft and a cutting head having mounting means for securing a cutting member, and further comprising mounting means for securing and disengaging the cutting head and cutting head carriage.

7. The apparatus of claim 1 wherein the cutting means is mounted in the cutting assembly to provide at

least one linear cut beveled on sheet material mounted upon the base plate.

8. The apparatus of claim 1 wherein the cutting means is mounted in the cutting assembly to provide at least one linear cut right angle edge on sheet material mounted upon the base plate.

9. The apparatus of claim 1 wherein the portion of the cutting head assembly in contact with the support shaft comprises a metal different from the metal of the support shaft thereby creating a bimetallic bearing.

10. The apparatus of claim 1 comprising a single cylindrical support shaft engaging a cylindrical orifice in the cutting assembly thereby providing a pivotal engagement between the cutting assembly and the support shaft.

11. The apparatus of claim 10 wherein the cylindrical support shaft is secured to the frame by a pivoted support arm attached at a pivot point to the frame at each end of the support rod thereby providing means for engaging and disengaging the cutting member and the sheet material.

12. The apparatus of claim 10 further comprising at least one support foot pivotally mounted at each end of the support shaft and having a base which extends outwardly from the pivotal mounting, the base extending from the support shaft to the frame and engaging the frame when the cutting assembly mounted on the support shaft is in a cutting position, the base of the support foot having adjustment means for controlling the distance between the support shaft and the base plate having mounting means for securing the sheet material.

13. The apparatus of claim 1 wherein the cutting assembly comprises a cutting head adapted to secure at least one cutting member at a desired angle for cutting sheet material; a cutting head carriage; and means to secure the cutting head to the cutting head carriage.

14. The apparatus of claim 11 further comprising means to move the support shaft at the pivot point of the pivoted support arms to engage and disengage the cutting member and the sheet material.

15. A cutting apparatus for making precision linear cuts of elastomeric sheet material comprising a frame; a movable base within the frame and having mounting means for securing sheet material on the surface thereof in a cutting position so that a linear cut can be made in sheet material secured thereto; means for moving the movable base plate; at least two spaced apart guide rail members attached to the frame and extending parallel in the linear direction of the cut to be made in sheet material mounted upon the movable base plate; a cutting assembly comprising a cutting head having at least one cutting assembly comprising a cutting head having at least one cutting member therein, a cutting head carriage pivotally and slidably mounted upon a cylindrical support extending parallel with the linear cut to be made in sheet material mounted upon the base plate and located in a position to support and guide the cutting member along the linear cut to be made in sheet material mounted upon the movable base plate when the cutting assembly is in a cutting position, said carriage adapted to receive and secure the cutting head, the cylindrical support shaft being secured to the frame by a pivoted support arm attached at a pivot point to the frame at each end of the support rod, the cutting head carriage in contact with the support shaft comprising a metal different from the metal of the support shaft, the cylindrical support shaft hav-

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ing at least one support foot pivotally mounted at each end of the support shaft and adapted to engage the frame when the cutting assembly is in a cutting position, the support foot having adjustment means for raising and lowering the cylindrical support shaft relative to the movable base plate, and at least two guide wheels

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adjustably secured to the cutting head carriage and adapted to engage the spaced apart guide rail members when the cutting assembly is in a cutting position; and means for moving the cutting head carriage on the support shaft.

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