

# *Service Instruction Manual*

Fourth Issue



SERIES I AND II  
and  
TRIUMPH "RENOWN" MODELS

## EXHAUST SYSTEM

### SECTION S

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# EXHAUST SYSTEM

## INDEX

	<i>Page</i>		<i>Page</i>
Exhaust and induction manifold :—		Exhaust manifold thermostat :—	
To remove. . . . .	1	Description . . . . .	1
To dismantle manifold system . . . . .	1	Function of manifold thermostat . . . . .	2
Manifold maintenance . . . . .	1	Fitting new flap valve spindle and bushes . . . . .	2
Vanguard Series II Supplement . . . . .		7	

## ILLUSTRATIONS

<i>Fig.</i>		<i>Page</i>	<i>Fig.</i>		<i>Page</i>
1	Showing bi-metal spring, stop plate, anchor and stop pin with flap valve in open position . . . . .	1	4	Giving details for the fitting of new bushes and flap valve spindle . . . . .	3
2	Position of flap valve for cold starting . . . . .	1	5	Exhaust and inlet manifold system . . . . .	4
3	Position of flap valve for normal running . . . . .	1	6	Exhaust System—Mounting details. The system shown is that of the "Vanguard" . . . . .	5

### Series II Supplement

<i>Fig.</i>		<i>Page</i>
1	Exhaust system—mounting details for Series II "Vanguard" . . . . .	7

## EXHAUST SYSTEM

### EXHAUST AND INDUCTION MANIFOLD

#### To Remove.

1. Remove Carburettor Air Cleaner and Silencer.
2. Remove ventilation suction pipe. ( $\frac{11}{16}$ " A/F Spanner and  $\frac{7}{8}$ " A/F spanner).
3. Disconnect throttle wire from trunnion on carburettor throttle lever and abutment on manifold.
4. Remove throttle return spring.
5. Detach distributor suction pipe from carburettor ( $\frac{5}{16}$ " A/F spanner) and detach downtake pipe after withdrawal of four  $\frac{11}{16}$ " A/F flange nuts.)
6. Remove manifold drain pipe ( $\frac{9}{16}$ " A/F spanner).
7. Remove eight  $\frac{9}{16}$ " A/F headed coppered steel nuts and two clamps retained by  $\frac{9}{16}$ " A/F headed bolts.
8. Manifold assembly can now be withdrawn, with the carburettor in position, leaving the composition packing pieces in position.
9. Reassembly is the reverse of the foregoing.

#### To dismantle manifold system.

1. Remove carburettor and packings (one thick and two thin) after removal of two  $\frac{1}{2}$ " A/F nuts, two spring and two plain washers.
2. Separate the induction and exhaust manifolds by removal of four nuts, 4 spring and two plain washers, also detach air silencer and abutment bracket.
3. Complete dismantling of exhaust manifold as described under "Fitting New Flap Valve Spindle and Bushes."

#### Manifold maintenance.

Inspect exhaust and induction manifolds for cracks and renew as necessary.

Examine the exhaust manifold thermostat for seizure or worn bushes. In view of the fact that a stainless steel flap valve spindle and bushes are used in this system, replacements should only be required, under normal conditions of usage, after a considerable mileage has been covered. Where such replacements are necessary, the instructions indicated below, under "Fitting New Flap Valve Spindle and Bushes" should be followed.

#### EXHAUST MANIFOLD THERMOSTAT

Description (Figs. 1, 2 and 3.).

The exhaust manifold thermostat comprises a thermostatically controlled flap valve, mounted

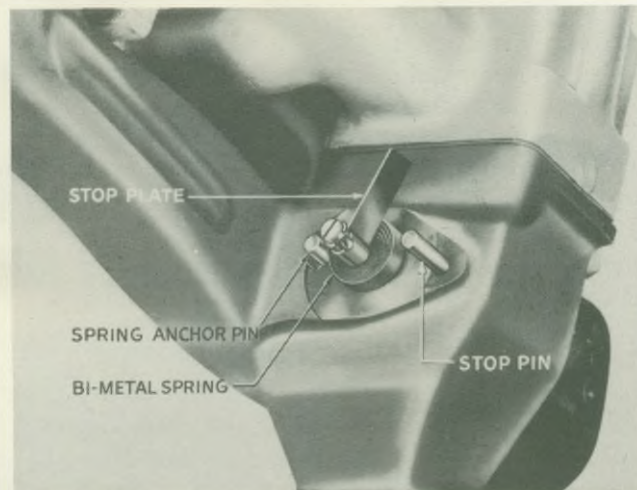


Fig. 1. Showing bi-metal spring, stop plate, anchor and stop pin with flap valve in open position.

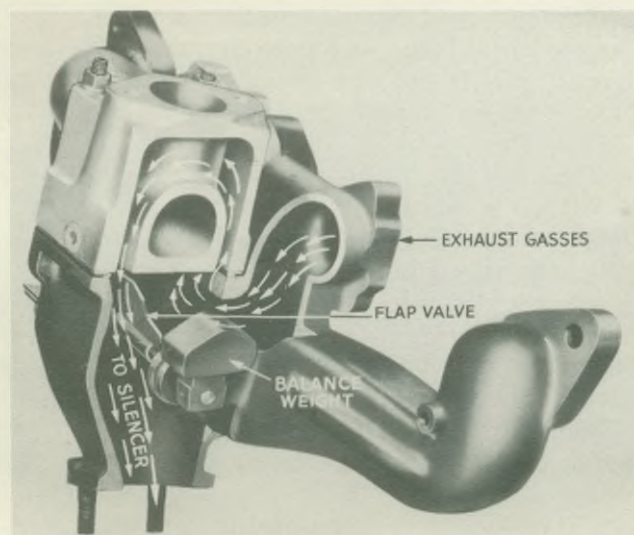


Fig. 2. Position of flap valve for cold starting.

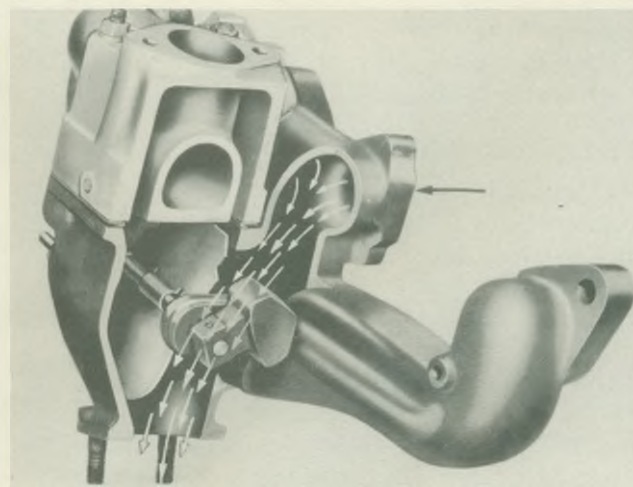


Fig. 3. Position of flap valve for normal running.

## EXHAUST SYSTEM

on a stainless steel spindle which operates in stainless steel bushes pressed into the manifold.

Thermostatic control of the flap valve is automatically provided, as described below, by a bi-metal coil spring, the inner end of which is hooked through the slotted outer end of the stainless steel spindle, on which the flap valve is mounted, the outer extremity of the spring being hooked over a pin on the outer face of the manifold.

The closing of the flap valve is limited by a stop plate, the plate being fitted in the slot in the flap valve spindle, which also accommodates the inner end of the bi-metal coil spring. The stop plate is located endwise, against the bi-metal spring, in the slot, by a split pin, as shown in Fig. 1.

The bi-metal spring is made from metals having different coefficients of expansion, the two layers of metal being welded together. The outer layer of metal is of nickel steel whereas the inner layer is of fairly high percent Nickel iron alloy.

The outer layer of nickel steel, having a greater coefficient of expansion than that of the inner layer of nickel iron alloy, when heated, tends to still further close the coils of the spring around the stainless steel spindle end, as the outer end of the spring is anchored, the closing of the spring coils rotates the spindle with the flap valve. The rotation of the spindle will continue with the rise in temperature, until the upper edge of the flap valve butts against the inside of the manifold.

A balance weight is fitted on the flap valve spindle, as shown in Figs. 2 and 3, being attached thereto by means of a mills pin. The function of the balance weight is to hold the flap valve in its fully open position, against the manifold inner face, and thus prevent any rattle which might otherwise occur.

### Function of manifold thermostat.

The function of the manifold thermostat is to control the flow of exhaust gases, so that these provide the necessary degree of "hot" spotting for various engine temperatures.

When the engine is cold, the flap will assume the position shown in Fig. 2 and the exhaust gases will take the direction shown by the arrows.

As the temperature of the engine rises and the bi-metal spring coils contract, as explained above, the flap valve will move towards the fully open position, as shown in Fig. 3 in which the balance weight comes into action.

In the fully open position the exhaust gases pass directly to the flanged manifold outlet as shown in the illustration.

This controlled flow of the exhaust gases ensures that the necessary initial "hot spotting" is provided to enable a rapid "drive away from cold" without prolonged use of the choke under even the most severe weather conditions. As the engine reaches its normal working temperature, the hot gases are diverted from the induction manifold as shown in Fig. 3, and overheating of the incoming charge is prevented.

The effect of opening the throttle, when the engine is cold, tends to force the flap valve into the open position.

### Fitting new flap valve spindle and bushes.

As previously indicated, the necessity for replacing these items should rarely arise, owing to the small amount of movement which occurs at this point and the employment of non-corrosive materials in the manufacture of the items in question.

After a considerable mileage, owing to a certain amount of wear between the flap valve spindle and bushes, exhaust gases may leak at this point. Where leakage becomes objectionable or serious, it will become necessary to fit a new spindle and bushes. Having removed and separated the exhaust and inlet manifolds, the following procedure is suggested:—

1. Having withdrawn the split pin, which locates the stop plate and bi-metal spring, these latter items can be withdrawn from the slot.
2. The spot welding which secures the flap valve to the spindle can be chipped off with a small chisel or, alternatively, burnt off with a oxy-acetylene torch. After removal of the spot welding, the spindle can be withdrawn with the balance weight.
3. The flap valve is next withdrawn from the manifold and the old bushes driven out of the manifold with a suitable drift.
4. Having driven out the old bushes, the new bush, for the bi-metal spring side of the assembly, should be pressed into the manifold until its outer face is flush with the casting.
5. Press the other bush into the manifold until a side float of .020"—.030" is permitted on the flap valve. The flap valve will naturally be used as a gauge when carrying out this operation.

## EXHAUST SYSTEM

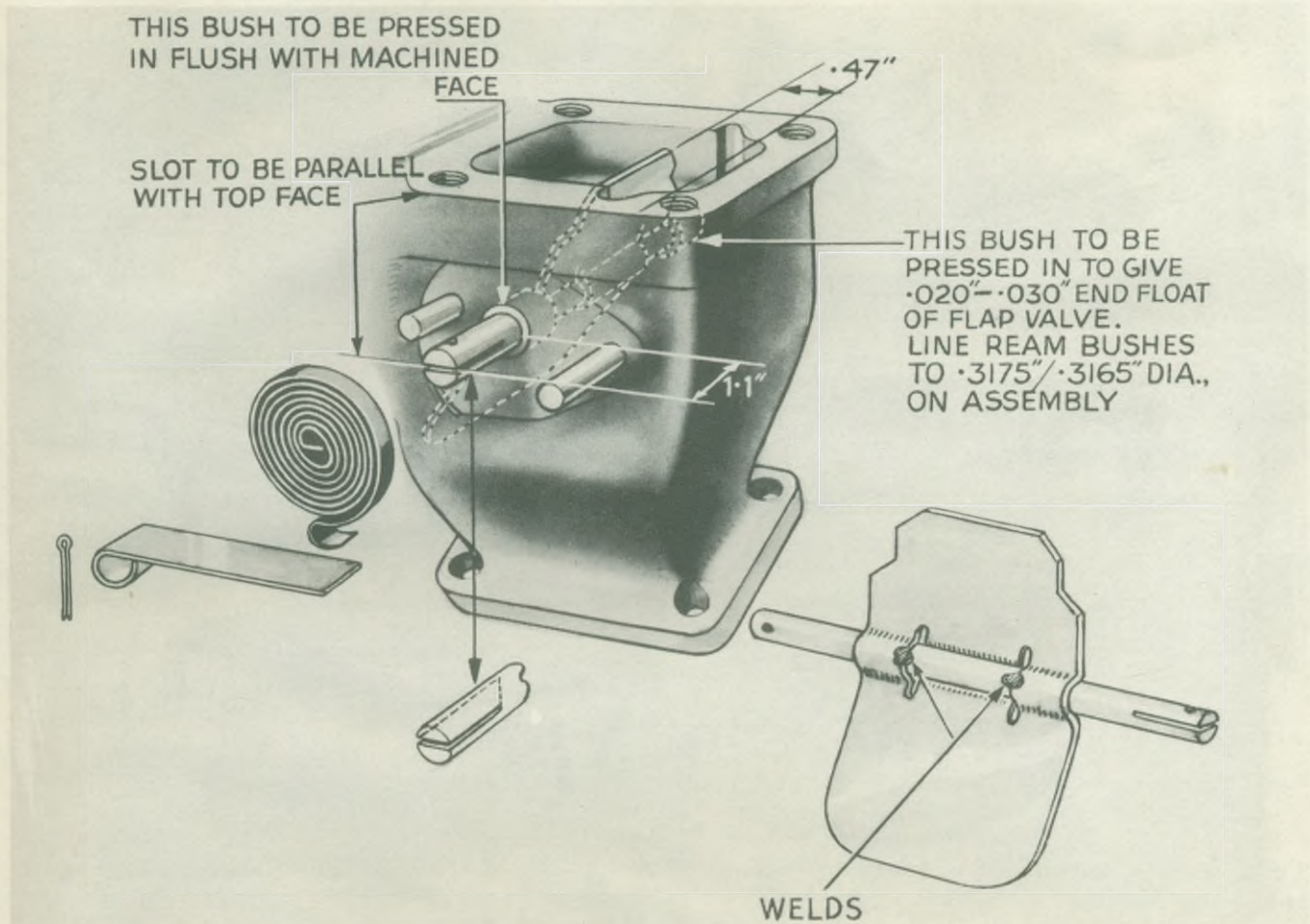


Fig. 4. Giving details for the fitting of new bushes and flap valve spindle.

6. Having positioned the flap valve in the manifold, thread the spindle, with the balance-weight fitted, into the position shown in Fig. 4 so that the short side of the slot is towards the outside and the slot itself is horizontal.
7. Having centralized the flap valve without altering the position of the spindle, place this valve as shown in Fig. 4 and, whilst retaining the valve in this position, spot weld the valve to the spindle as shown in Fig. 4. This operation is best carried out by electric welding and **must be performed with a non-corrosive type of electrode**. In the Works we use a NICREX A.C. welding electrode. If, for any reason, Oxy-Acetylene welding has to be used, a **non-corrosive**

**type of welding bar** must be employed. Whichever method is used, **particular care should be taken to avoid over-heating the spindle**, as such may well cause distortion, which condition is difficult to rectify with the items assembled.

8. The inner end of the bi-metal spring is fitted into the slot in the spindle, with valve retained in the position shown in Fig. 4, and the other end of this spring is then hooked over its anchor pin. The stop plate is located in the slot so that the lower portion of the divided spindle is engaged. The split pin is then fitted to secure the spring and stop plate.
9. The exhaust manifold is now ready for refitting as described earlier.

## EXHAUST SYSTEM

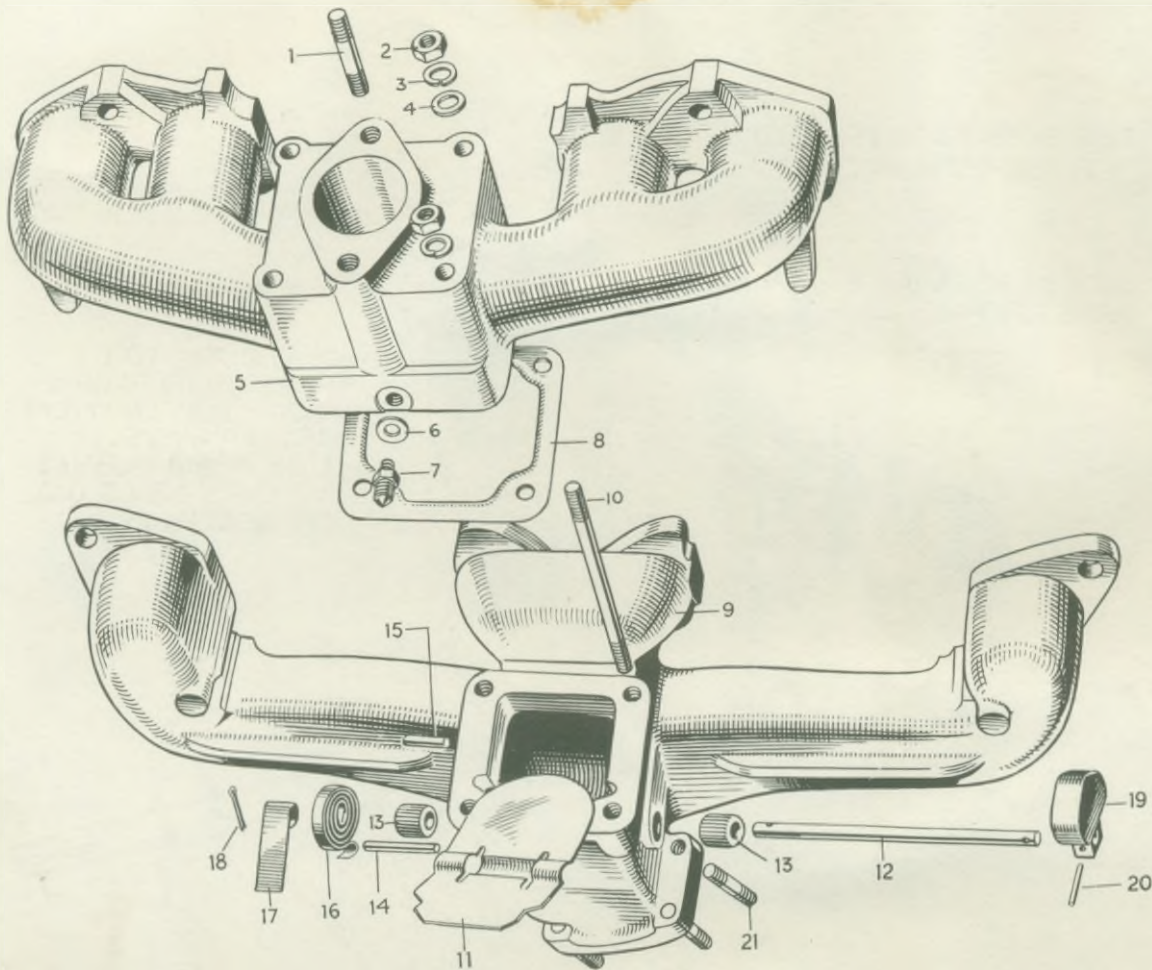


Fig. 5. Exhaust and inlet manifold system fitted on Commission No. V134917 and future (Engine No. V135001E and future).

### NOTATION FOR FIG. 5

Notation No.	Item	Detail No.	No. off
1.	Stud carburettor attachment .. .. .	60402	2
2.	Nut for carburettor or inlet manifold .. .. .	NH.2008	6
3.	Lockwasher carburettor and manifold .. .. .	WL.0208	6
4.	Plain washer for carburettor .. .. .	WP.0008	2
5.	Inlet manifold .. .. .	300474	1
6.	Washer copper .. .. .	500053	1
7.	Union for drain pipe .. .. .	58685	1
8.	Manifold joint .. .. .	103241	1
9.	Exhaust manifold .. .. .	300476	1
10.	Studs—inlet manifold to exhaust .. .. .	101979	4
11.	Flap valve .. .. .	102309	1
12.	Flap valve spindle .. .. .	102357	1
13.	Flap valve bush .. .. .	102311	2
14.	Stop peg .. .. .	101796	1
15.	Spring Anchor Pin .. .. .	500410	1
16.	Bi-metal spring .. .. .	102765	1
17.	Stop plate .. .. .	102360	1
18.	Cotter pin for spindle slot .. .. .	PC.0043	1
19.	Balance Weight .. .. .	102374	1
20.	Mills pin for balance weight .. .. .	500411	1
21.	Exhaust flange stud .. .. .	101442	4

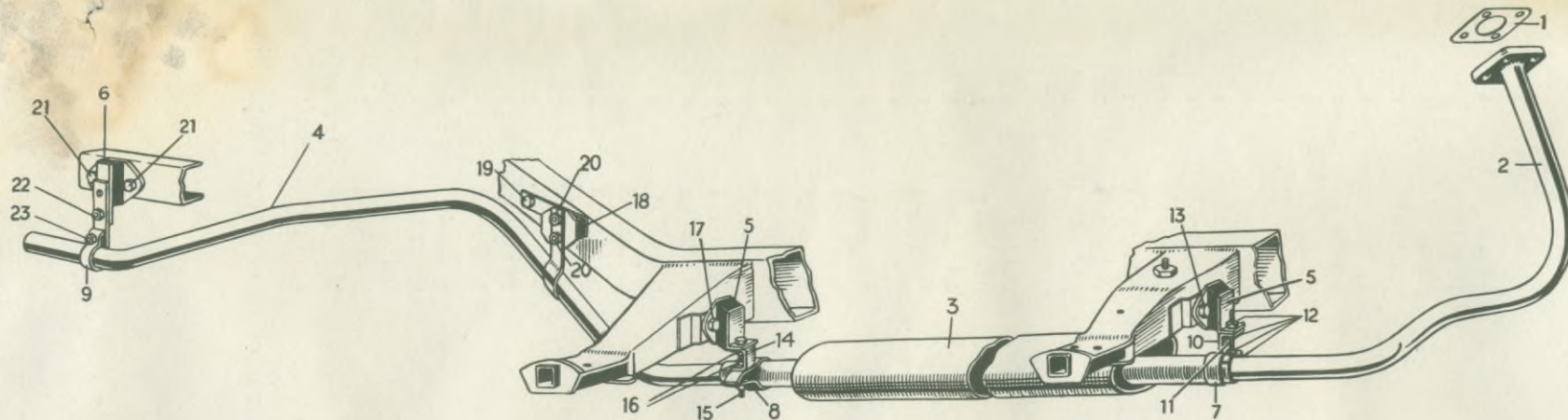


Fig. 6. Exhaust system—mounting details. The system shown is that used on all the "Vanguard" but should also be used in conjunction with the Notation Index for the Triumph "Renown" (see page 6).

20S EXHAUST STSYEM

NOTATION FOR FIG. 6

Notation No.	Item	Detail No.	No. off	Notation No.	Item	Detail No.	No. off
1.	Exhaust flange gasket ..	57924	1	15.	Setscrew ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ 2 $\frac{1}{2}$ ")	UH.0802	1
2.	Front exhaust pipe assembly ..	62042	1	16.	Nut ( $\frac{5}{16}$ " $\times$ 24 N.F.) ..	NH.2008	2
	Front exhaust pipe assembly ..	62043*	1		Washers—lock ( $\frac{5}{16}$ " ..	WL.0208	2
3.	Exhaust silencer .. ..	60262	1	17.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{5}{8}$ ") ..	BH.0805	2
	Exhaust silencer .. ..	61858*	1		Washer—lock ( $\frac{5}{16}$ " ..	WL.0208	2
4.	Exhaust tail pipe .. ..	62029	1	18.	Flexible support .. ..	45078	1
	Exhaust tail pipe .. ..	61854*	1	19.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{5}{8}$ ") ..	BH.0805	1
	Exhaust tail pipe .. ..	60994	1		Washer—lock ( $\frac{5}{16}$ " ..	WL.0208	1
	(For Van and Pick-up Truck)			20.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{5}{8}$ ") ..	BH.0805	2
5.	Rubber mounting .. ..	45484	2		Washer—lock ( $\frac{5}{16}$ " ..	WL.0208	2
6.	Flexible support .. ..	100793	1	21.	Bolt ( $\frac{3}{8}$ " $\times$ 24 N.F. $\times$ $\frac{7}{8}$ ") ..	BH.0907	2
7.	Clip (silencer front pipe) ..	60545	1		Washer—plain ( $\frac{3}{8}$ " ..	WP.0009	2
8.	Clip (silencer rear pipe) ..	60544	1		Washer—lock ( $\frac{3}{8}$ " ..	WL.0209	2
9.	Rear clip (rear pipe) .. ..	62022	1		Nut ( $\frac{3}{8}$ " $\times$ 24 N.F.) ..	NH.2009	2
10.	Stiffener bracket (front) ..	100288	1	22.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{5}{8}$ ") ..	BH.0805	1
11.	Stud ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ 3 $\frac{1}{2}$ ")	60375	1		Washer—lock ( $\frac{5}{16}$ " ..	WL.0208	1
12.	Nut ( $\frac{5}{16}$ " $\times$ 24 N.F.) .. ..	NH.2008	2		Nut ( $\frac{5}{16}$ " $\times$ 24 N.F.) ..	NH.2008	1
	Washers—lock ( $\frac{5}{16}$ " .. ..	WL.0208	2	23.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ 1") ..	BH.0808	1
13.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{5}{8}$ ") ..	BH.0805	2		Washer—lock ( $\frac{5}{16}$ " ..	WL.0208	1
	Washer—lock ( $\frac{5}{16}$ " .. ..	WL.0208	2		Nut ( $\frac{5}{16}$ " $\times$ 24 N.F.) ..	NH.2008	1
14.	Stiffener bracket (rear) ..	100289	1				

\*Left-hand steering Van and Pick-up Truck.

EXHAUST SYSTEM

## EXHAUST SYSTEM

### "RENOVN" (20ST) EXHAUST SYSTEM

Notation No.	Item	Detail No.	No. off
1.	Exhaust flange gasket .. .. .	57924	1
2.	Front exhaust pipe assembly .. .. .	300217	1
3.	Silencer .. .. .	300203	1
4.	Rear exhaust pipe assembly .. .. .	300219	1
5.	Rubber mounting—front .. .. .	45484	1
	Rubber mounting—rear of silencer .. .. .	45078	1
6.	Rubber mounting—rear of tail pipe .. .. .	45484	1
7.	Clip (silencer front pipe) .. .. .	60545	1
8.	Clip (silencer rear pipe) .. .. .	59027	1
9.	Rear clip (rear pipe) .. .. .	37111	1
10.	Stiffener bracker (front) .. .. .	100288	1
11.	Stud ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $3\frac{1}{2}$ ") .. .. .	60375	1
12.	Nut ( $\frac{5}{16}$ " $\times$ 24 N.F.) .. .. .	NH.2008	2
	Washer—lock ( $\frac{5}{16}$ " .. .. .	WL.0208	2
13.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{3}{4}$ ") .. .. .	BH.0806P	2
	Washer—lock ( $\frac{5}{16}$ " .. .. .	WL.0208	2
14.	Silencer bracket .. .. .	101118	1
15.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $2\frac{1}{2}$ ") .. .. .	BH.0820	1
16.	Nut ( $\frac{5}{16}$ " $\times$ 24 N.F.) .. .. .	NH.2008	1
	Washer—plain .. .. .	WP.0008	1
	Washer—lock .. .. .	WL.0208	1
17.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{5}{8}$ ") .. .. .	BH.0805	2
	Nut ( $\frac{5}{16}$ " $\times$ 24 N.F.) .. .. .	NH.2008	2
	Washer—lock .. .. .	WL.0208	2
18.	Flexible support—rear pipe centre .. .. .	45078	1
19.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{3}{4}$ ") .. .. .	BH.0806P	1
	Washer—lock .. .. .	WL.0208	1
	Washer—plain .. .. .	WP.0021	1
20.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{5}{8}$ ") .. .. .	BH.0805	2
	Washer—lock .. .. .	WL.0208	2
	Nut ( $\frac{5}{16}$ " $\times$ 24 N.F.) .. .. .	NH.2008	2
21.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{3}{4}$ ") .. .. .	BH.0806P	2
	Washer—lock .. .. .	WL.0208	1
22.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $\frac{5}{8}$ ") .. .. .	BH.0805	1
	Nut ( $\frac{5}{16}$ " $\times$ 24 N.F.) .. .. .	NH.2008	1
	Washer—lock .. .. .	WL.0208	1
23.	Bolt ( $\frac{5}{16}$ " $\times$ 24 N.F. $\times$ $1\frac{1}{2}$ ") .. .. .	BH.0812	1
	Washer—lock .. .. .	WL.0208	1
	Nut ( $\frac{5}{16}$ " $\times$ 24 N.F.) .. .. .	NH.2008	1
	Washer—plain .. .. .	WP.0008	<i>As required</i>
	Spacer .. .. .	101156	1

*N.B.*—An additional bracket, Detail 101155, is used for attaching the rear tail pipe clip to the flexible mounting.



# VANGUARD—SERIES II

## EXHAUST SYSTEM

### SUPPLEMENT

A slightly modified system of mounting is used with Series II models, as compared with that employed on Series I cars.

With this later method of mounting the flexible rubber mountings at the front and rear of the silencer and at the outer end of the tail pipe have been discarded and are replaced at these points by a single supporting fabric strap used in conjunction with a suitable bracket, pipe clip and clamp plates. (See Fig. 1.)

It is particularly important that the Nyloc nuts on the bolts, which pass through the fabric supports, are not over-tightened (2-3 lbs./ft. tightening torque is specified) and also that the bolt heads and nuts are separated from the fabric strap by either a clamp plate or a bracket according to their position in the system.

The intermediate rubber mounting provided for the tail pipe on Series I models is retained with Series II cars.

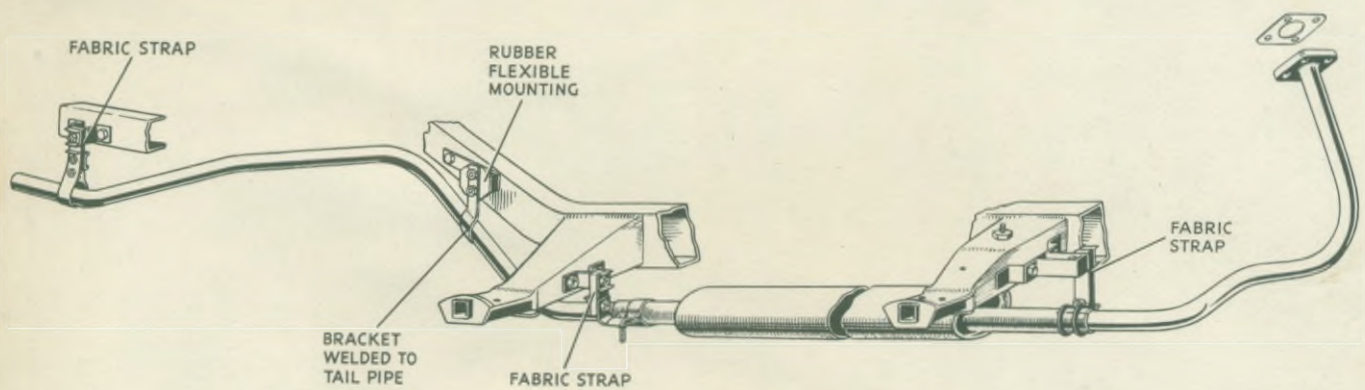


Fig. 1. Exhaust system—mounting details for Series II "Vanguard"