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ELBOW FOR CONNECTING AIR CLEANERS AND CARBURETORS

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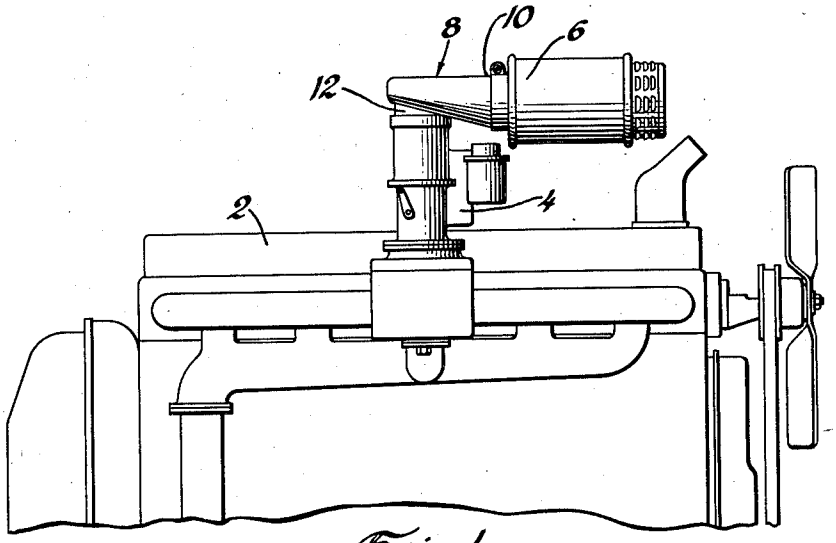


Fig. 1

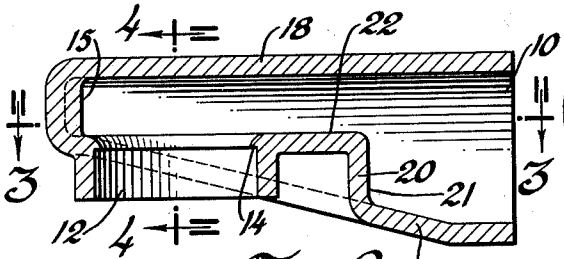


Fig. 2

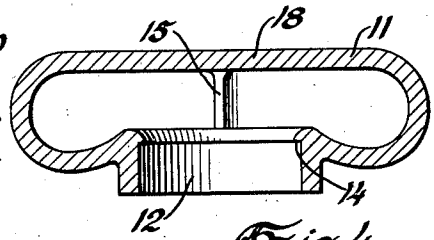


Fig. 4

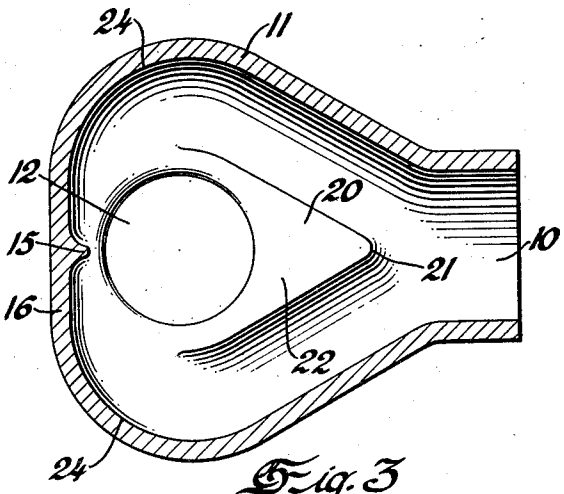


Fig. 3

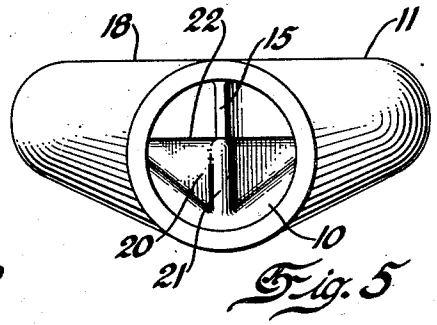


Fig. 5

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ELBOW FOR CONNECTING AIR CLEANERS AND CARBURETORS

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6 Claims. (Cl. 285—211)

This invention relates to an elbow and more particularly to an elbow for connecting a horizontally disposed air cleaner and silencer to the barrel of a downdraft carburetor.

In an ordinary 90° elbow the inner and outer walls swing about the same center. The velocity of air or other fluid traveling therein is much higher at the outer wall than at the inner wall. Where such an elbow is used to connect a horizontally disposed air cleaner assembly to a carburetor the velocity of air entering the carburetor throat is much higher on one side than on the other. Undesirable eddy currents are formed and the carburetion is upset, due to the uneven flow of air. The power output of the engine is considerably reduced due to the eddying effect in the air stream, as well as to the flow resistance in the elbow. The power loss due to the eddying effect is ordinarily much larger than that due to the resistance to flow in the elbow.

The ideal flow into the carburetor would be from still air which would have no eddying effect. Under such conditions the flow would be substantially streamline with approximately no variation in velocity throughout the cross sectional area of the carburetor throat. The power output of an engine using the elbow disclosed herein closely approaches the power output of the engine with the elbow and air cleaner removed and the carburetor throat directly exposed to still air. This indicates that flow conditions through the elbow closely approaches the ideal. Accordingly, it is an object of this invention to provide a means for connecting an air cleaner and silencer with the throat of a carburetor arranged at an angle thereto which greatly increases the power output over that obtained with elbows used heretofore.

It is also an object of this invention to provide an elbow in which eddy currents are reduced to a minimum.

Another object of this invention is the provision of a connection in which the height of the air cleaner above the carburetor is reduced over certain devices heretofore used.

A specific object of this invention is to provide a means for connecting a horizontally disposed air cleaner and silencer with the vertical throat of a downdraft carburetor in which resistance and turbulence are greatly reduced over that of connecting means heretofore used.

Other objects and advantages of this invention will become more apparent as the description proceeds. Reference is herein made to the drawing forming a portion of this specification in which:

Figure 1 is an elevational view of a portion of an internal combustion engine having a horizontally disposed air cleaner and silencer attached to the carburetor thereof by means of the elbow of this invention.

Figure 2 is a sectional view of the elbow taken substantially on the medial plane thereof.

Figure 3 is a sectional view on line 3—3 in Figure 2.

Figure 4 is a view on line 4—4 in Figure 2.

Figure 5 is an end view of the elbow looking toward the left in Figure 2.

In the drawing, 2 is an engine having a downdraft carburetor 4 connected to a combination intake silencer and air cleaner 6, by means of the elbow of this invention, indicated generally at 8. The elbow 8 has a generally horizontal air passageway formed therein which comprises a circular portion 10 which joins the air cleaner assembly and a flared or widened portion 11. Connected to the horizontal passageway substantially centrally of the widened portion 11 is a circular passage 12 at a right angle to the first passageway. A lip 14 is provided where the two passages join in order to assist in reducing frictional resistance to flow. The central axis of the passage 12 is located at the intersection of a vertical plane through the axis of the portion 10 and a vertical plane through the widest part of the flared portion 11. A curved projecting portion 15 in the rear end wall 16 of the horizontal passageway, is provided in order to assist in directing air into the vertical passage. The top wall of the horizontal passage gradually changes from the curved circular portion at the junction with the air cleaner to a flat wall 18 at the wide portion 11, as best seen in Figures 4 and 5. The lower wall 19 of the horizontal passageway slopes gradually upwardly toward the left as viewed in Figures 1 and 2.

The extreme width of the portion 11, as shown in the drawing, is approximately twice the diameter of the entrance portion 10, while its height is approximately half thereof. These proportions may vary considerably, however, so long as the size is sufficient to cause no undue restriction to air flow within the passageway.

A vertically disposed, generally V-shaped member 20 is formed in the lower portion of the horizontal part of the elbow, said member being generally symmetrically arranged with respect to a vertical plane through the central axis of the

horizontal passage, as best seen in Figures 3 and 5. The apex 21 of the V is spaced slightly to the left of the point where the horizontal passageway begins to widen and at a point where the floor is sloping upwardly. The sides of the V are generally parallel to the sides of the flared passage, as seen in Figures 3 and 5, and divide the lower portion of the passage into two portions. Thus the V-shaped member may be termed an "air splitter".

The upper surface 22 of the "air splitter" is preferably flat and parallel with the flat wall 18. As indicated in the drawing, the space between the portions 18 and 22 is slightly less than half the height of the air passageway at 10. It will be understood, however, that this proportion is only approximate and it may be varied considerably without departing from the invention.

Curved end wall portions 24 are adapted to assist in directing the air from the horizontal passage into the vertical passage 12 without excessive loss due to air resistance. Air traveling in the horizontal passageway contacts the smooth curved portions 24 of large radius and is turned inward toward the central axis of the passage, whereupon it enters the passage 12 from either side thereof, the projection 15 assisting in performing this function. While for maximum efficiency the projection 15 is desirable, for some purposes it may be possible to omit the projection and still attain satisfactory results.

In the operation of the device air will enter the circular portion 10 of the horizontal section of the elbow from the air cleaner and silencer. The lower portion of the air will be divided by means of the "air splitter" into two equal or substantially equal portions. Thereupon the divided portions will travel on either side of the V-shaped member and the rising floor will direct the two portions upwardly. Air will enter the vertical passage 12 from all sides thereof with substantially no eddying effect. The power output of the engine is consequently greatly increased over that obtained with an ordinary elbow.

While the invention has been described in connection with an elbow for joining a horizontally disposed air cleaner with a downdraft carburetor, it will be understood that the device is not so limited and may be, if desired, used to connect any air cleaner to a carburetor throat at an angle thereto. Also, while the device has been described in connection with the flow of air into a carburetor, the elbow of this invention is not limited thereto and it may be used in any installation where it is desirable to obtain streamline or substantially streamline flow in one fluid passage at an angle to another.

Various changes and modifications in the relative sizes and arrangements of the several parts may be made without departing from the spirit of our invention and we do not wish to limit the patent thereon other than as necessitated by the prior art.

We claim:

1. A device for connecting an air cleaner to a carburetor at substantially a right angle thereto comprising, a member having an air passageway therein comprising a portion of constantly increasing width and constantly decreasing height and a second air passageway at right angles to said first mentioned passageway and joining the same; said member also having a projection formed in one end of the first passageway, a curved lip portion adjacent the junction of the two passageways and a generally V-shaped member in the lower wall of said first mentioned passageway in substantial alignment with the projection which divides a portion of the same into two parts.

2. An elbow for connecting an air cleaner to a carburetor arranged at an angle thereto comprising, a member having a first air passageway substantially circular at the entrance thereof and of approximately twice the width and one-half the depth of the circular portion adjacent the exit thereof, a second air passageway of substantially the size of the circular entrance portion of the first passageway joining the first passageway at an angle, an "air splitter" in the widened portion of the first passageway and a projecting portion in the wall adjacent the exit in substantial alignment with the "air splitter", said "air splitter" and projecting portion directing air traveling in the first passageway into the second passageway substantially free of eddy currents.

3. An elbow comprising, a member having a first passageway and a second passageway connected to said first passageway at an angle, said first mentioned passageway comprising a portion of substantially uniform diameter and a flared portion of substantially twice the width and half the height of the portion of uniform diameter adjacent the juncture of the two passageways, a lip formed at the juncture of the first and second passageways, a member formed integral with a wall of said first passageway for dividing a portion of the same into two smaller passageways, and a curved projecting member formed in the end wall of said first passageway, said curved projecting portion being in substantial alignment with the member formed integral with the wall of the first passageway.

4. An elbow comprising, a member having a first passageway and a second passageway connected at an angle to said first passageway, the first of said passageways having a wide, flattened portion adjacent the connection with the second passageway, and means to divide a portion of said first passageway at the wide flattened portion into two parts.

5. An elbow as in claim 4 in which the last mentioned means is a substantially V-shaped member formed in a wall of said first passageway.

6. An elbow comprising, a member having a first passageway and a second passageway connected at an angle thereto, and means in said first passageway adjacent the junction with said second passageway to direct a fluid from said first passageway into said second passageway substantially free of eddy currents, said means including an "air splitter" in said first passageway.

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