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Masonry block splitter assembly with projections adjacent to  
splitting blades

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(71) Applicant(s)  
Anchor Wall Systems, Inc

(72) Inventor(s)  
Ronald J. Scherer; David Matthew Lacroix

(74) Agent/Attorney  
Griffith Hack,GPO Box 1285K,MELBOURNE VIC 3001

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- (71) Applicant: ANCHOR WALL SYSTEMS, INC. [US/US]; Suite 390, 5959 Baker Road, Minnetonka, MN 55345-5996 (US).
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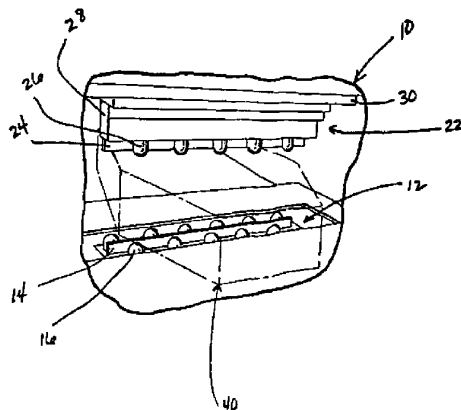
(72) Inventor: SCHERER, Ronald, J.; 5703 Peller Avenue North, Oak Park Heights, MN 55082 (US).

(74) Agent: BRUESS, Steven, C.; Merchant & Gould P.C., P.O. Box 2903, Minneapolis, MN 55402-0903 (US).

(72) LACROIX, David Matthew

4608 103rd Lane N.E. Circle Pines MN 55014 US

(54) Title: MASONRY BLOCK SPLITTER ASSEMBLY WITH PROJECTIONS ADJACENT TO SPLITTING BLADES



(57) Abstract: The invention is a block splitting machine (10) which uses an assortment of protrusions (16, 26) to supplement or replace the action of the splitting blade (24) in splitting and dressing concrete or masonry block (40).



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## MASONRY BLOCK SPLITTER ASSEMBLY WITH PROJECTIONS ADJACENT TO SPLITTING BLADES

**Field of the Invention**

The invention relates generally to manufacture of masonry block. More specifically, it relates to equipment and processes for the creation of decorative faces on masonry block. Even more specifically, the invention relates to equipment and processes for producing roughened textures and the appearance of weathered edges on masonry block.

**Background of the Invention**

The process of splitting a masonry block to create a rock-like appearance on the exposed face of the block is known. See, for example, Besser, U.S. Patent No. 1,534,353, which discloses the manual splitting of blocks using a hammer and chisel. Automated equipment to split block is well-known, and generally includes a splitting table comprising a supporting table and one or more hydraulically-actuated splitting blades. These machines are useful for the high-speed processing of blocks. They produce a rock-face finish on the blocks. The edges of the faces are generally well-defined, i.e., "sharp".

It is sometimes desirable to produce a concrete product that has edges which appear to be weathered. This has been a desired look for concrete pavingstones for sometime. Recently, it has become desirable to create the weathered look on the decorative face of concrete retaining wall blocks. The common process for producing the weathered look on pavers is to "tumble" the pavers in a rotary drum to knock off their sharp edges. This process can be used with some retaining wall blocks, as well, provided that the blocks do not have any features, such as integral concrete locator flanges, that would be damaged by the tumbling process. Tumbling is not an option with such blocks. The problem with the tumbling process is that it is costly. The process requires the capital investment in a tumbling apparatus, and the upkeep of that equipment. In addition, the pavers or blocks must be removed from the production line, tumbled, and then reassembled into suitable cubes for transportation. This makes the process labor-intensive.

Another option is to use a hammermill to attack the face of the block with various hammers. This option can slow down production, if it is done "in line", because the process can only move as fast as the hammermill can operate on each

block, and the block may need to be manipulated-flipped over and or rotated-to attack all of its edges.

Accordingly, there is a need for equipment and a  
 5 process that will create the appearance of weathered edges on retaining wall block, in such a manner that it will not slow down the production line, will not add costly equipment to the line, will not be labor-intensive, and will not have high cull rates when processing blocks with  
 10 integral locator flanges or other similar features.

#### Summary of the Invention

In accordance with a first aspect of the invention, a masonry block splitter is provided that has a  
 15 splitting line with which a work piece is aligned for splitting the work piece into at least two pieces. The block splitter includes a first splitting assembly including a plurality of projections disposed on at least one side of the splitting line, with the projections being  
 20 positioned so that they travel into the work piece during a splitting operation into the at least two pieces by the block splitter, whereby the first splitting assembly contributes to the formation of at least one irregular split edge and surface on at least one of the split  
 25 pieces.

In accordance with a second aspect of the invention, there is provided a masonry block that is produced from a molded work piece that is split in a block splitter having a splitting line. The block splitter  
 30 comprises a first splitting assembly that includes a plurality of projections disposed on at least one side of the splitting line, with the projections being positioned so that they travel into the work piece during a splitting operation, whereby the masonry block includes at least one  
 35 irregular split edge and surface produced by said first splitting assembly.

In accordance with another aspect of the invention, there is provided a splitting assembly for use in a masonry block splitter having a splitting line with  
5 which a work piece is aligned for splitting the work piece into at least two pieces. The splitting assembly includes a plurality of projections disposed adjacent to the splitting line on at least one side thereof. The  
10 projections are positioned so that they travel into the work piece during a splitting operation, whereby the projections contribute to the formation of at least one irregular split edge and surface on at least one of the split pieces.

In accordance with a further aspect of the  
15 invention, there is provided a method of producing a masonry block having at least one irregular split edge and surface. The method includes providing a masonry block splitter having a splitting line with which a masonry work piece to be split is to be aligned, the block splitter



including a first splitting assembly that includes a plurality of projections disposed on at least one side of the splitting line, with the projections being positioned so that they travel into the work piece during the splitting operation. The method further includes locating a masonry work piece in the masonry block splitter so that the  
5 work piece is aligned with the splitting line, and splitting the work piece into at least two pieces using the first splitting assembly, wherein at least one of the split pieces is the masonry block having the at least one irregular split edge and surface.

#### **Brief Description of the Drawings**

Figure 1 is a partial perspective view of a block splitting machine  
10 using the block splitter blade assembly of the invention.

Figure 2A is a top plan view of one portion of a splitting blade assembly in accordance with the invention.

Figure 2B is a top plan view of one portion of a splitting blade assembly also showing protrusions of various diameters positioned in a random  
15 manner.

Figure 2C is a top plan view of one portion of a splitting blade assembly in accordance with a further alternative embodiment of the invention comprising protrusions which are random connected and unconnected panels.

Figure 3 is a side elevational view of an alternative embodiment of a  
20 protrusion in accordance with the invention.

Figure 4A is a side elevational view of a further alternative embodiment of a protrusion in accordance with the invention.

Figure 4B is a side elevational view of another alternative embodiment of the invention depicting protrusions of varying height.

Figure 5 is a perspective view of a split work piece, (forming two masonry blocks), which was split using the splitter blade assembly of the invention.

Figure 6 is a top plan view of a masonry block split using the splitter blade assembly of the invention.

Figure 7 is a front elevational view of the masonry block depicted in  
30 Figure 6.

#### **Detailed Description of the Preferred Embodiment**

Attention is now directed to the figures where like parts are identified with like numerals through several views. In Figure 1, a conventional block  
35 splitting machine modified in accordance with invention is depicted, in part,

showing in particular the block splitter assembly 10. Generally, block splitting machines may be obtained from Lithibar Co., located in Holland, Michigan. In particular, the Lithibar Co. 6386 was used in practicing the invention. The block splitter assembly generally has opposed first 12 and second 22 splitting blade assemblies. The first splitting blade assembly 12 is positioned at the bottom of the block splitter 10 and, as depicted, includes a splitting blade 14 and a number of protrusions positioned on either side and adjacent to the blade.

The invention may be used with any variety of blocks molded or formed through any variety of processes including those blocks and processes disclosed in U.S. Patent No. 5,827,015 issued October 27, 1998, U.S. Patent No. 5,017,049 issued May 21, 1991 and U.S. Patent No. 5,709,062 issued January 20, 1998.

An upper or second splitting blade assembly 22 may also be seen in Figure 1. The second splitting blade assembly 22 also includes a splitting blade 24 and a plurality of projections 26 located on either side of the blade 24. The second splitting blade assembly may be attached to the machine's top plate 30 through a blade holder 28. The position of the work piece 40, (shown in phantom), within the block splitter may be seen in Figure 1, in the ready-to-split position.

As can be seen in Figure 2A, the splitting blade assembly 12 is generally comprised of a number of projections 16 positioned adjacent to blade 14 and on either side of the blade 14. As shown, the projections 16 on the first side of the blade are staggered in relationship to the projections 16' on the second side of the blade. The projections on either side of the blade may also be aligned depending upon the intent of the operator.

As can be seen in Figure 2B, the protrusions 16 may be used without a splitting blade. The protrusions 16 may also be varied in diameter or perimeter, (if not round), and placed randomly on the splitting assembly 12. Any number of ordered or random patterns of protrusions 16 may be created using regular or irregular spacing depending on the effect to be created in the split block.

Figure 2C shows a further alternative embodiment of the invention where plates 16" are attached to either, or both, assemblies 12 and 22. As can be seen, these plates may be configured in random order and left unconnected across the surface of the assembly 12. The invention has been practiced using steel plates about four inches (about 10.16 cm) long welded to the assembly to provide a number of partially connected protrusions 16" about two inches (about 5.08 cm) high.

As shown in Figures 1, 2A and 2B, the projections 16 and 16' may have a rounded shape. However, the shape of the projections may also be pyramidal, cubic, or pointed with one or more points on the top surface of the projection. In Figures 2B and 2C the relative position of the work piece 40 is again shown in phantom outline.

Generally, the protrusions may have a diameter of about 1/2 to 1 and 1/4 inches (about 1.27 to 3.18 cm) and may be attached by welding, screwing or other suitable means. The height of the protrusions may be about 1 and 1/4 inches (about 3.18 cm) and varied about 3/4 of an inch (about 1.91 cm) shorter or taller depending upon the effect to be created in the block at splitting. Attaching the protrusions by threading or screwing allows easy adjustment of protrusion height.

The relative height of the projection and blade may also be varied depending upon the effect that is to be created in the block split according to the invention. Specifically, as can be seen in Figure 3 the relative height of the blade 14 may be less than the relative height of the projection 16. Alternatively, as can be seen in Figure 4A the relative height of the blade may be greater than the height of the projections 26. Generally, we have found with the first splitting blade assembly that X may range from about 1/8 to about 3/8 of an inch (about 0.32 to about 0.95 cm) beyond the first blade. With regard to the second splitting blade assembly, X' may range from about 1/16 to 1/8 of an inch (about 0.16 to 0.32 cm) beyond the height of the plurality of the projections.

Protrusions 16 such as those depicted in Fig. 2A have been found useful having a diameter of about 1 and 1/4 inches (about 3.18 cm) and, when used with a blade 14, having a height of about 1/8 of an inch (about 0.32 cm) above the blade in the first or lower assembly and 1/8 of an inch (0.32 cm) below the blade in the second or upper assembly. Overall, the height of the protrusions may vary up or down about 3/8 of an inch (about 0.95 cm) relative to the height of the blade.

In operation, the work piece is generally centered in the block splitter according to known practices as seen in Figures 1 and 2. The block splitter is then activated resulting in the first and second opposing splitting blade assemblies converging on, and striking, the work piece 40. In operation, the first and second splitting blade assemblies may travel anywhere from about 1/4 to one inch (about 0.63 to 2.54 cm) into the top and bottom surfaces of the work piece. The work piece 40 is then split resulting in an uneven patterning on the split edges 46 and 46' of the resulting blocks, 42 and 44, as illustrated in Figure 5. As depicted, the work piece



40' is split in two. However, it is possible and within the scope of the invention to split the work piece into more than two pieces.

The distance traveled by the protrusions 16 into the work piece may be varied by adjusting the limit switches on the machine and, in turn, varying the hydraulic pressure with which the splitting assembly acts. Generally, the splitting assemblies act on the block with a pressure ranging from about 600 to 1000 psi (about  $4.14 \times 10^6$  to  $6.89 \times 10^6$  Pa), and preferably about 750 to 800 psi (about  $5.17 \times 10^6$  to  $5.52 \times 10^6$  Pa).

As will be well understood by one of skill in the art, the splitting machine may include opposed hydraulically activated side knife assemblies (not shown) which impinge upon the block with the same timing and in the same manner as the opposed top and bottom assemblies. Projections 16 may also be used to supplement or replace the action of the side knives.

Closer examination of block 44 after splitting (see Figures 6 and 7) shows the formation of exaggerated points of erosion in the front, split surface 46 of the block 44. With the block 44 depicted, both the first and second blade assemblies 12 and 22 comprised protrusions 16 and 26, respectively. As a result, depressions 48 and 50 were formed in the front, split surface 46 of the block 44, adjacent the upper 52 and lower 54 respective surface of the block 44.

The magnitude of the indentations, 48 and 50, or points of erosion is far greater than that which is caused by conventional splitting blades and may be varied by varying the prominence of the protrusions 16 and 26, (height and size), relative to the height and thickness of the blade. In one embodiment of the invention, masonry block may be split with only a row or rows of protrusions 16 and 26 without a blade 14 and 24.

The above specification, examples and data provide a complete description of the manufacture and use of the composition of the invention. Since many embodiments of the invention can be made without departing from the spirit and scope of the invention, the invention resides in the claims hereinafter appended.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A masonry block splitter having a splitting line with which a work piece is aligned for splitting the work  
5 piece into at least two pieces, comprising a first  
splitting assembly including a plurality of projections  
disposed on at least one side of the splitting line, said  
projections being positioned so that they travel into the  
work piece during a splitting operation, whereby said  
10 first splitting assembly contributes to the formation of  
at least one irregular split edge and surface on at least  
one of the split pieces.

2. The masonry block splitter of claim 1, wherein  
15 said first splitting assembly includes a splitting blade  
aligned with the splitting line.

3. The masonry block splitter of claim 2, including  
a plurality of projections disposed on each side of the  
20 splitting blade.

4. The masonry block splitter of any one of the  
preceding claims, further including a second splitting  
assembly opposed to the first splitting assembly, said  
25 second splitting assembly including a plurality of  
projections disposed on at least one side of the splitting  
line, said projections being positioned so that they  
travel into the work piece during the splitting operation.

5. The masonry block splitter of claim 4, wherein  
30 each of said first and second splitting assemblies  
includes a splitting blade aligned with the splitting  
line.

6. The masonry block splitter of claim 5, including  
35 a plurality of projections disposed on each side of the  
splitting blades.

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7. The masonry block splitter of claim 3 or claim 6,  
wherein the plurality of projections and the splitting  
blade are fixed relative to each other during the  
5 splitting operation whereby said projections and said  
blade move simultaneously during the splitting operation.

8. The masonry block splitter of claim 2, wherein  
said splitting blade has a length, and said plurality of  
10 projections are adjacent said splitting blade along the  
length of said splitting blade.

9. The masonry block splitter of any one of the  
preceding claims, wherein the projections are  
15 cylindrically shaped.

10. The masonry block splitter of claim 9, wherein  
said projections have rounded tips.

20 11. The masonry block splitter of claim 9, wherein  
said projections have a diameter of between about 1.27 to  
about 3.18 cm.

25 12. The masonry block splitter of any one of claims 1  
to 8, wherein said projections comprise plates.

13. The masonry block splitter of any one of claims 1  
to 8, wherein said projections are pyramidal in shape.

30 14. The masonry block splitter of claim 2, wherein  
said projections have a tip that is positioned about 0.95  
cm above or below the top of the splitting blade.

35 15. The masonry block splitter of any one of the  
preceding claims, wherein said projections are adjustable.

16. The masonry block splitter of claim 3, wherein said projections on one side of the splitting blade are aligned with said projections on the other side of the splitting blade.

5

17. The masonry block splitter of claim 3, wherein said projections on one side of the splitting blade are staggered with respect to said projections on the other side of the splitting blade.

10

18. The masonry block splitter of claim 4, wherein said projections of said second splitter assembly are disposed on the same side of the splitting line as said projections of said first splitting assembly, and wherein at least a portion of an upper edge and at least a portion of a lower edge of one of the split pieces are roughened by the projections during the splitting operation.

15

19. A masonry block that is produced from a molded work piece that is split in a block splitter having a splitting line, said block splitter comprising a first splitting assembly that includes a plurality of projections disposed on at least one side of the splitting line, said projections being positioned so that they travel into the work piece during a splitting operation, whereby the masonry block includes at least one irregular split edge and surface produced by said first splitting assembly.

20

20. The masonry block of claim 19, wherein the block includes:

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a top surface, a bottom surface, a front surface extending between the top and bottom surfaces, a rear surface extending between the top and bottom surfaces, and side surfaces between the front and rear surfaces; a locator protrusion formed integrally with the block and disposed on the top or bottom surface thereof; the

35

intersection of the front surface and the top surface defining an upper edge, and the intersection of the front surface and the bottom surface defining a lower edge; and the irregular surface comprises at least a portion of the front surface and irregular split edge comprises at least a portion of one of the upper edge and the lower edge.

21. The masonry block of claim 19 or claim 20, wherein the block splitter comprises a second splitting assembly opposed to the first splitting assembly, and wherein said second splitting assembly includes a plurality of projections positioned so that they engage the work piece during the splitting operation whereby the masonry block includes an opposed pair of irregular edges.

22. The masonry block of claim 21, wherein each splitting assembly has a splitting blade aligned with the splitting line, each said splitting blade and their respective said projections are fixed relative to each other during the splitting operation whereby said blades and their respective said projections move simultaneously during the splitting operation, and each said splitting blade is arranged to contact the work piece during the splitting operation.

23. The masonry block of claim 20, wherein the locator protrusion comprises a lip.

24. The masonry block of claim 21, wherein the front surface includes depressions formed adjacent the upper and lower edges.

25. A splitting assembly for use in a masonry block splitter having a splitting line with which a work piece is aligned for splitting the work piece into at least two pieces comprising:

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a plurality of projections disposed adjacent to the splitting line on at least one side thereof, said projections being positioned so that they travel into the work piece during a splitting operation, whereby said  
5 projections contribute to the formation of at least one irregular split edge and surface on at least one of the split pieces.

26. The splitting assembly of claim 25, further  
10 including a splitting blade aligned with the splitting line, and wherein said projections and said splitting blade are fixed relative to each other during the splitting operation whereby said projections and said  
15 splitting blade move simultaneously during the splitting operation and move into the work piece to split the work piece into the two pieces.

27. The splitting assembly of claim 25 or claim 26,  
20 including a plurality of projections disposed on each side of said splitting line.

28. The splitting assembly of any one of claims 25 to  
25 27, wherein said projections are adjustable relative to said splitting blade.

29. The splitting assembly of any one of claims 25 to  
28, wherein said projections are cylindrically shaped.

30. The splitting assembly of claim 29, wherein said  
30 projections have rounded lips.

31. The splitting assembly of claim 29 or claim 30,  
wherein said projections have a diameter of between about  
1.27 to about 3.18 cm.

32. The splitting assembly of any one of claims 25 to  
35 28, wherein said projections comprise plates.

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33. The splitting assembly of any one of claims 25 to 28, wherein said projections are pyramidal in shape.

5        34. The splitting assembly of claim 26, wherein said projections have a tip that is positioned up to about 0.95 cm above or below the top of said splitting blade.

10       35. The splitting assembly of claim 27, wherein said projections on one side of the splitting line are aligned with said projections on the other side of the splitting line.

15       36. The splitting assembly of claim 27, wherein said projections on one side of the splitting line are staggered with respect to said projections on the other side of the splitting line.

20       37. The splitting assembly of claim 26, wherein said splitting blade has a length, and said plurality of projections are adjacent said splitting blade along the length of said splitting blade.

25       38. A method of producing a masonry block having at least one irregular split edge and surface, comprising:  
         providing a masonry block splitter having a splitting line with which a masonry work piece to be split is to be aligned, the block splitter including a first splitting assembly that includes a plurality of

30       projections disposed on at least one side of the splitting line, said projections being positioned so that they travel into the work piece during a splitting operation;

         locating a masonry work piece in the masonry block splitter so that the work piece is aligned with the  
35       splitting line; and

         splitting the work piece into at least two pieces using the first splitting assembly, wherein at least one

of the split pieces is the masonry block having the at least one irregular split edge and surface.

39. The method of claim 38, further including the  
5 step of providing the masonry block splitter with a second  
splitting assembly opposed to the first splitting assembly  
and operating in concert therewith, the second splitting  
assembly including a plurality of projections disposed on  
10 the same side of the splitting line as the projections of  
the first splitting assembly, said projections being  
positioned so that they engage the work piece during the  
splitting operation whereby the masonry block includes an  
opposed pair of irregular split edges.

15 40. The method of claim 39, further including  
providing each of the first and second splitting  
assemblies with a splitting blade aligned with the  
splitting line and a plurality of projections disposed on  
each side of each of the splitting blades.

20 41. The method of claim 40, wherein each said  
splitting blade and their respective said projections are  
fixed relative to each other during the splitting  
operation whereby said blades and their respective said  
25 projections move simultaneously during the splitting  
operation.

42. The method of any one of claims 38 to 41, wherein  
said projections of said first splitting assembly travel  
30 about 0.63 to 2.54 cm into the work piece.

43. The method of any one of claims 39 to 42, wherein  
said projections of said second splitting assembly travel  
into the work piece during the splitting operation.

35 44. The method of claim 43, wherein said projections  
travel about 0.63 to 2.54 cm into the work piece.



45. The method of any one of claims 39 to 44, wherein  
said first splitting assembly is positioned to strike the  
top of the work piece and said second splitting assembly  
5 is positioned to strike the bottom of the work piece.

46. A masonry block splitter substantially as  
hereinbefore described with reference to the accompanying  
drawings.

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47. A splitting assembly substantially as  
hereinbefore described with reference to the accompanying  
drawings.

15 48. A method of producing a masonry block  
substantially as hereinbefore described with reference to  
the accompanying drawings.

Dated this 17th day of March 2004

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ANCHOR WALL SYSTEMS, INC

By their Patent Attorneys

GRIFFITH HACK

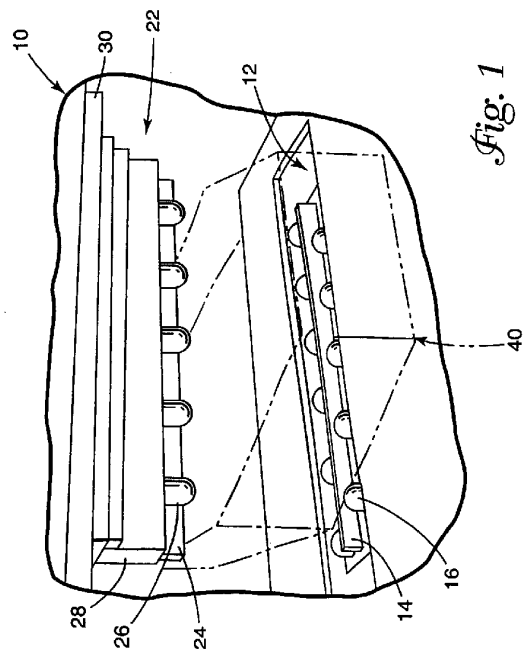
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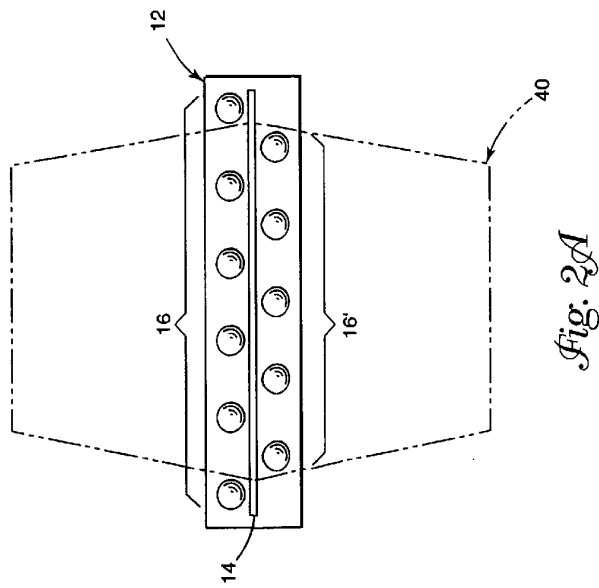
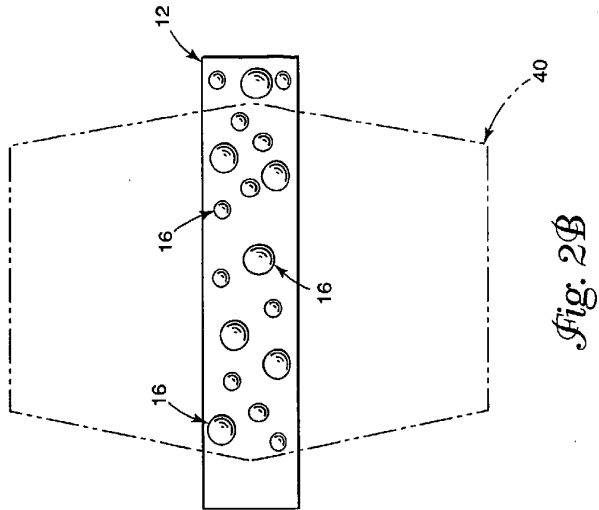
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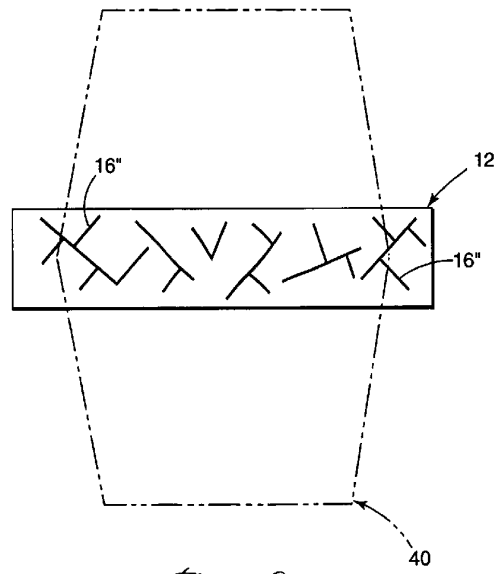
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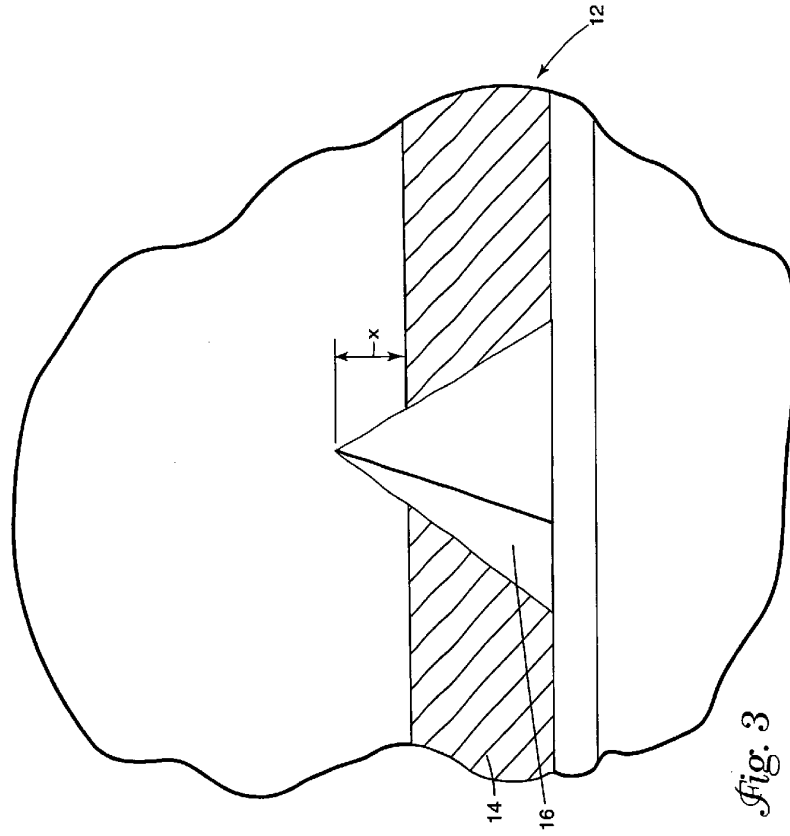
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*Fig. 2C*

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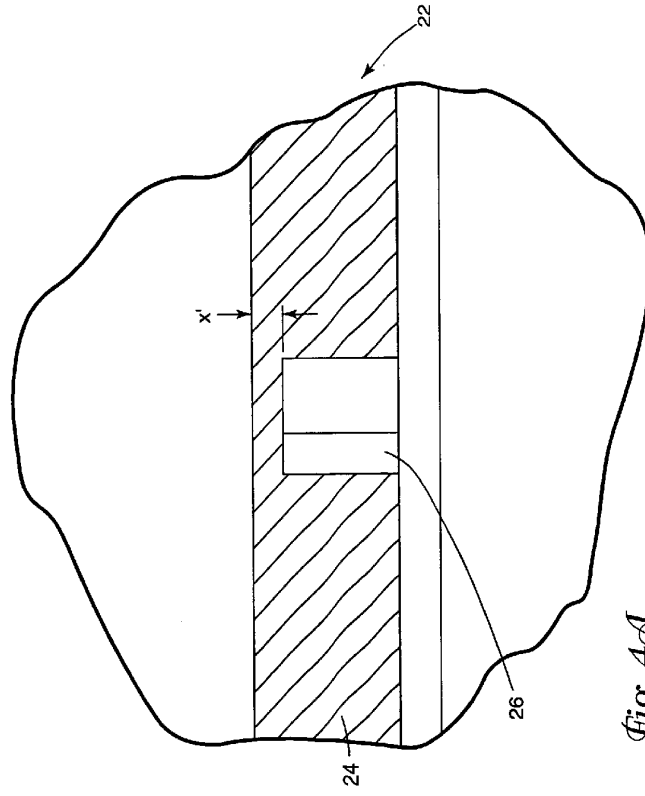


Fig. 4A

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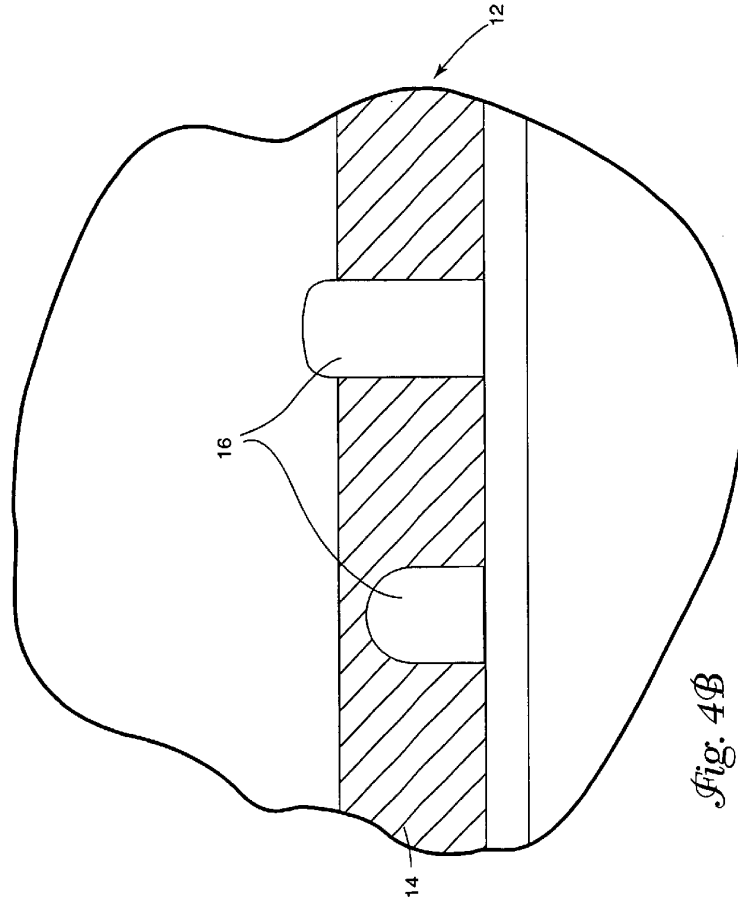


Fig. 4B

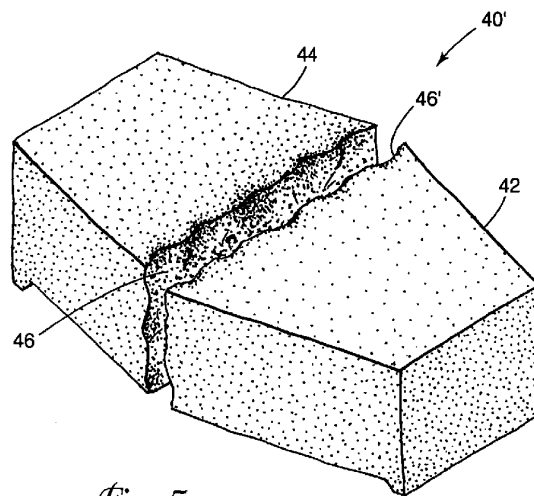
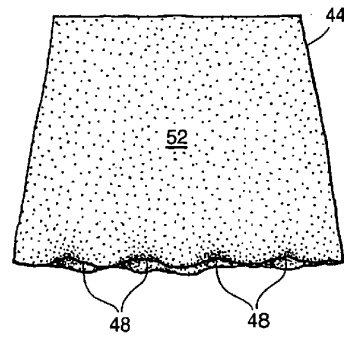
*Fig. 5*

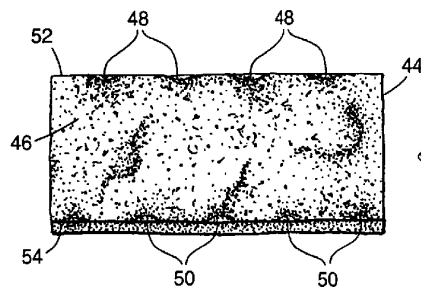
Fig. 5

Fig. 5





*Fig. 6*



*Fig. 7*

FIG. 6

FIG. 7