A machine for notching corners and cutting a U-shaped glazing bead or gasket. The machine automatically measures a length L-1, notches the corner, measures a length L-2, notches the corner, measures a length L-3, notches the corner, measures a length L-2, notches the corner, measures a length L-1, and cuts the gasket from a roll of gasket material. The machine is completely variable for length L-1, L-2 and L-3 by changing numbers on three counter means. The machine is completely automatic after loading.

11 Claims, 5 Drawing Figures
GASKET CUTTING APPARATUS

BACKGROUND OF THE INVENTION

In the assembly of various patio doors and windows, a U-shaped gasket or glazing bead made of a plastic such as polyvinyl chloride is placed on the edge of the glass before a protective aluminum strip of trim is placed around the edge of the glass. The gasket must be measured for proper length, notched at the corners, and cut off of a roll. Such an operation if done manually is costly and time-consuming.

In accordance with the present invention there is provided an apparatus for automatically measuring and notching a length of gasket material so that the gasket material may be easily fitted around the edge of a plate glass door or window. The machine automatically measures out a length L-1, notches for the corner, measures a length L-2, notches for the corner, measures a length L-3, notches for the corner, measures a length L-2, notches for the corner, measures a length L-1, and cuts the gasket from the roll containing a given length of gasket material.

The invention will be more clearly understood by reference to the drawings in which;

FIG. 1 is a side plan view of a length of gasket material;

FIG. 2 is a top plan view of a glass panel having a notched gasket placed thereon;

FIG. 3 is a sectional view taken along lines 3—3 of FIG. 1;

FIG. 4 is a side plan view of the apparatus of the present invention; and

FIG. 5 is a block diagram of the invention.

Referring now to the drawings, in FIG. 1 and FIG. 2, is shown a length of gasket generally indicated by the numeral 10, having two notches 8a and 8b therein which are identical. The notches 8a are spaced at a distance L-1 from the ends of the gasket 10. The distance between notches 8a and 8b is indicated by the length L-2, and the distance between the two notches 8b is indicated by the length L-3. The section between the end of the vinyl strip and notches 8a is labeled S-1, the section between the notches 8a and 8b is labeled S-2, and the section between the notches 8a-8b is labeled S-3.

The gasket 10 shown in cross-section in FIG. 3 can be seen to have two legs 14 connected by top 13 to form a generally U-shaped channel.

In FIG. 2 is shown a rectangular section of glass 9 having corners 11 with gasket 10 attached to the edge thereof. The notches 8a—8a and 8b—8b can be seen to be cut partially through the gasket 10 to allow the corners 11 of glass 9 to project outwardly through gasket 10. If notches 8a—8a and 8b—8b were not provided, the gasket 10 would fold at corners 11 and prevent the metal trim (not shown) placed over the gasket from fitting smoothly against the glass at the corners.

The gasket 10 is contained on a large circular roll (not shown) from which it feeds onto the apparatus depicted in FIG. 4. The gasket 10 is guided in a horizontal direction by guide 12 which is generally U-shaped channel over which the vinyl gasket 10 is received. The top 13 of the gasket faces upward over the top of guide 12. As the gasket material 10 is moved along guide 12 it contacts the drive wheel 18 and is forced thereagainst by idler wheel 20 which turns in the direction indicated by arrow 21. The drive wheel 18 is driven by electric motor 16, which is connected to drive wheel 18 by gear box 17, belt 17a and clutch-brake 19. Clutch-brake 19 acts as both a clutch and a brake to disengage motor 16 from drive wheel 18 and to stop drive wheel 18 from turning as soon as motor 16 is disengaged from drive wheel 18. The idler wheel 20 is driven by the gasket material 10 and merely holds the gasket material 10 in contact with drive wheel 18. Gasket 10 is soft and flexible and deforms or flattens as it passes between drive wheel 18 and idler wheel 20. As the gasket material 10 continues along guide 12 it contacts measuring wheel 24 causing measuring wheel 24 to turn in the direction indicated by arrow 25. The measuring wheel 24 sends impulses to counters 51, 52 and 53, shown in FIG. 5, to indicate what length of gasket is passing under the wheel. The number of impulses corresponds directly to the length of gasket 10 passing beneath measuring wheel 20. The gasket material 10 continues along guide 12 until it passes beneath knife 30. The knife 30 severs or notches gasket material 10 at the appropriate lengths L-1, L-2 and L-3.

Knife 30 and knife holder 31 to which knife 30 is rigidly attached are actuated to notch by air or pneumatic cylinder 32a or to cut by both air cylinders 32a and 34a acting in conjunction. Air cylinders 32a and 34a are actuated by solenoids 32 and 34 which operate valves 32b and 34b to supply air from air supply 6 through air supply lines 7 and 7a to cylinders 32a and 34a. After a given length of gasket 10 is notched or cut, the material rests beneath switch 36 in holding chamber 37 and extending therefrom maintains start switch 36 in a depressed position. When the gasket 10 is removed, start switch 36 opens to initiate a new cycle of notching and cutting.

In FIG. 5 is shown a block diagram indicating the operation of the apparatus of the present invention. The electric motor 16 which drives the drive wheel 18 is energized or turned on by depressing motor switch 15 which energizes conductor 15a. The gasket 10 is manually advanced over guide 12 to contact drive wheel 18. The advance switch 66 is then depressed which de-energizes conductor 66a and 38a to de-energize clutch solenoid 38 and to engage the clutch-brake 19 to turn drive wheel 18. Drive wheel 18 feeds gasket 10 along guide 12 to knife 30. When the gasket material 10 is fed beneath knife 30 the operator then releases the advance switch 66 which thereby energizes clutch 38 and disengages electric motor 16 from the drive wheel 18, thereby stopping gasket material 10 beneath knife 30. The manual cut switch 58 is then depressed which energizes solenoids 32 and 34 thereby causing knife 32 to completely sever portions of gasket 10 from the portion of gasket 10 remaining on guide 12. A portion of gasket 10 is depressing start switch 36. Reset switch 56 is then depressed which energizes reset 55, which is time-delay relay. Reset 55 energizes conductors 79, 80, 81 and 82 to set counters 51, 52 and 53 to a zero reading. Homing switch 60 is depressed to energize conductor 60a and advance stepping switch 50 to step 1. Start switch 36 is released to de-energize clutch 38 by removing the portion of gasket 10 from beneath switch 36, thereby connecting drive wheel 18 to motor 16. Movement of the gasket material 10 along guides 12—12 turns measuring wheel 24. Measuring wheel 24 sends pulses to stepping switch 50. In the embodiment depicted in FIG. 5, stepping switch 16 has 16 steps. More or less steps may be used.
as desired. In step 1, stepping switch 50 conveys the pulses being received from measuring wheel 24 via 90 to counter 51 which is preset to measure a certain number of signals received from measuring wheel 24. When counter 51 has counted a preset number of signals from measuring wheel 24 corresponding to length L-1, conductor 70 is energized thereby energizing conductor 71 and clutch solenoid 38 which disengages the motor from the drive wheel 18, thereby stopping the movement of gasket material 10. Energized conductor 70 also energizes conductor 72 and time-delay relay 40. After a preset period of time, time-delay relay 40 energizes conductor 73 which steps stepping switch 50 to step 2, which is the “notch step.” At step 2, line 74 is energized which thereby energizes parallel lines 75 and 76. Line 75, when energized, energizes solenoid 32 which actuates to notch gasket material 10. Line 76 energizes time-delay relay 42 which after a preset period of time energizes line 77 to step stepping switch 50 to step 9, which is the reset step. In step 9, line 78 from stepping switch 50 is energized thereby actuating reset 55. After a preset period of time, reset 55 energizes line 79 which in turn energizes conductors 80, 81, 82 and 83. Conductors 80, 81 and 82 reset counters 51, 52 and 53 to zero. Energized conductor 83 advances stepping switch 50 to step 10 and the cycle is repeated for counter 52 in the manner previously explained, i.e., distance L-2 is measured in step 10, the gasket 10 is notched in step 11, counters 51, 52 and 53 are reset in step 12, and stepping switch 50 is advanced to step 13. In step 13 the cycle is initiated for counter 51 in the manner previously explained, i.e., distance L-1 is measured in step 13, gasket 10 is cut in step 14 by energizing conductor 86 to energize and actuate both solenoids 32 and 34, and counters 51, 52 and 53 are reset in step 15, and stepping switch 50 is advanced to step 16 which is a hold position in which clutch 38 is energized by energizing conductor 87 to stop the movement of gasket 10.

What is claimed is:

1. An apparatus for notching and severing a flexible gasket means comprising:
   a. motor means;
   b. clutch means;
   c. drive wheel means connected to said motor means by said clutch means for moving said gasket means;
   d. idler wheel means adjacent to said drive wheel means for forcing said gasket means against said drive wheel means;
   e. guide means located between said idler wheel means and said drive wheel means for guiding said gasket means between said idler wheel means and said drive wheel means;
   f. measuring wheel means located adjacent to said guide means for measuring said gasket means at a first series of preset intervals and at a second series of preset intervals as said gasket means is driven along said guide means;
   g. knife means located adjacent to said guide means for notching said gasket means at said first series of preset intervals and for severing said gasket means at said second series of said preset intervals after said gasket means has been notched in accordance with said first series of preset intervals;
   h. counter means connected to said clutch means and said measuring wheel means for (i) measuring the length of said gasket means traveling beneath said measuring wheel means and (ii) for de-energizing said clutch means to engage and disengage said clutch means at preset intervals; and,
   i. air cylinder means connected to said knife means and said counter means for actuating said knife means for notching said gasket material at said first series of preset intervals and for severing said gasket means at said second series of said preset intervals after said gasket means has been notched in accordance with said first series of preset intervals.

2. The apparatus of claim 1 wherein air supply means is connected to said air cylinder means by air line means, said air line means having valve means therein, said valve means being actuated by solenoid means.
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3. The apparatus of claim 1 wherein said air cylinder means comprises at least two cylinder means, said two cylinder means each having an air supply line means connected thereto, each of said air supply means having valve means therein, said valve means being opened and closed by solenoid means.

4. The apparatus of claim 1 wherein said clutch means contains means for both engaging and disengaging said motor means from said drive wheel means and for stopping said drive wheel means when said clutch means disengages said motor means from said drive wheel means.

5. The apparatus of claim 1 wherein said counter means comprises at least three counters.

6. The apparatus of claim 5 wherein a stepping switch means connects said measuring wheel means to each of said three counters.

7. The apparatus of claim 6 wherein each of said counters is connected by conductor means to said clutch means and to time-delay relay means, said time-delay relay means being connected by conductor means to said stepping switch means.

8. The apparatus of claim 7 wherein said stepping switch means is connected by conductor means to solenoid means for actuating said air cylinder means.

9. The apparatus of claim 8 wherein homing switch means is connected by conductor means to said stepping switch means for advancing said stepping switch to an initial step.

10. An apparatus for notching and severing a flexible gasket means comprising:
   a. means for driving said gasket means through said apparatus;
   b. means for measuring said gasket means at a first series of preset intervals and at a second series of preset intervals as said gasket means is driven through said apparatus;
   c. means for notching said gasket means at said first series of preset intervals and for severing said gasket means at said second series of said preset intervals after said gasket means has been notched in accordance with said first series of preset intervals; and,
   d. means for actuating said notch means and severing means for notching said gasket means at said first series of preset intervals and for severing said gasket means at said second series of said preset intervals after said gasket means has been notched in accordance with said first series of preset intervals.

11. The apparatus of claim 1 comprising guide means for receiving gasket means of a generally U-shaped configuration in cross-section.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,927,587
DATED : December 23, 1975
INVENTOR(S) : James C. Jackson and Loyd D. Harberson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 55, "8a-8a and 8a-8b" should read -- 8a-8a and 8b-8b --. Column 2, line 53, "portions" should read -- portion --. Column 2, line 57, "is time-delay" should read -- is a time-delay --. Column 3, line 33, "counter" should read -- counted --. Column 3, line 60, "counter" should read -- counted --. Column 4, line 56, "disengae" should read -- disengage --.

Signed and Sealed this
Seventeenth Day of August 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks