Jan. 29, 1946. H. A. WAGNER ET AL 2,393,845

CUTTING MACHINE

Filed Aug. 28, 1944 3 Sheets-Sheet 1

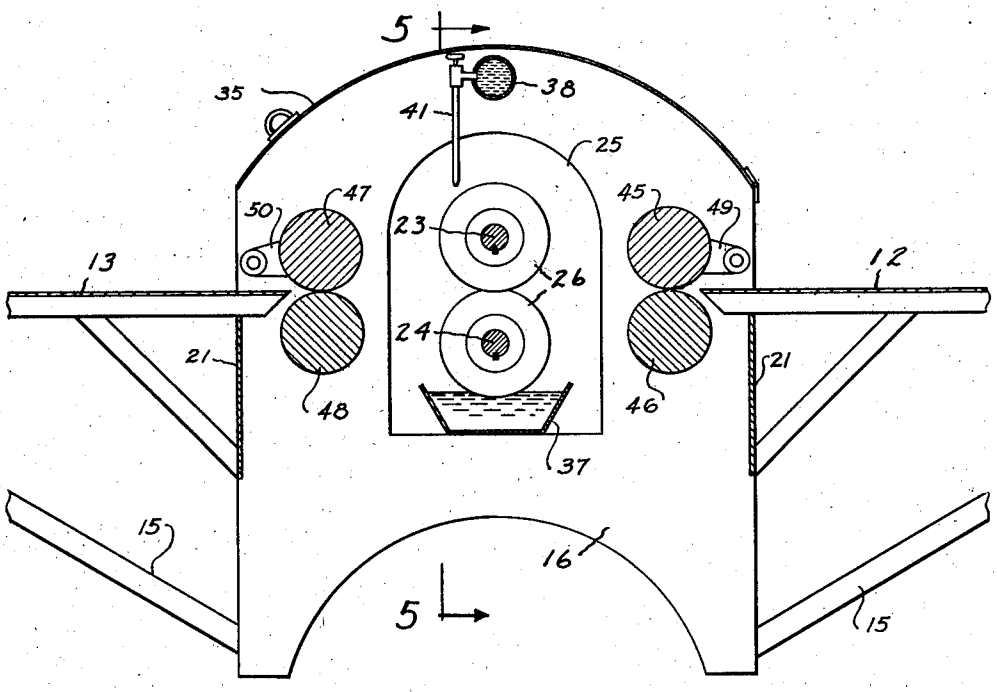

Fig. 1

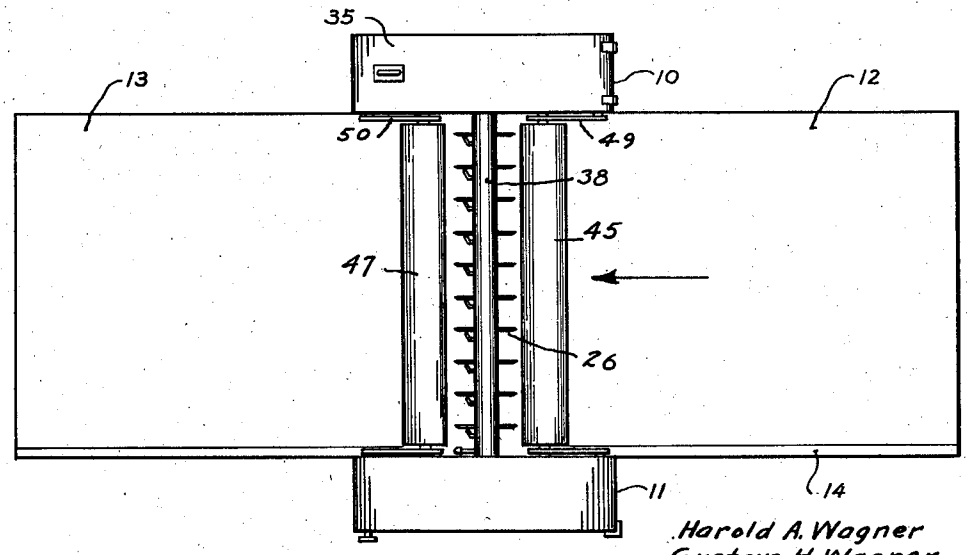

Fig. 2

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CUTTING MACHINE

Filed Aug. 28, 1944 3 Sheets-Sheet 2

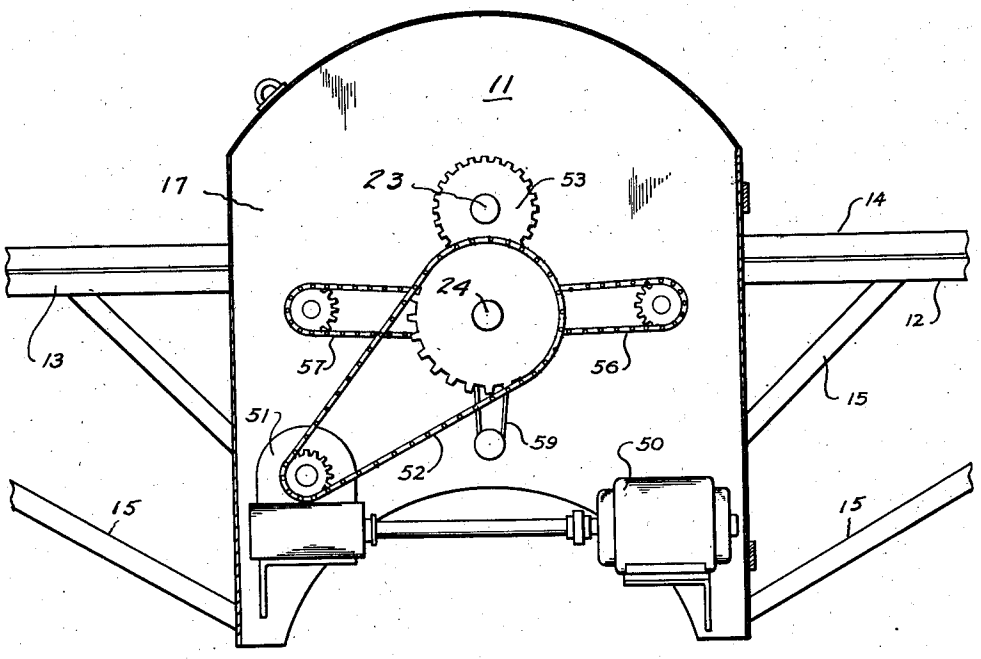

Fig. 4

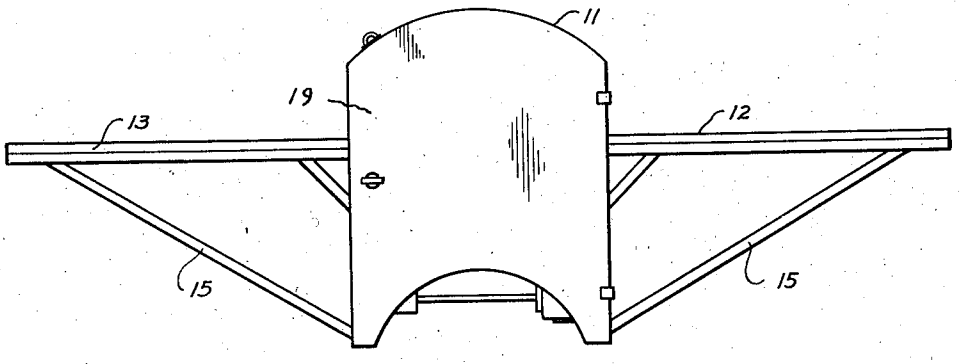

Fig. 3

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CUTTING MACHINE

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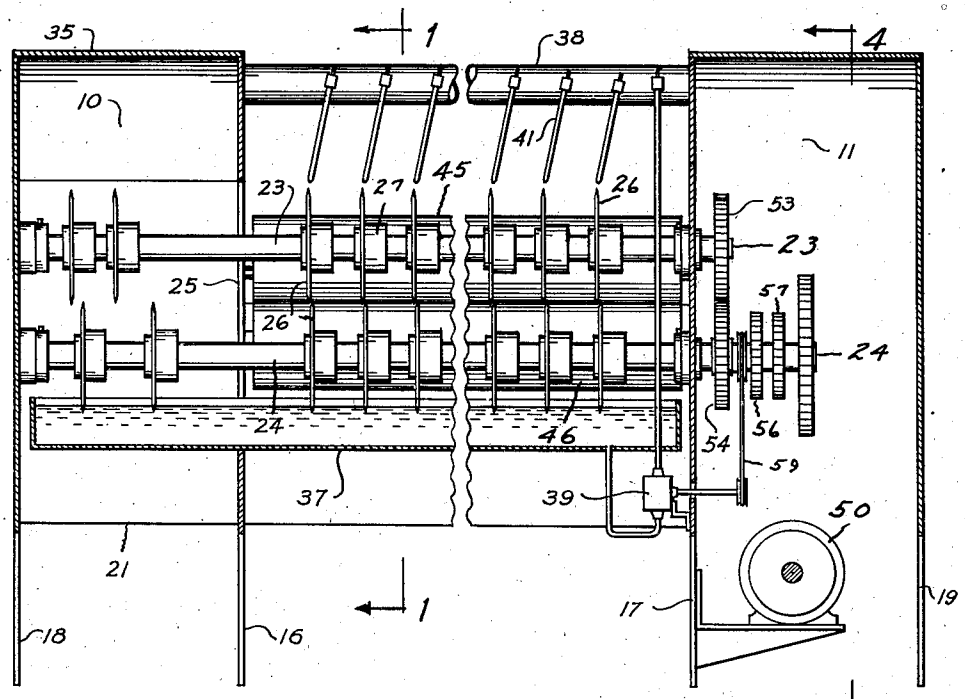

Fig. 5

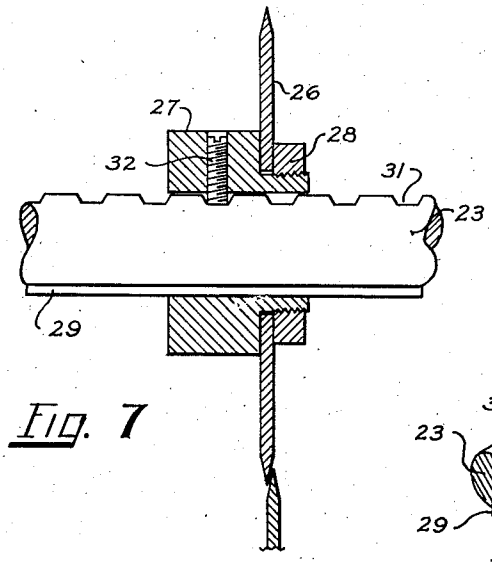

Fig. 7

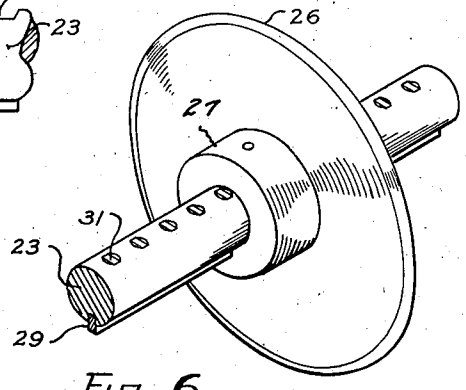

Fig 6

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UNITED STATES PATENT OFFICE

2,393,845

CUTTING MACHINE

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Application August 28, 1944, Serial No. 551,583

1 Claim. (Cl. 164—61)

The present invention relates to cutting machines and more particularly to machines which are suitable for cutting expansion joints such as are used in concrete road construction.

In laying concrete slabs for roadways adjacent blocks are spaced apart by expansion joints one form of which consists of a strip of asphalt impregnated porous fiber board. The fiber board is normally manufactured in relatively large sheets such as 4 feet by 10 feet and is impregnated with asphalt in this form. These large sheets are then required to be cut into relatively narrow strips of varying width, depending upon the thickness of the concrete slab. Cutting machines presently available for this use are in the nature of shears which cut only one strip at a time whereas it is desirable to provide a machine which can cut up an entire sheet in a single operation.

It is therefore, a general object of the present invention to provide a new and improved machine which is particularly suitable for cutting relatively large asphalt impregnated porous fiber sheets into relatively narrow strips, which machine is relatively simple in design, of low manufacturing and low maintenance cost.

A further object of the invention is to provide a new and improved machine for cutting relatively large sheets of material such as asphalt impregnated porous fiber board, into relatively narrow strips, which machine is capable of relatively quick adjustment for cutting strips of different widths.

A still further object of the present invention is to provide a new and improved multi-strip cutting machine comprising a plurality of pairs of cutter discs, the discs being mounted on shafts in such a manner that certain of the cutter discs may be moved to an inoperative position without being required to be removed from the shafts.

In accordance with an illustrated embodiment of the invention, the cutting machine comprises a table having a pair of horizontal shafts, one disposed vertically above the other, the one above and the other below the plane of the table top, the shafts having a plurality of pairs of cutter discs mounted thereupon, the adjacent edges of the discs extending closely together in a slightly overlapping relation, the discs overlapping substantially in line with the top of the table. The discs are axially adjustable upon the shafts in accordance with the width of the strips to be cut. The shafts are of a length somewhat greater than the width of the table and the discs are movable to an inoperative position on the overhanging ends of the shafts to which position the excess discs may be moved without requiring their removal from the machine.

For a consideration of what is believed novel and inventive, attention is directed to the following description taken in connection with the accompanying drawings while the features of novelty will be pointed out with greater particularity in the appended claim.

In the drawings, Fig. 1 is a vertical cross-sectional view through the machine; Fig. 2 is a plan view of the machine; Fig. 3 is a side elevation of the machine; Fig. 4 is a side view of the machine taken along the line 4—4 of Fig. 5; Fig. 5 is a view of the machine taken along the line 5—5 of Fig. 1; Fig. 6 is a view in perspective illustrating in enlarged detail one of the cutter discs embodied in the machine; and Fig. 7 is a cross-sectional view taken through the cutter disc unit of Fig. 6.

Referring now to the drawings and more particularly to the views of Figs. 2 and 3; the cutting machine of the invention comprises a frame structure including a pair of oppositely disposed housing sections 10 and 11 and a pair of table extensions 12 and 13. The table extensions 12 and 13 are of a width corresponding substantially to the width of the sheets of material which are to be cut into a plurality of relatively narrow strips. The table top 12 on the forward side to the machine is adapted for receiving the sheets of raw material being fed to the cutter knives while the table 13 is adapted for receiving the strips discharged from the machine. For facilitating the alignment of the sheets at right angles to the axis of the rotary cutter knives an upstanding ledge 14 is provided along one edge of the table 12. For convenience tables 12 and 13 may be rigidly secured to the machine itself by braces 15 as illustrated in the drawings, though it is to be understood that the tables may be provided as separate units if desired.

The frame structure also includes a pair of vertically extending walls 16 and 17 (see Fig. 5) arranged adjacent each of the opposite sides of the table 12—13 and a pair of outer walls 18 and 19 extending parallel with and in a spaced relation with respect to the first pair of walls 16 and 17. The walls 16, 17 and 18 are secured rigidly together by transversely extending members 21. The walls 16 and 18 define the rigid housing section 10 while the walls 17 and 19 define the housing section 11. The end wall 19 is hingedly mounted along one side in order to provide ready access to the mechanism mounted therewithin.

A pair of parallel shafts 23 and 24 are rotatably

journaled in the walls 17 and 18 in a vertically disposed relation to each other and extending transversely relative to the table 12—13. The wall 16 is provided with a relatively large opening 25 through which the shafts extend. Mounted upon the shafts 23—24 are a plurality of pairs of similar cutter discs 26 which are more clearly illustrated in the enlarged views of Figs. 6 and 7. The discs 26 are mounted upon hubs 27 and secured upon a shoulder of reduced diameter by means of nuts 28. In order to prevent relative rotation between the hubs 27 and the supporting shaft, a suitable key 29 is provided therebetween. The shafts 23 and 24 are each provided with a plurality of flat-bottomed notches 31 spaced a predetermined desired distance apart, and which are adapted to receive the end of the set screw 32 provided in the hubs 27. The vertical spacing between the shafts 23, 24 and the diameter of the discs 26 is such that the knife edges overlap somewhat as shown more clearly in Fig. 7, the point of overlap of the discs occurring slightly above the level of the table 12 and 13.

The spacing between the cutter discs or knives may readily be adjusted in accordance with the width of the strips to be cut from the sheets simply by loosening the set screws 32 and sliding the hubs upon the supporting shafts to the desired position and again tightening the set screws. It will be obvious that it is not essential for flattened notches 31 to be provided on the shafts 23, 24 and which may be undesirable in the event that the width of the strips to be formed thereby vary by uneven increments. If, on the other hand, the width of the strips vary by even increments, such as one-half inch, then the flattened notches greatly facilitate rapid adjustment of the knives since the set screws centering in the notches 31 will automatically position the knives accurately in a cooperatively spaced relation.

It will be obvious that in cutting relatively narrow strips a greater number of knives will be required than for cutting wider strips. According to the present invention the excess knives may readily be shifted to an inoperative position upon the shafts without requiring the complete removal of such excess knives from the machine. The shafts 23 and 24 extend through the frame wall 16 and are journaled upon the outer wall 18 whereby end portions of the shafts of suitable length overhang the edge of the table 12—13. The opening 25 in the wall 16 is of sufficient size so that the knives 26 may be slid along the shafts into the end housing 10 out of sight and out of the way. The upper curved wall of the housing 10 may be hinged at one end so as to provide a door 35 through which access may be had to the knives arranged upon ends of the shafts extending therewithin.

In cutting through a material impregnated with asphalt there will be an inherent tendency for the asphalt to gum up on the knife edges and which if not counteracted would foul the machine in short order. As illustrated, the present machine is provided with a trough 37 extending beneath and parallel with the lower shaft 24 and spaced therefrom so that the upper edges of the trough side walls are somewhat above the lowermost portions of the respective knives. The trough 37 is filled with a suitable solvent so that the knife edges rotating therein are kept clean. Secured between the upper portions of the frame walls 16 and 17 is a tubular header 38 which is kept filled with solvent pumped thereto by a small pump unit 39 connected to the trough 37. Solvent is distributed from the header 38 by a plurality of feeder tubes 41 suitably mounted on the header 38 so that they may be swung to deliver a small stream of solvent to the edge of each of the knives on the upper shaft 23.

A suitable arrangement of feed rolls are provided both fore and aft of the knife discs and as illustrated in the drawings, similar pairs 45, 46 and 47, 48 are mounted between the inner frame walls 16 and 17 of the machine. The lower rolls 46 and 48 are rotatably journaled within fixed bearings whereas the upper rolls 45 and 47 are journaled in bearings provided in the outer ends of arms 49 and 50, respectively, which arms are pivotally secured at their opposite ends onto the frame walls. The rolls 45 and 47 are free to move up and down in an arc about the pivotal point of the supporting arms 49 and 50 but are biased by their own weight into engagement with the lower rolls 46 and 48.

The machine may be driven by a suitable motor 50 mounted within the housing 11, the motor 50 being connected to a reduction gear unit 51 and which in turn may be connected by a driver chain 52 to a sprocket mounted on the outermost end of the shaft 24. The upper shaft 23 is driven through a gear 53 meshed with a similar gear 54 mounted on the lower shaft. The lower feed rolls 46 and 48 are driven through chains 56 and 57 respectively from the shaft 24, the chains 56 and 57 being trained about a sprocket provided on the ends of shafts fixedly secured to the corresponding rolls. The pump 39 may also be driven such as by the belt 59 from the shaft 24. In the illustrated modification power drive is provided only for the lowermost of each of the two pairs of feed rolls.

The shafts 23 and 24 should be of a relatively large diameter in order that they will not be sprung apart at the center due to the resistance of the sheet material which normally tends to wedge the knives of the different pairs apart. In order to affect clean cutting of the sheet material, it will be obvious that the knife edges should be maintained closely adjacent each other at all times.

The cutting machine of the invention has a relatively pleasing appearance due to its symmetrical design and having substantially similar housings 10 and 11 on each of the opposite sides, one enclosing the drive mechanism and the other enclosing the excess knives. The knives positioned upon the outermost ends of the shafts 23 and 24 within the housing 10 are protected from injury while not in use while the housing furthermore safeguards against clothing of workmen getting caught in the revolving parts.

Having described the invention in what is considered to be a preferred embodiment thereof, it is desired that it be understood that the specific details shown are merely illustrative and that the invention may be carried out by other means.

We claim:

A machine for cutting asphalt impregnated porous fiber sheets and the like into a plurality of strips of selective width, said machine comprising a pair of spaced apart housings, horizontally aligned forwardly and rearwardly extending table portions secured to and supported by said housings, the adjacent ends of said table portions being spaced apart and extending between said housings, a pair of parallel driven shafts extending between said housings and

spaced similarly above and below the level of said table portions, a plurality of cooperating pairs of cutter discs secured to said shafts, the discs of each of said pairs secured to different shafts, an enlarged opening in the inner wall of one of said housings between said adjacent table ends, said pair of driven shafts extending through said openings and journalled in the outer wall of said one housing, motor means in the other of said housings and connected for driving said shafts, a trough for containing solvent mounted beneath the lower one of said shafts and extending through said opening, the cutter discs on said lower shaft depending into said trough, said discs being movable along said shafts, and said opening in said one housing wall being of sufficient size to permit unused discs to be slid therethrough onto the shaft portions extending within said one housing.

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