July 31, 1934. C. B. BAILEY 1,968,365

GASKET

Filed April 27, 1931 2 Sheets-Sheet 1

Fig. 1.

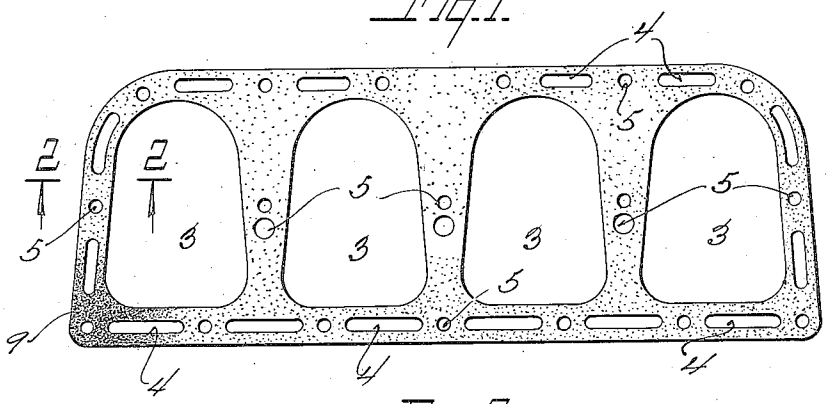


Fig. 2.

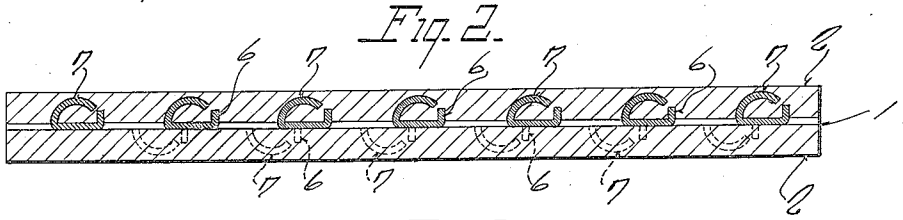


Fig. 3.

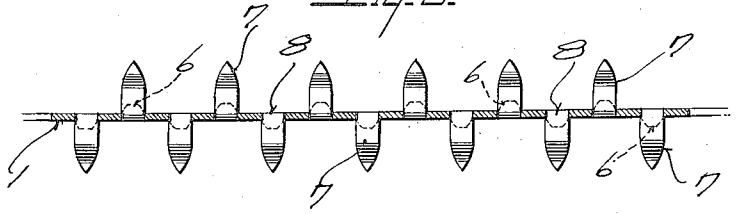


Fig. 4.

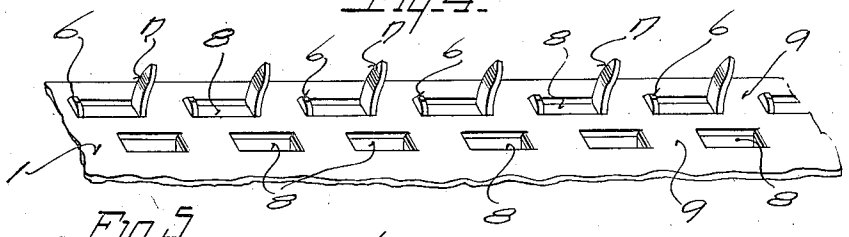
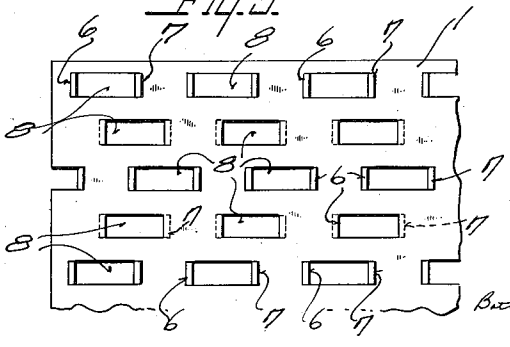


Fig. 5.



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July 31, 1934. C. B. BAILEY 1,968,365

GASKET

Filed April 27, 1931 2 Sheets-Sheet 2

Fig. 6.

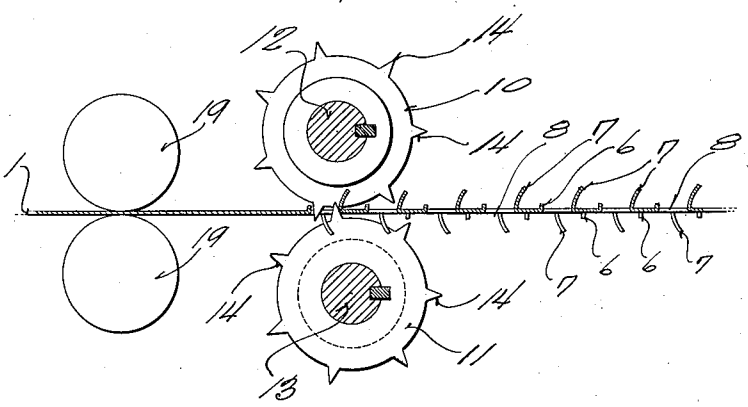


Fig. 7.

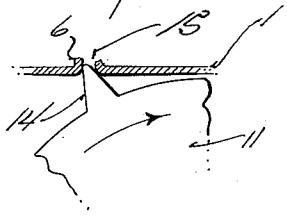


Fig. 8.

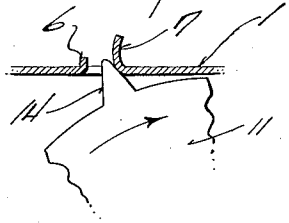


Fig. 9.

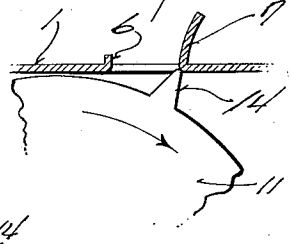
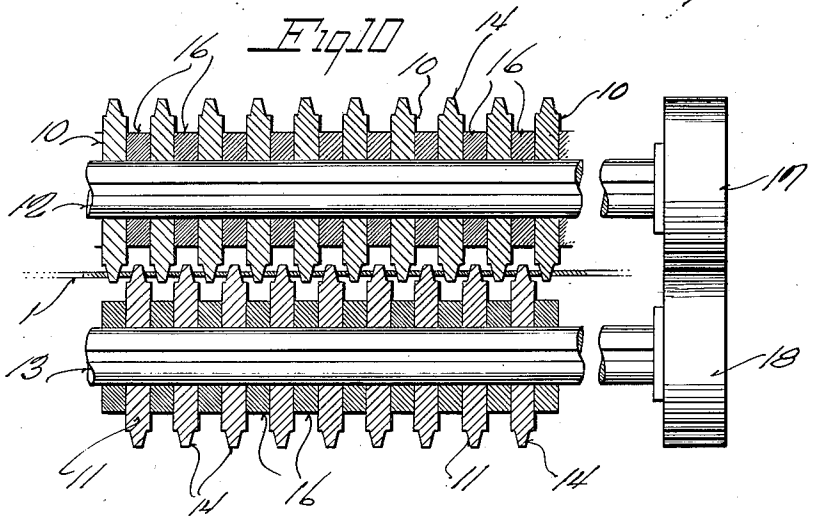


Fig. 10



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Patented July 31, 1934 1,968,365

UNITED STATES PATENT OFFICE

1,968,365

GASKET

Claude B. Bailey, Wyandotte, Mich., assignor to McCord Radiator & Mfg. Co., Detroit, Mich., a corporation of Maine

Application April 27, 1931, Serial No. 533,049

4 Claims. (Cl. 288—1)

This invention relates to gaskets of the type having metal inserts forming supporting layers for the cushion material on opposite sides thereof, and with prongs on the inserts to secure the cushion material thereto.

One object of my invention is to so form and arrange the prongs on the metal layer that when the layers of the gasket are subjected to pressure in the formation of the gasket, the prongs will be bent towards imperforate portions of the metal layer to clinch the cushion material thereto instead of folding back toward the holes in the metal layer from which the prongs are cut, and thus avoid an insecure fastening of the cushion material to the metal layer.

Another object of my invention is to so arrange and form the prongs on the metal layer that the latter is provided with a multiplicity of sets of prongs with certain of the prongs of each set longer than the others, so that the longer prongs may be bent toward the shorter prongs to clinch the cushion material against the metal layer between each set of long and short prongs.

A further object of my invention is to alternate the short prongs with the long prongs, so that the long prongs will cooperate with the short prongs struck out from the metal layer at the ends of the openings next following the long prongs in securing the cushion material to the metal layer.

A further object of my invention is to have the long prongs at such an angular arrangement to the metal layer and have such contour that the long prongs tend to curl rather than flatten out when pressure is applied to secure the cushion material to the metal layer.

The invention consists further in the matters hereinafter described and claimed.

In the accompanying drawings—

Fig. 1 is a top plan view of a cylinder head gasket constructed in accordance with my invention;

Fig. 2 is an enlarged longitudinal sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view showing the prong provided metal insert, the prongs standing in the positions they occupy before the cushion material is applied to the insert;

Fig. 4 is a fragmentary perspective view of the insert as shown in Fig. 3;

Fig. 5 is a plan view of the insert;

Fig. 6 shows the method by which the prongs are formed on the insert;

Figs. 7, 8 and 9 show several steps of the method; and

Fig. 10 shows an assembly of rolls for making the prongs.

As shown in Figs. 1 and 2, the gasket comprises an intermediate supporting layer or insert 1 of suitable sheet metal, such as steel, and two cushion layers 2, 2 of asbestos or other fibrous heat resistant material on opposite sides of the metal layer and completely covering the same. When the gasket is of the cylinder head type, the layers are provided with a plurality of registering openings 3, 4 and 5, respectively. These openings have the arrangement, size and shape required, and constitute in the order indicated, the combustion chamber openings, the water passage openings, and the stud or bolt holes, respectively. In any other type of gasket, the openings will have the size, shape and arrangement as required.

To anchor and firmly secure the cushion layers 2, 2 to the metal layer or insert 1, I provide the latter with a multiplicity of relatively narrow prongs 6, 7 punched or struck out from the metal layer in rows on opposite sides of the same as shown in Figs. 3, 4 and 5. The prongs are preferably arranged in rows extending lengthwise of the metal layer with the prongs of one row staggered with respect to the prongs of an adjacent row. By this arrangement, the prongs are effectively distributed over both sides of the metal layer, and thus enable the cushion layers to be secured or anchored to the metal layer at a multiplicity of points over the same. The holes or apertures 8 made in the metal layer in the projection of the prongs 6, 7 therefrom permit the material forming the cushion layers to be pressed through the openings in the making of the gasket as when pressing the layers together. This provides for a more or less homogeneous connection between the cushion layers on opposite sides of the metal through the holes 8, as shown in Fig. 2.

When pressing the layers together, the prongs 6, 7 are embedded in the cushion layers. Certain of the prongs on opposite sides of the metal layer are bent back toward the metal layer in clinching relation with the cushion layers to more effectively anchor or secure the layers together. This is rendered possible by making certain of the prongs longer than the others, the long prongs being the ones which are bent into clinching relation to the cushion layers. In the drawings, I show the prongs 6, 7 in each row alternately long and short, with a short prong 6 at one end of each aperture or opening 8 and a long prong 7 at the opposite end of said aperture or opening. This arrangement provides imperforate portions

of the metal layer 1 in each row of prongs between each long prong 7 and its following short prong 6. The result is that when the long prongs are bent toward their following short prongs, the long prongs will clinch the cushion material in which they are embedded against the imperforate portions of the metal layer and thus more effectively secure or anchor the cushion material to the metal layer than should the long prongs be bent over the openings from which they extend. To avoid any possibility of this taking place, when pressure is applied on the layers in securing them, the long prongs 7 are initially made to extend toward the following short prongs, as shown in Fig. 4. In other words, the long prongs are bent past the perpendicular in a direction away from their respective openings 8. Moreover, the prongs are slightly curved in this direction and with their outer ends pointed, they will under pressure curl back toward the metal to clinch the cushion material thereto and not flatten out to provide an insecure connection.

The cushion material 2 may be applied to the metal layer 1 in the form of previously made sheets or in moist paste form. When the cushion material is in self-supporting sheet form, the sheets are disposed on opposite sides of the metal layer, and all are subjected to the required pressure to assemble the layers and to cause the prongs to penetrate the cushion layers and clinch the latter to the metal layer. When the cushion material is in paste form, it is usually spread over the opposite sides of the metal layer to the thickness required, whereupon pressure is applied to connect the layers and bend over the long prongs into clinching relation with respect to the cushion layers. Regardless of the manner in which the cushion material is applied to the metal layer, the long prongs clinch the cushion material to the metal layer and the assembly becomes one composite entity. The sheet material so formed, is afterward cut or blanked to the shape and size required with the necessary arrangement of port and other holes or openings for gasket purposes. The metal layer provides an effective support for the cushion layers and with the cushion layers on opposite sides of the metal layers, the exposed faces of the gasket are formed of yieldable material to take into and fit against the surfaces against which they are pressed to provide leak-proof joints. To keep the cushion material from adhering to such surfaces, the exposed faces of the gasket are coated with graphite or the like as indicated at 9 in Fig. 1.

In Figs. 6 to 9, I have shown a method for making the prong provided layer or insert 1. The metal sheet is passed between a set of upper and lower discs or rolls 10, 11, keyed or otherwise fixed to supporting shafts 12, 13. Each disc or roll is provided with a plurality of teeth 14 on its periphery and projecting radially outward therefrom. The teeth, as the rolls revolve, puncture the metal sheet and form the prongs 6, 7 thereon, as shown. The puncture is made on the initial contact of a tooth with the sheet, as shown at 14 in Fig. 7. As the roll continues to revolve, in the direction of the arrow in Fig. 7, the tooth enters further into the puncture and displaces the metal of the sheet ahead of it and curls the displaced metal upward, providing the long prong 7, as shown in Fig. 8. Continued rotation of the roll completes the prong, as shown in Fig. 9, whereupon the tooth leaves the sheet. The leading edge of each tooth is so made that it will clear itself from the sheet. The outer ends of the teeth are pointed, as shown, to puncture the sheet and also insure the forming of pointed ends of the prongs. As the long prongs are made, the metal sheet is severed along the sides of these prongs, making the slots or openings 8.

To form the rows of prongs lengthwise of the sheet, the rolls or discs in the respective groups are offset laterally with respect to each other by spacers 16, 16, arranged between them as shown in Fig. 10. The rolls on one shaft are arranged opposite the spacers on the other shaft so that the teeth may puncture the sheet in providing the prongs on opposite sides thereof. The shafts are rotated in unison by meshing gears 17, 18 fixed thereon. Guide rolls 19, 19 engage the metal sheet on opposite sides thereof ahead of the rolls to hold the sheet against upward displacement while being punctured by the rolls. The engagement of the teeth with the metal sheet serves to feed it between the rolls as the latter revolves. To stagger the prongs of the various rows, the rolls are arranged on their shafts with the teeth in offset relation circumferentially to the extent desired.

The details of structure and arrangement of parts shown and described may be variously changed and modified without departing from the spirit and scope of my invention, except as set forth in the appended claims.

I claim as my invention:

1. A gasket having openings and comprising a substantially flat metal layer and heat resistant cushion material overlapping the metal layer and substantially co-extensive therewith, said metal layer being provided with a multiplicity of long and short prongs struck out therefrom and extending into the cushion material, the prongs being distributed in closely spaced relation over the area of the metal layer and arranged in rows on the metal layer with a pair of prongs for each opening made in the metal layer on striking out the prongs, the openings in the metal layer being elongated in the direction of the length of the rows and each opening having a long prong at one end and a short prong at the opposite end, said prongs having their base portions directly connected with the metal layer at the openings therein and providing substantially perpendicular barriers on the metal layer for the cushion material, the short prongs extending into the cushion material and the long prongs having their outer ends bent into clinching relation with the portion of the cushion material beyond the outer ends of the short prongs to secure the cushion material to the metal layer.

2. A gasket having openings and comprising outer layers of cushion material and an insert metal layer between the cushion layers and substantially co-extensive therewith, said metal layer being provided with a multiplicity of long and short prongs struck out from the metal layer on opposite sides of the same and extending into the cushion layers, said prongs being distributed in closely spaced relation over the area of the metal layer and arranged in rows thereon with the long prongs of each row alternating with the short prongs of the row, said prongs having their base portions directly connected with the metal layer at the openings made in the metal layer on the striking out of the prongs and erecting substantially perpendicular barriers on the metal layer for the

cushion layers on opposite sides of the metal layer, the openings in the metal layer being elongated in the direction of the length of the rows and having a short prong at one end of each opening and a long prong at the opposite end of the opening, the short prongs extending into the cushion layers and the long prongs having their outer ends bent into clinching relation with the portions of the cushion layers beyond the outer ends of the short prongs to secure the cushion layers to the metal layers.

3. A gasket having openings and comprising a metal layer and heat-resistant cushion material overlapping the metal layer and substantially coextensive therewith, said metal layer being provided with a multiplicity of long and short prongs struck out therefrom and extending into the cushion material, the prongs being distributed in closely spaced relation over the area of the metal layer, the long prongs extending into said cushion material to a greater depth than the short prongs and having their outer ends bent into clinching relation with a portion of the cushion material to secure the cushion material to the metal layer, said long and short prongs forming a multiplicity of barriers for preventing blow-outs.

4. A gasket having openings and comprising a metal layer and heat-resistant cushion material overlapping the metal layer and substantially coextensive therewith, said metal layer being provided with a multiplicity of long and short prongs struck out therefrom and extending into the cushion material, the prongs being distributed in closely spaced relation over the area of the metal layer, the long prongs being bent into clinching relation with the cushion material and substantially bridging the space between adjacent openings formed by striking out the prongs.

CLAUDE B. BAILEY.