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A. R. KRAHN  
 READILY REMOVABLE EXHAUST MUFFLER FOR HIGH  
 VERTICAL EXHAUST STACKS  
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3,401,774

Fig. 1

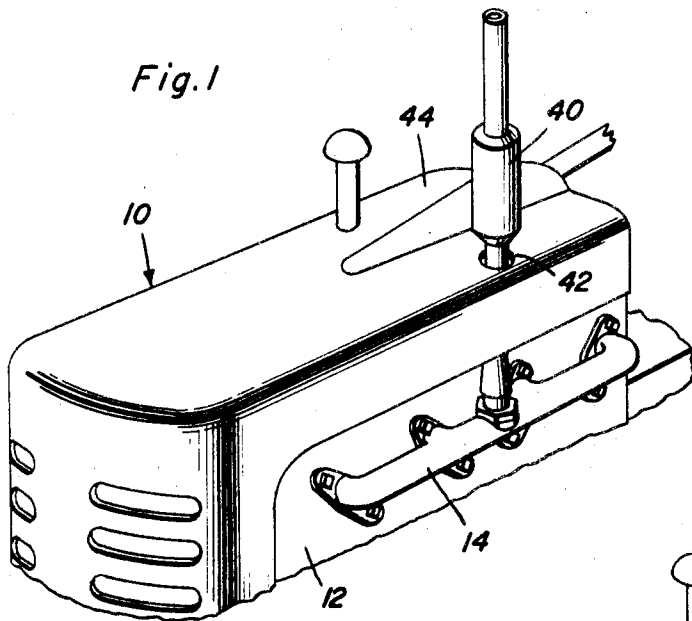


Fig. 2

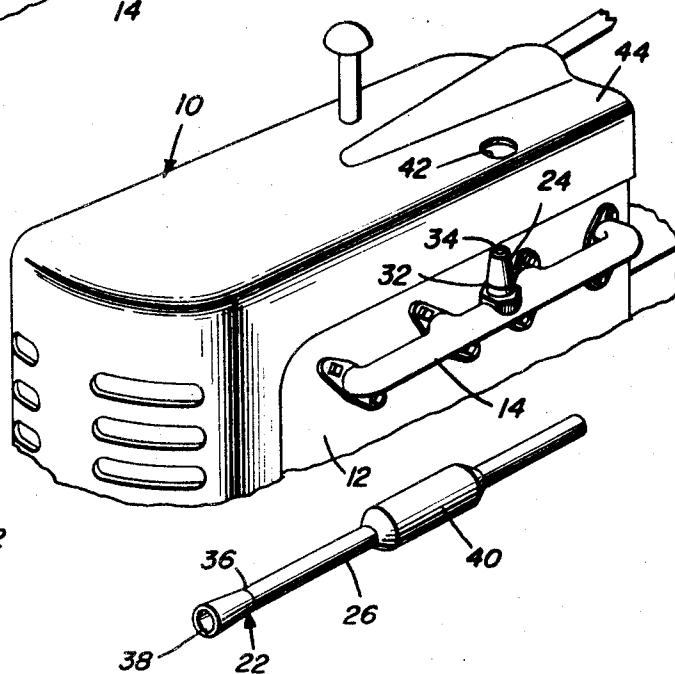
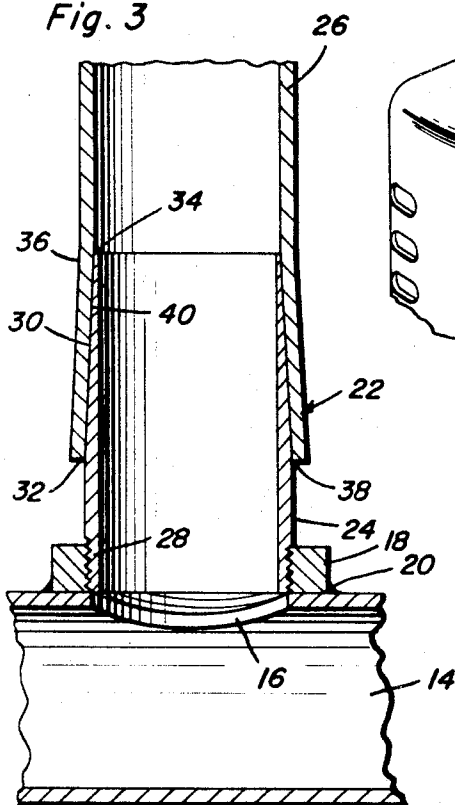


Fig. 3



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## 3,401,774 READILY REMOVABLE EXHAUST MUFFLER FOR HIGH VERTICAL EXHAUST STACKS

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### ABSTRACT OF THE DISCLOSURE

An upstanding exhaust stack assembly for a tractor of the type including a horizontally disposed engine cover spaced above the exhaust manifold of the tractor, the engine cover having an opening formed therethrough through which the exhaust stack assembly extends and the exhaust stack assembly including a lower section whose lower end is supported from and communicated with the interior of the exhaust manifold and an upper section which extends through the opening in the engine cover and is telescopically engaged with the upper end of the lower section. The telescoped end portions of the upper and lower sections include frusto-conical seatingly engaged opposing inner and outer surfaces and the lower end portion of the upper section disposed below the cover being upwardly axially displaceable through the opening.

This invention relates to a novel and useful readily removable exhaust muffler and more specifically to an exhaust muffler and header pipe extension assembly adapted to be utilized on a farm tractor or other similar equipment provided with high substantially vertically disposed exhaust stacks.

Many types of farm tractors are provided with vertical exhaust stacks whose upper ends terminate a spaced distance above the normal position of the head of the driver of the tractor. This high elevation of the outlet end of the exhaust system of farm tractors is of course designed to assure that the exhaust gases from the tractor will be directed upwardly away from the operator of the tractor.

However, such high vertically extending exhaust stacks or pipes sometimes project upward to an elevation in excess of eight feet above the supporting surface of the farm tractor. With this high overhead projection of the exhaust stack or pipe, a tractor cannot be moved through a low doorway of a barn or shed for the purpose of storing the tractor or repairing the tractor in a sheltered location without first removing the exhaust stack or pipe.

Although such high vertically extending exhaust stacks or pipes are, in substantially all instances, removably secured to the associated exhaust manifold or header pipe in a manner such that they may be removed, the means provided for removably securing such conventional exhaust pipes to the associated exhaust manifold conventionally includes bolt-tightened clamps or mounting flanges which, after extended use of the tractor, become severely rusted and/or corroded to an extent that they are inoperable to provide a means whereby the exhaust stack or muffler may be readily removed thereby necessitating breakage of such means if the exhaust pipe must be removed.

Accordingly, the main object of this invention is to provide a novel means by which the vertical exhaust pipe or stack of a farm tractor or the like may have at least a major portion of its upper end portion readily removably supported from the associated exhaust manifold or header pipe.

Another object of this invention, in accordance with the immediately preceding object, is to provide a readily releasable connection between the vertically extending ex-

haust pipe or stack and an associated header pipe or the like devoid of releasable fastening means which could become inoperable due to rust and corrosion.

A final object of this invention to be specifically enumerated herein is to provide a readily removable exhaust stack or pipe for a farm tractor in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to remove and/or replace so as to provide a device that will be economically feasible, long lasting and relatively trouble free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a fragmentary perspective view of a farm tractor including a vertically extending exhaust pipe or stack constructed in accordance with the present invention;

FIGURE 2 is a perspective view similar to that of FIGURE 1 but illustrating the removable portion of the exhaust stack or pipe removed from engagement with the portion thereof secured to the exhaust manifold of the tractor; and

FIGURE 3 is an enlarged fragmentary vertical sectional view taken substantially through a plane passing through the readily disengageable portion of the exhaust stack of the instant invention.

Referring now more specifically to the drawings the numeral 10 generally designates a conventional form of farm tractor including an internal combustion engine 10 provided with an exhaust manifold 14.

The exhaust manifold 14 has an opening 16 formed therein about which an internally threaded coupling member 18 is suitably secured in any convenient manner such as by welding 20.

The vertically extending exhaust stack of the instant invention is generally referred to by the reference numeral 22 and includes a first section 24 and a second section 26. The first section 24 includes one externally threaded inlet end portion 28 which is threadedly engaged in the coupling member 18 and need not, except for replacement purposes, be ever unthreaded from engagement with the coupling member 18.

The outlet end portion of the first section 24 includes outer surface portions 30 which taper from point 32 to the free end 34 of the section 24. Although any suitable taper may be utilized, it has been found that if the outlet end section of the first section 24 tapers in outside diameter approximately one-quarter inch throughout two and one-quarter inches of length of the first section 24, a relatively tight but readily releasable connection between the first and second sections 24 and 26 will be formed.

The inlet end of the second section 26 is truncated from the point 36 to the free end 38 thereof and includes inner surface portions 40 which flare outwardly toward the free end 38 and increase in inside diameter approximately one-quarter inch throughout two and one-quarter inches of length of the inlet end section of the second section 26.

The above dimensions of taper of the sections 24 and 26 are to be appreciated as only exemplary for a given weight of second section 26 and when the inlet and outlet end portions of the first and second sections 24 and 26, respectively, are approximately two to two and a half inches in diameter.

If it is desired, the outlet or second section 26 need not include a muffler. However, the second section 26 does include a muffler section 40 disposed intermediate

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its opposite ends and above an opening 42 formed in the cowl 44 of the tractor 10 through which the second section 26 projects. Of course, the major diameter end portion of the flared lower end of the second section 26 should not be greater in outside diameter than the diameter of the opening 42.

The operation of the exhaust stack 22 should be obvious from the foregoing. Depending upon the weight of the upper or second section 26, the adjacent ends of the sections 24 and 26 telescoped with each other will be given appropriate outside and inside tapers. Of course, the weight of the second section 26 and vibration of the tractor 10 will have a tendency to maintain the lower flared end of the second section 26 fully seated in engagement with the upper tapered end portion of the first section 24 at all times. However, slight lateral back and forth deflection of the upper end of the second section 26 will be sufficient to loosen the connection between the tightly telescoped upper and lower end portions of the sections 24 and 26 to the extent that the upper section 26 may be raised vertically from engagement with the lower section 24. Further, if it is desired, the diameter of the opening 42 and its elevation above the telescopic connection between the sections 24 and 26 may be such that the edges of the cowl 44 defining the opening 42 may properly limit lateral deflection of the upper end of the second section 26 for the purpose of disconnecting the second section 26 from the first section 24.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination, a vehicle of the type provided with an internal combustion engine having an exhaust gas manifold and a stationarily supported generally horizontally disposed engine cover panel spaced above said manifold, an upstanding exhaust gas stack assembly whose lower end is at least substantially fully supported from said manifold and in communication with the interior of said manifold, said panel portion having an opening formed therethrough upwardly through which the stack assembly is loosely received, said stack assembly including upper and lower sections, the lower and upper end

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portions of the upper and lower sections, respectively, being removably telescopically engaged with each other, said lower section terminating upwardly below said cover panel portion, the telescoped end portions of said sections being relatively axially shiftable apart and including opposing inner and outer tapering truncated cone-shaped surfaces seatingly engaged with each other, the edges of said cover panel portion defining said opening comprising means operable to limit angular displacement of said upper section relative to said lower section during manual lateral generally horizontal displacement of the upper end of said upper section for unseating the lower end portion of said upper section from telescoped engagement with the upper end portion of said lower section, said upper section being axially shiftable upwardly through said opening and being supported from and removably secured to said lower section solely by the telescopic engagement of the lower and upper ends of said upper and lower sections, respectively.

2. The combination of claim 1 wherein the longitudinal extent of the overlapped outer and inner surfaces equals generally the average diameter of said overlapped surfaces.

3. The combination of claim 1 wherein the diametric difference between the major and minor dimensional ends of said overlapped inner and outer surfaces equals approximately one tenth of the longitudinal extent of said overlapped surfaces.

4. The combination of claim 3 wherein the longitudinal extent of the overlapped outer and inner surfaces equals generally the average diameter of said overlapped surfaces.

5. The combination of claim 1 wherein said tapering outer and inner surfaces comprise the terminal end portions of the corresponding ends of the associated sections.

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