Dec. 16, 1952 J I. WEBB 2,621,735

MACHINE FOR CUTTING ARTICLES FROM METAL SHEETS

Filed Oct. 1, 1948 2 SHEETS—SHEET 1

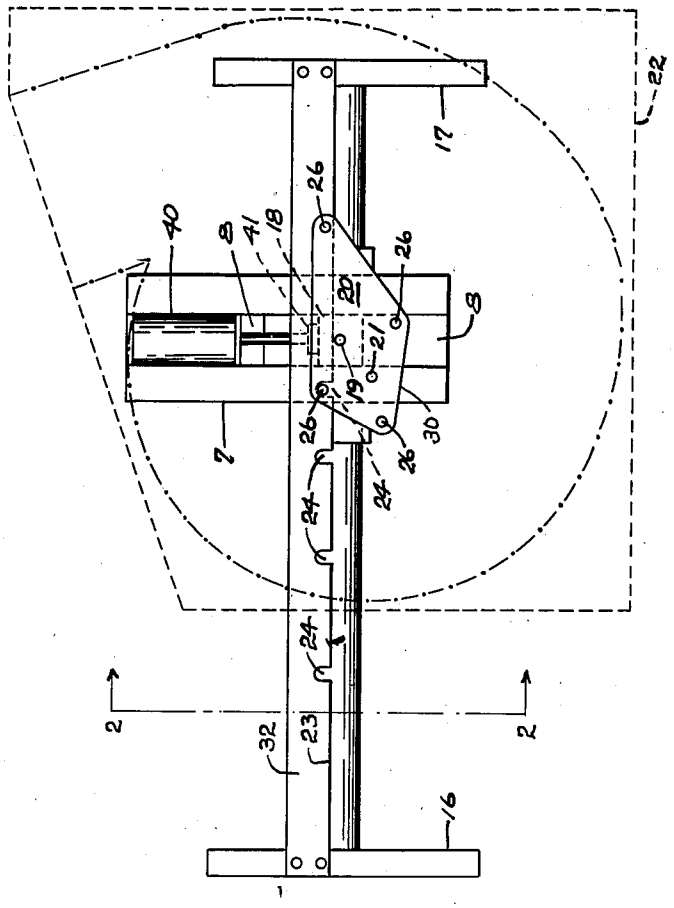


FIG. 1

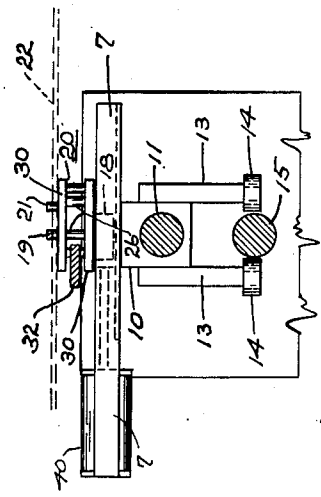


FIG. 2

INVENTOR.
J. Irwin Webb
BY Robert J. Palmer
Attorney

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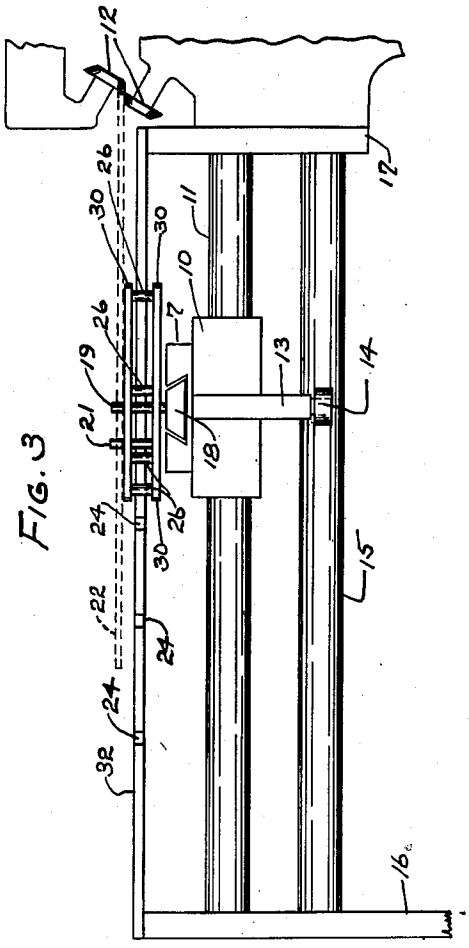


FIG. 3

INVENTOR.
J. Irwin Webb
BY
Robert J. Palmer
Attorney

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MACHINE FOR CUTTING ARTICLES FROM METAL SHEETS

J Irwin Webb, Munhall, Pa., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

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2 Claims. (Cl. 164—63)

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This invention relates to machines for cutting articles from metal sheets, and relates more particularly to machines for cutting scroll-shaped side plates for the casings of centrifugal fans, from metal sheets.

Centrifugal fans have involute casings with scroll-shaped side plates. It is the general practice in manufacturing the side plates of such fans to mark the outline of a scroll-shaped side plate on a metal sheet from which the side plate is to be cut, and then to feed the sheet by hand through cutters, and to guide it between the cutters so that they cut along the line on the sheet which defines the outline of the scroll. This has to be repeated for each side plate, and is a slow and relatively expensive process.

This invention provides a machine which will cut a scroll-shaped side plate from a metal sheet without the necessity for marking the outline of the scroll on the sheet, and without the necessity for guiding the sheet by hand through the cutters.

In one embodiment of the invention, a metal sheet from which a scroll-shaped side plate is to be cut is mounted on a cam which is rotatedly mounted on a support which moves along a straight line towards a pair of cutters. The cutters rotate the sheet and through it the cam. Rotation of the cam causes its support to be moved towards the cutters, and its surface is so shaped that the sheet is caused to pass between the cutters in a scroll-shaped path.

An object of the invention is to reduce the cost of cutting articles having desired outlines, from metal sheets.

Another and more definite object of the invention is to reduce the cost of cutting scroll-shaped side plates for centrifugal fans, from metal sheets.

The invention will now be described with reference to the drawing of which:

Fig. 1 is a plan view looking down upon one embodiment of this invention with the cutters omitted, a metal sheet from which a scroll-shaped outline is being cut, being shown by a dashed line, the scroll-shaped outline being shown by a dash-dot line;

Fig. 2 is a partial sectional view along the lines 2—2 of Fig. 1, and

Fig. 3 is a side elevation of the machine with a metal sheet shown thereon in dashed line outline.

Referring now to the drawing, the cam support 10 has a central bore around the cylindrical guideway 11, along which the support slides for horizontal movement towards the cutters 12. The vertical shafts 13 are attached at their upper ends to the support 10, and have the rollers 14 on their lower ends which contact the opposite surfaces of the cylindrical guideway 15. The guideways 11 and 15 have their ends anchored in the end supports 16 and 17 respectively, of the machine.

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The support 10 has attached to its upper portion, a transversely extending plate 7 having therein the slot 8 with upwardly converging walls, which extends perpendicular to the guideways 11 and 15, and which contains the slide member 18 which has a vertical shaft 19 on which the cam 20 is rotatedly supported.

The cam 20 has a drive pin 21 extending vertically above its upper surface, and the metal sheet 22 has a circular hole therein which is fitted over the drive pin. The shaft 19 extends through another circular hole in the sheet.

The cam 20 includes the upper and lower, spaced horizontal plates 30 between which extend the four-notch engaging pins 28. The horizontal bar 32 is attached at its end to the supports 16 and 17, with the inner side 23 extending in a horizontal plane through which the pins 26 extend. The side 23 of the bar 32 has the spaced notches 24 therein which are adapted to receive corresponding pins 26 which they engage when the cam is rotated, as will be described.

The hydraulic cylinder 40 is attached to the plate 7, and has a piston 41 which is attached to the slide member 18 and which pulls it toward cylinder 40 during the rotation of the cam 20 for maintaining the notch-engaging pins 26 in their proper positions relative the notches 24 in the bar 32. The cutters 12 are the usual motor driven cutters for a conventional machine for cutting metal sheet, this invention being designed for use with such a machine.

The effective cam surface is a line extending parallel the outline of the upper cam pate 30 seen in Fig. 1, through the centers of the pins 26. The effective cam surface is so designed that as the cam is rotated, as will be described, the path of the sheet between the cutters it will be the scroll shown by the dash-dot outline of Fig. 1.

For cutting a scroll-shaped side plate, a metal sheet 22 having the outline shown by the dashed line of Fig. 1, has circular holes bore therethrough which are fitted over the driving pin 21 on the cam 20, and the shaft 19. The cut-

ters 12 are then moved down on the sheet to the cutting position shown by Fig. 3, and are started to rotate. The rotation of the cutters causes the sheet to move therethrough and to rotate about the shaft 19, and the movement is communicated through the sheet and the drive pin 21, to the cam causing the cam 20 to rotate about the shaft 19.

The rotation of the cam causes the notch-engaging pins 26 to move into the corresponding notches 24 in the bar 32, causing the cam 20 and the cam support 10, to move towards the cutters 12, the support 10 sliding during this movement along the guideway. Due to the different distances of the different pins 26 from the pivot pin, the cam supporting slide member 18 will move in the transverse slot sufficiently to permit the pins 26 to engage their corresponding notches 24, the piston 41 of the hydraulic cylinder 40 exerting sufficient opposing pressure to this movement for maintaining alignment.

The rotation of the cam and its movement towards the cutters, cause the sheet to move between the cutters along the dash-dot path shown by Fig. 1, causing the scroll-shaped side plate to be cut automatically from the sheet.

While the cam has been described as being moved towards the cutters through pins carried by the cam, engaging notches in a notched bar, other equivalent ways of affecting cam movement could be used.

While one embodiment of the invention has been described for the purpose of illustration, it should be understood that the invention is not limited to the exact apparatus and arrangement of apparatus illustrated, as modifications therefrom may be suggested by those skilled in the art without departure from the essence of the invention.

What is claimed is:

1. In a machine for cutting an irregular outline from a metal sheet, and including a cutter through which the sheet is moved, the combination of a cam having a flat upper surface for supporting a flat metal sheet, a guideway below said cam, a cam support movable along said guideway towards said cutter, said support having a slot therein extending perpendicular to said guideway, a slide member slidable in said guideway, said slide member having attached thereto a fixed shaft on which said cam is rotatably supported, said shaft extending through said cam above said surface so as to extend through a hole in a sheet, said cam having means extending above said surface and spaced from said shaft so as to extend through another hole in the sheet for causing said cam to rotate about said shaft when said sheet is rotated about said shaft when moved through said cutter, said cam having a plurality of cam surfaces spaced different distances from, and extending in lines parallel to, said shaft, and means engaging said surfaces for causing through the rotation of said cam, said support to move along said guideway towards said cutter.

2. The invention claimed in claim 1 in which the means engaging the cam surfaces comprises a notched bar extending parallel to the guideway, and in which the cam surfaces are notch engaging pins.

J IRWIN WEBB.

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