This invention relates to an improved exhaust pipe for internal combustion engines and more especially for gasoline engines used to propel automobiles, trucks, busses and the like.

Much difficulty has been heretofore experienced on account of the oxidization of automobile exhaust pipes. This oxidization largely results from the fumes and acids which are formed by the burning of gasoline and which readily attack the metal in the pipes. The oxidization is particularly noticeable at the outlet of the pipe. At the outlet some of the escaping fumes flow reversely and contact the outside of the pipe immediately after the engine is stopped, resulting in deterioration from without as well as from within.

It is my belief that the greatest damage is done to the rear end of the tail pipe by its cooling off after the engine is stopped. I have observed that in automobiles which are driven many hours at a time day after day, that deterioration of the tip of the tail pipe is not as noticeable as in city driving, making short trips. It is the cooling of the exhaust pipe in the presence of oxygen which causes the deterioration. As both the outside and inside surfaces of the tip of the tail pipe are subjected to the exhaust fumes and subsequent cooling, this is where the most rapid deterioration occurs. By shielding this tip from exposure to the exhaust fumes and also insulating the same against attack from oxygen the tip is thus preserved against substantial deterioration. It is therefore an object of this invention to provide an exhaust pipe having a detachable section on the exhaust end, whereby that portion of the pipe which more readily deteriorates may be replaced without disturbing the other portions.

It is another object of this invention to provide a detachable end section for exhaust pipes, which section is made of a material such as asbestos or the like which will resist the corrosive action of the heat, acid and gases which accompany engine exhaust and which will protect both the interior and exterior surfaces of the end of the tail pipe from exposure to circulating air.

Another object of the invention having been stated, other objects will appear when taken in connection with the accompanying drawings, in which—

Figure 1 is an elevation, showing certain portions of an automobile in dotted lines, illustrating my improved detachable end section for an exhaust pipe of an internal combustion engine;

Figure 2 is an enlarged sectional view taken along the line 2—2 in Figure 1;

Figure 3 is an exploded isometric view showing portions of the detachable pipe section;

Figure 4 is an isometric view of the section as it appears when detached from the exhaust pipe.

Referring more particularly to the drawing, the numeral 10 indicates an automobile of a conventional type which has an elongated exhaust or tail pipe 11. This exhaust pipe provides the products of combustion from an internal combustion engine and muffler not shown, to a point rearwardly of the automobile body.

As heretofore stated, when the engine is stopped, the atmosphere not only is in contact with all of the exterior of the tail pipe, but it circulates on the inside of the pipe at the rear open end for an inch or so and therefore the pipe is attacked by oxidation more than further back in the pipe, and this end portion is eaten away by oxidation much sooner than the remaining portion of the exhaust system.

In order to reduce the above described deterioration, of the end of the tail pipe a suitable extension or section 12 has been provided to be secured to the exhaust end of the tail pipe 11 thereby forming a two piece exhaust conduit. This extension 12 is preferably formed as a laminated structure, however, other forms may be employed in its production. In the present embodiment of the invention, the extension 12 comprises an outer shell or cylindrical member 14 which is preferably made of cardboard so treated as to make it a fire-resistant material. This material should be treated so as not to be subject to oxidation and rust due to the action of the oxygen in the air in combination with the products of combustion. This tube is preferably wound in a parallel wind of several convolutions of the cardboard until the desired thickness is obtained.

As the tube 14 is being wound from the cardboard, casein glue is applied to the cardboard. Disposed within the outer tube 14 is another tubular member 15 which is formed from a suitable fire-proof or fire-resistant material, such as asbestos. Disposed within the member 15 is a shorter tubular member 16 which is also made from asbestos or other fireproof or fire-resistant material. This latter member being shorter, thus provides a shoulder 17 to limit the amount the extension 12 can be telescoped over the end of tail pipe 11. The extension could be made devoid of the shoulder, provided care was employed in installing the same on the tail pipe end. When the parts 14, 15 and 16 are assembled, the
finished article is then placed in a pressure tank which contains Bakelite varnish, which is a non-inflammable synthetic material produced by the action of formaldehyde on phenol. This impregnates the layers of the tube and has a cementing effect to bind the layers together to form an integral structure after the same has dried. It is then placed in a drying oven and subjected to a temperature of 275 degrees Fahrenheit until the same is thoroughly dried. The members 14 and 15 have longitudinally disposed coinciding slots 18 and 19 respectively therein, which slots extend from one end of the assembled members. This enables the extension beyond shoulder 11 to have a certain amount of resiliency to permit it to be inserted and clamped over the end of the tail pipe 11 without forcing the same, and thus accommodates the extension to slight variations in sizes of the tail pipes.

The finished extension 12 is secured in position on the end of the tail pipe by any suitable means such as a clamp 20 having threaded screw 21 for securing the ends of the clamp together to thereby bind the overlapping portions of members 14 and 15 around the extreme exhaust end of tail pipe 11.

In the drawing and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being set forth in the appended claims.

I claim:

1. An extension for an exhaust pipe for internal combustion engines, comprising an outer tube formed from fibrous material and being impregnated with Bakelite, and an inner tubular member of shorter length than the outer tubular member and disposed within the first-named tube and being of fireproof material, and forming a shoulder to fit against the end of the exhaust pipe, and means for securing the end of the extension having the shoulder on the interior thereof over the end of the exhaust pipe.

2. An extension pipe for tail pipes of internal combustion engines comprising a tubular member of fibrous material, a second tubular member of fibrous material fitting within the first tubular member and being of less length than the outer tubular member, thereby forming a shoulder to fit against the end of the tail pipe while the outer tubular member fits over the end portion of the tail pipe, and means for securing the extension pipe to the end portion of the tail pipe.

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