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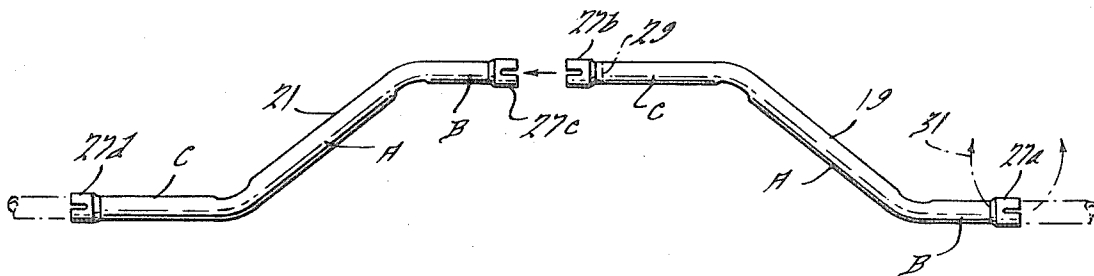
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[54] **EXHAUST SYSTEM ASSEMBLY**
 6 Claims, 3 Drawing Figs.

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 117, 155; 180/64 A

ABSTRACT: An exhaust gas conduit assembly especially adapted for use as replacement piping in internal combustion engine exhaust systems includes a kickup or overaxle section composed of two members which prior to assembly are identical in construction, being preferably of a generally Z-shape.



EXHAUST SYSTEM ASSEMBLY

BRIEF SUMMARY OF THE INVENTION

It is the purpose of this invention to provide a means for materially reducing the inventory of exhaust system pipes required to service vehicles such as school buses, trucks and the like.

The invention accomplishes this by means of an overaxle or kickup assembly which comprises two conduit members which can be interconnected to form an arch that will carry gases over the axle and differential housing of a school bus or other vehicle. Being identical, the two members which form the kickup materially reduce inventory and they make it possible to employ straight pieces of pipe for much of the remaining length of the exhaust system thereby avoiding the need to stock long awkwardly shaped pipe sections that may differ widely from one vehicle to another.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of a type of school bus (shown in phantom) exhaust system incorporating the invention, the pipe clamping elements being omitted for the sake of clarity;

FIG. 2 is an enlarged side view of the kickup or overaxle portion of the exhaust system prior to interconnection as provided by the two identical pipe members constructed in accordance with this invention; and

FIG. 3 is a view similar to FIG. 2 but showing the parts immediately prior to interconnection and with one of the overaxle members cut off so that it can be inserted into the other. This view can be either a side or top view of an arch assembly embodying the invention, being a side view as applied to FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

The school bus 1 has an internal combustion engine 3 with an exhaust manifold 5 that discharges exhaust gases into the exhaust system 7. The exhaust system includes an exhaust pipe portion 9 and a tailpipe portion 11 which are connected to the inlet and outlet sides respectively of an exhaust muffler 13. The tailpipe 11 must pass over a rear axle and differential assembly 15 for the vehicle 1 and therefore includes an arch shaped kickup section 17 that passes over the axle. The kickup section 17 includes an upstream member 19 and a downstream member 21 which prior to their assembly together are identical and appear as shown in FIG. 2. The exhaust system 7 may also include additional conduits, as required, such as the straight pipe 23 which connects the muffler 13 to the arch member 19 and a straight pipe 25 which connects the arch member 21 to the rear of the bus for discharge of gas to atmosphere.

Each of the kickup members 19 and 21 is of substantially uniform diameter (being formed of one piece of pipe) and generally Z-shaped and has diagonal sections A which are integral with and interconnect parallel sections B and C, sections C being longer than sections B. The ends of the members 19 and 21 have enlarged or flared and slotted bushings formed therein (as indicated at 27a, 27b, 27c, and 27d) sized to receive and be clamped to the straight pipe sections 23 and 25, or to the sections B or C of the members 19 and 21. It will be seen that the offset sections B and C are each parallel to the primary direction of gas flow in the exhaust system 7.

As indicated in FIG. 1, in the case of the bus 1 it is possible to obtain adequate clearance by interconnecting the two members 19 and 21 without the use of a separate straight pipe between them. In fact, this is possible with most school buses now on the road. Thus, in order to interconnect the members

19 and 21 the flared end 27b is cut off to leave section C the desired length as indicated by the dotted line 29. Section C of kickup member 19 will then fit inside the bushing 27c and the slots will permit the bushing to be tightly clamped to it by the usual clamp means (not shown). Obviously, the bushing 27c could have been cut off instead of bushing 27b, if desired. Also, as previously implied, a separate pipe (not shown) could be inserted between the members 19 and 21 as seen in FIG. 2 and clamped inside of bushings 27b and 27c if the obstacle to be avoided by the exhaust system requires it.

The rear axle 15 requires a vertical deviation of the exhaust system tailpipe portion 11 from a straight line or main direction of gas flow but lateral or transverse deviations are also easily obtained with the arch section 17. This is indicated by curved lines 31 showing that the plane defined by the members 19 and 21 may be angularly adjusted by simply rotating the members to the desired angle prior to clamping. Such adjustment provides a means to vary the vertical location of the top of the kickup section 17 and also provides additional adjustment in a direction transverse to the vehicle that may be useful in clearing shock absorbers, spare tires, rear doors, wheel walls, etc.

While most school buses have exhaust systems which can be satisfactorily formed with the two sections 19 and 21, it is possible to use a third or even more of the Z-shaped sections as desired.

It is apparent that the invention provides gas flow conduits for an exhaust system in the nature of a kit for on the job assembly that are the ultimate in simplicity, involving a minimum number of parts, minimum storage facilities, easy assembly and installation, and enable the piping to be custom fitted upon installation to the vehicle involved. Thus, the invention makes satisfactory replacement exhaust systems available at a minimum cost.

Modifications may be made without departing from the spirit and scope of this invention.

I claim:

1. In a motor vehicle having an internal combustion engine at the front and a rear axle structure adjacent the rear and an exhaust gas system for conducting exhaust gases from the engine to the rear of the vehicle on the remote side of the rear axle structure from the engine, said exhaust system including an arch shaped conduit assembly extending vertically up and over the rear axle structure, said assembly comprising two arch members coupled together in a gastight joint located substantially at the top of the arch shape and above the rear axle structure.

2. The invention as set forth in claim 1 wherein each of said members has two end sections and an intermediate section joining the end sections, the end sections extending longitudinally of the vehicle.

3. The invention as set forth in claim 2 wherein the end sections are straight and parallel to each other.

4. The invention as set forth in claim 3 wherein the intermediate sections are straight and extend at an angle to the end sections.

5. The invention as set forth in claim 3 wherein three of the four terminal ends of the four end sections has an enlarged bushing formed therein and the fourth terminal end fits inside one of said bushings to form said gastight joint.

6. An over the axle exhaust gas conduit combination for an internal combustion engine exhaust system comprising two substantially identical conduit members, each member consisting of parallel transversely and longitudinally offset conduit end sections and a diagonally extending section joining the respective end sections, the terminal ends of each end section being enlarged to form a bushing having an internal diameter substantially the same as the outer diameter of the conduit member.