

KES

Design Standard of Alternator

KES M – D005

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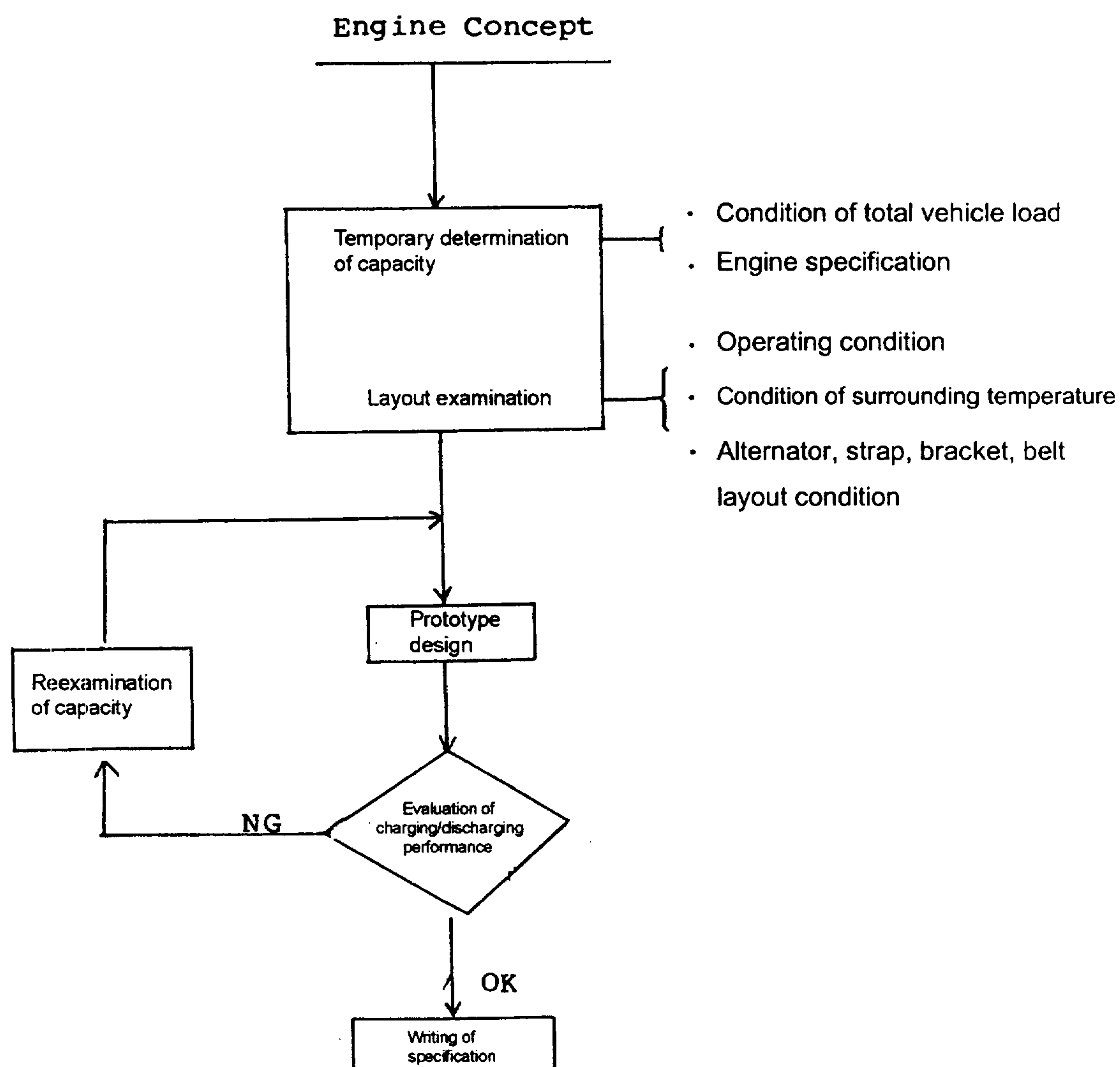
1. Scope of application

This standard shall specify about the alternator with a built-in IC regulator for automobile.

2. Object

This standard's object is to obtain the proper quality from design point by the standardization of design.

3. Design procedure of alternator



4. Examining contents precedent to alternator design

Examine and investigate the contents of alternator design before the design, and refer to the results.

(1) Engine layout(L/O) (Front view, side view, top view and so on)

(a) Layout drawing and components plan of alternator

(b) Layout drawing and components plan of strap

(c) Layout drawing and components plan of bracket

(d) Layout drawing and components plan of vacuum pump hose

(Oil feeding and extraction) – only diesel engine

(2) Engine room(Layout)

(3) Engine specification

(4) Each power consumption(Capacity) about the total electric load used in vehicle

(5) Battery specification

5. Layout design

5.1 Examining particulars in layout

5.1.1 Condition of alternator surrounding temperature

When the alternator surrounding temperature is high(In gasoline engine, More than 110 °C, in diesel engine, More than 100 °C), the temperature affects performance and durability(Regulation about allowable surrounding temperature in specification of alternator) of alternator, so, be careful of not installing the alternator around the point such as exhaust port whose temperature is high. When alternator is installed around the exhaust port as to the engine layout, it is desirable to install the heatproof plate between alternator and exhaust port to protect the alternator from being affected directly from the heat of exhaust port.

So, to install alternator around intake port, decide after due consultation with the

related department from the examination of engine layout.

5.1.2 Examination of the layout of alternator, bracket, strap

- (1) Because the vibration characteristic of engine can do damage to alternator, bracket and strap, design the installing point of alternator around the engine center line from the engine front view and around cylinder block.
- (2) Install alternator, bracket and strap at the point(Cylinder block, cylinder head) where the engine vibration is low(Suppressed). Except the special cases, it is not desirable to install them at water pump housing or A/C housing.

Remark

Specially, in case of light(Small displacement) engine, the vibration amplitude is high. So, consult with related department in examination of engine layout to install them at the point(Cylinder block, cylinder head) where the vibration is low.

5.1.3 Examination about assembling characteristic of alternator

- (1) In assembling the alternator, examine not be interfered with other parts (Cylinder block, oil filter, other engine parts).
- (2) In assembling the terminal B wire harness of alternator, examine if there is the proper space to prevent the assembling error by the interference(Example, assembling tool) with other parts(Example, oil filter)

5.1.4 Examination about after-sales service of alternator

- (1) In examination about engine room layout, by considering the after-sales service of alternator, secure the proper space for disassembling and assembling of strap bolt and bracket-alternator bolt.
- (2) In disassembling alternator, examine the layout to prevent inference with engine mount, drive shaft, bracket and vehicle body and so on.

5.2 Layout design of alternator, bracket-alternator and strap

The belt tension and tension adjusting range depends on rotation of alternator and tension adjusting hole of strap.

After adjusting the belt tension, the relation between alternator and strap should be as figure 1. In case of figure 2 and 3, if alternator is not loaded uniformly, which affects slippage of belt or durability, and it is necessary to reexamine the shape of belt. So, except the special cases, abstain the situations such as figure 2 and 3.

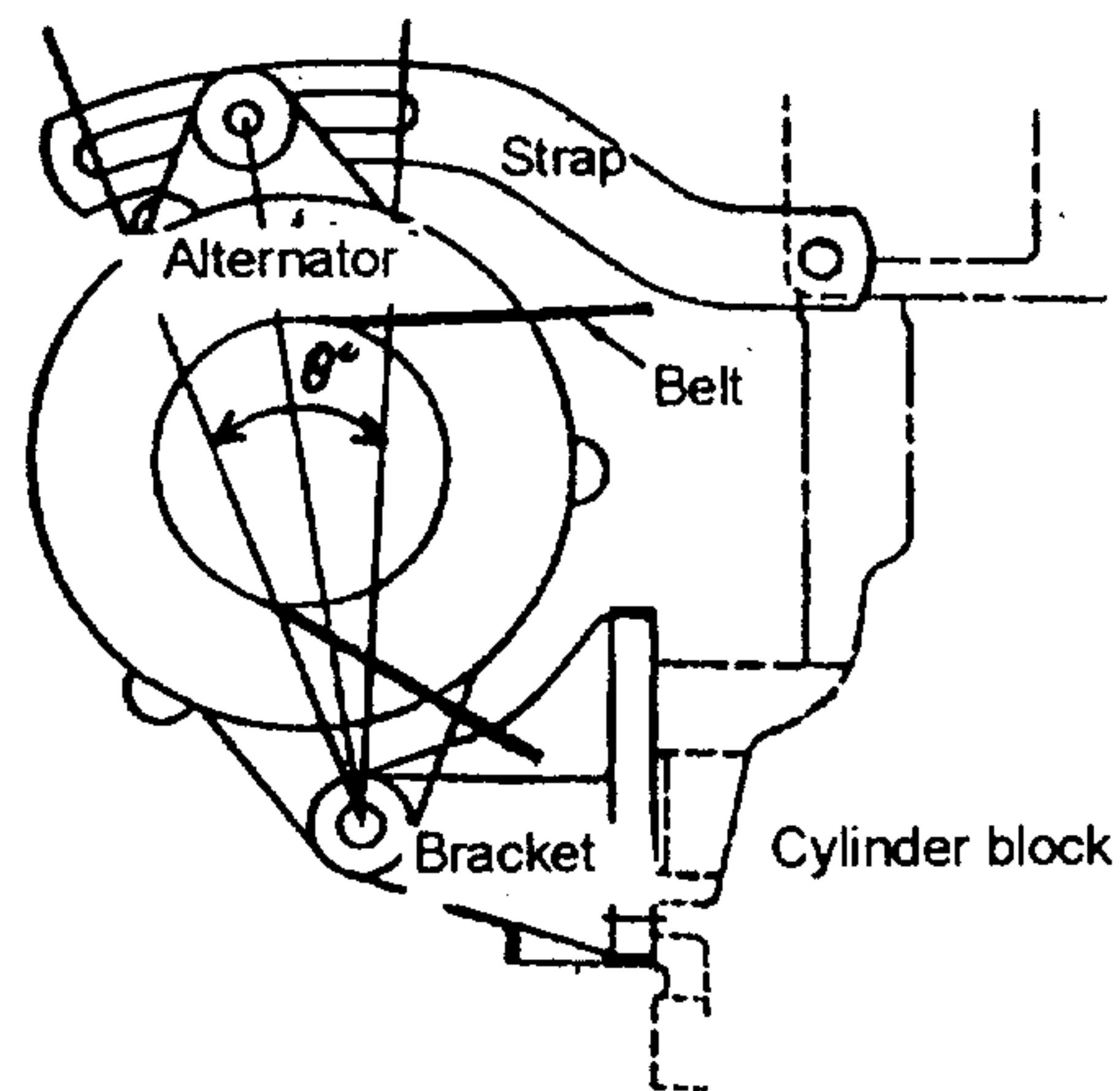


Figure 1. Proper layout

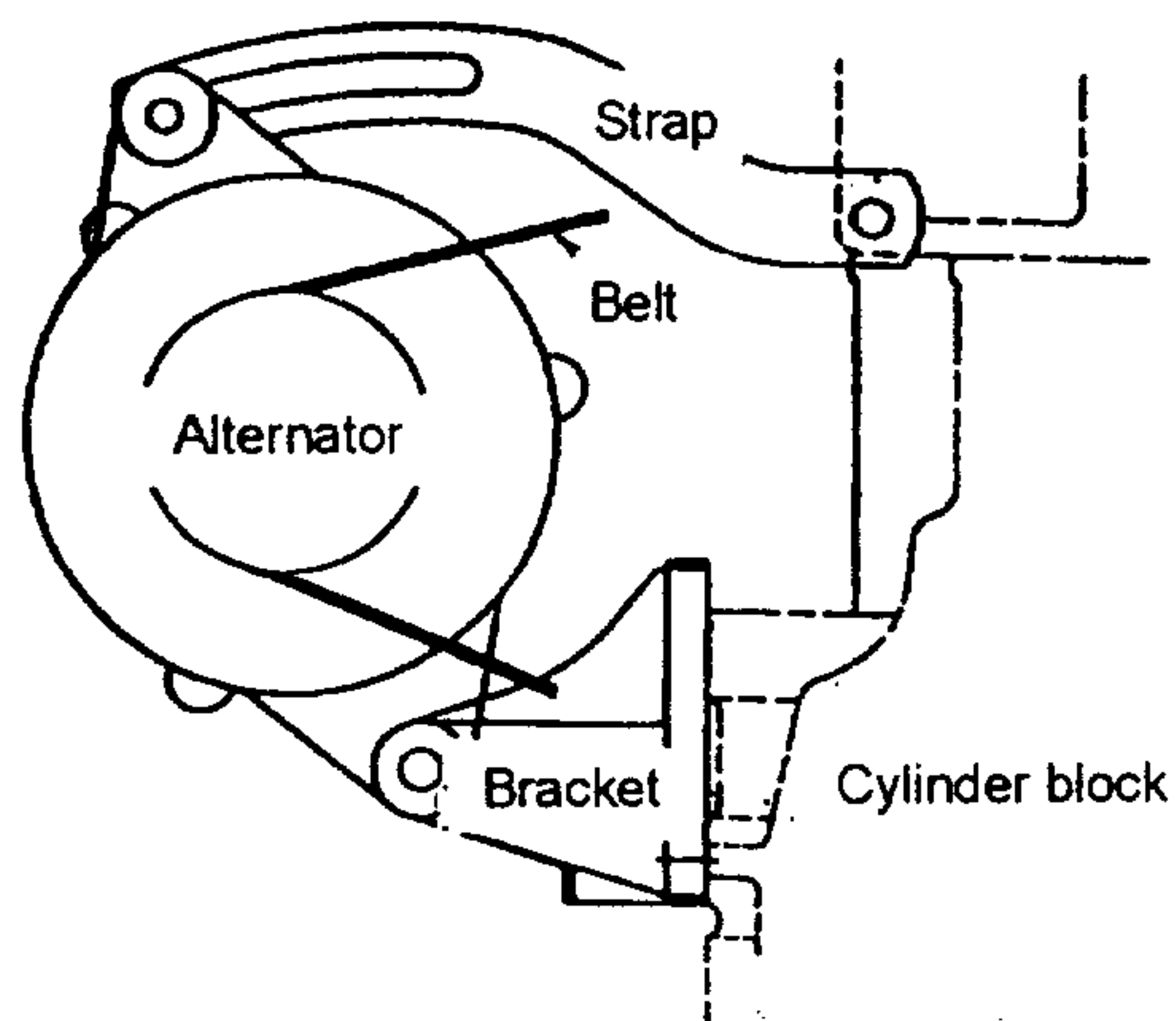


Figure 2. Improper layout

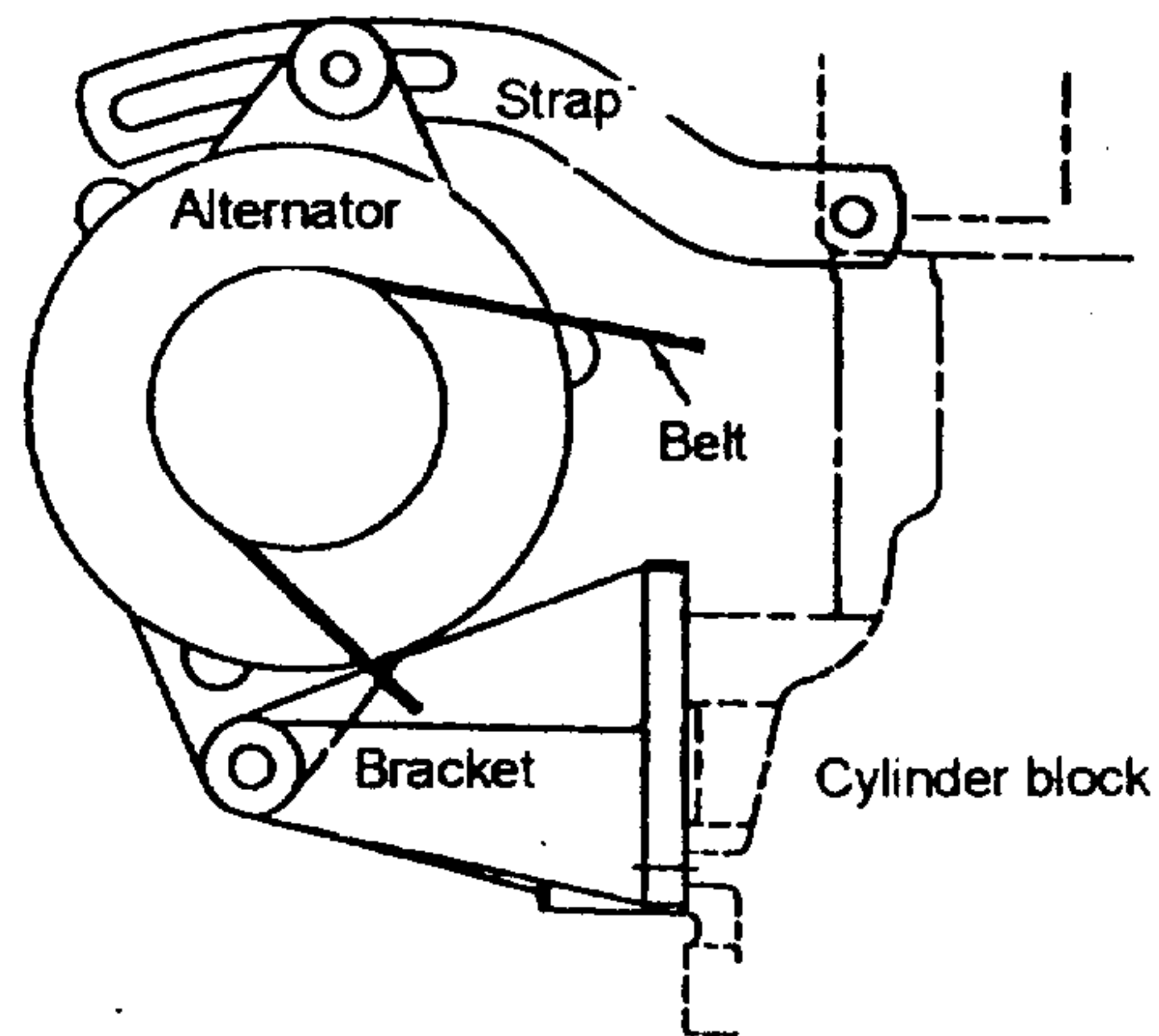


Figure 2. Improper layout

Remark

The rotation range(θ°) of alternator is different according to the installed layout, but the general rotation range is $\theta^\circ = 22^\circ \sim 26^\circ$.

5.3 Design of alignment

The alignment of alternator is determined from the following procedures.

5.3.1 When bracket-alternator and cylinder block(or oil pump bracket) are in one body.

- (1) Like figure 4, calculate the distance(A) between side of cylinder block, ϕ (Engine center or standard point), and crank shaft pulley.

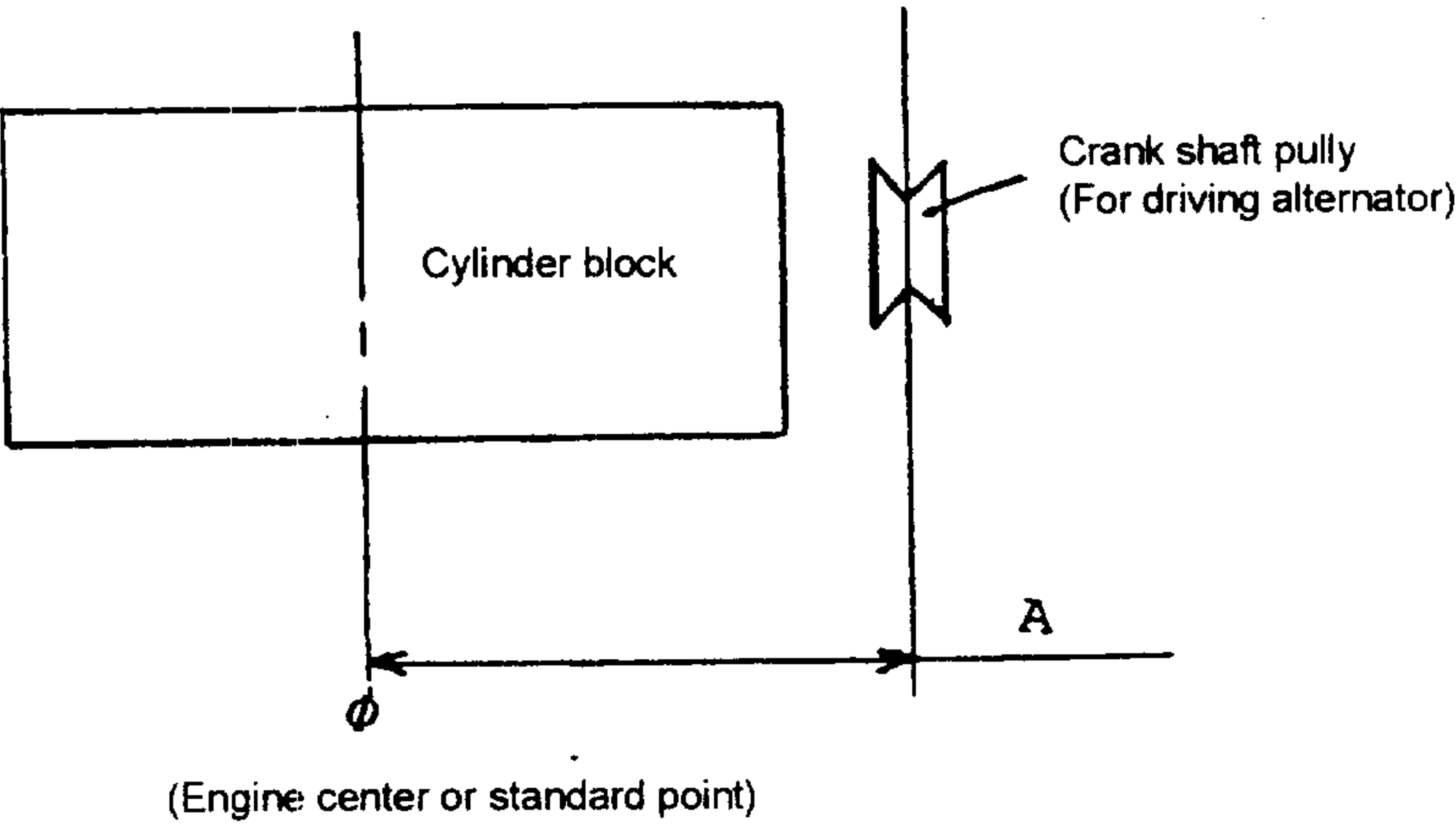


Figure 4

(2) Like figure 5, calculate the distance between side of cylinder block, ϕ (Engine center or standard point), and the first terminal(B) or final terminal(D) of bracket-alternator.

* C : Installed length of alternator mount

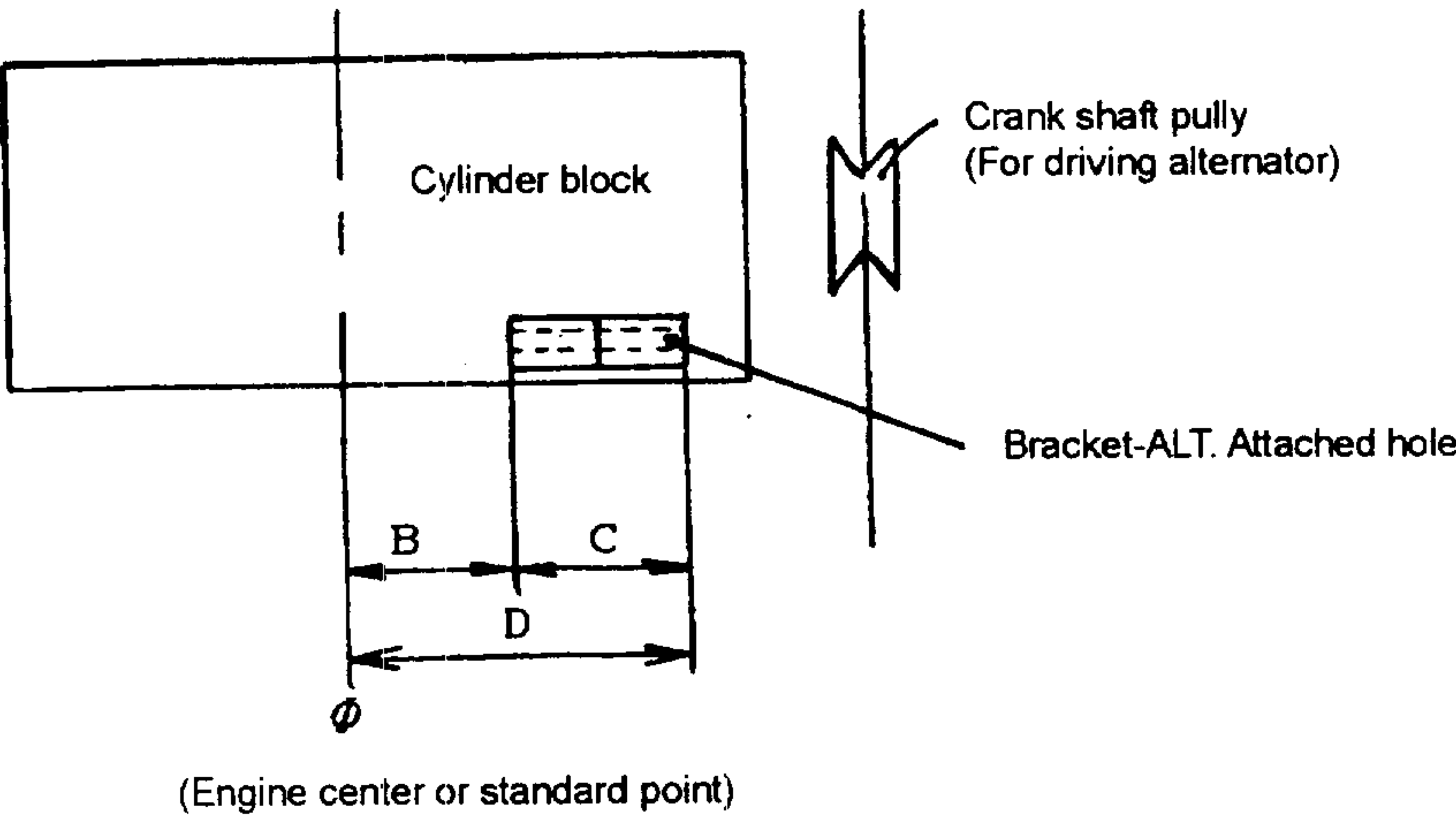


Figure 5

(3) After calculating the distances, A, B, C and D, calculate the alignment(Z) of alternator.

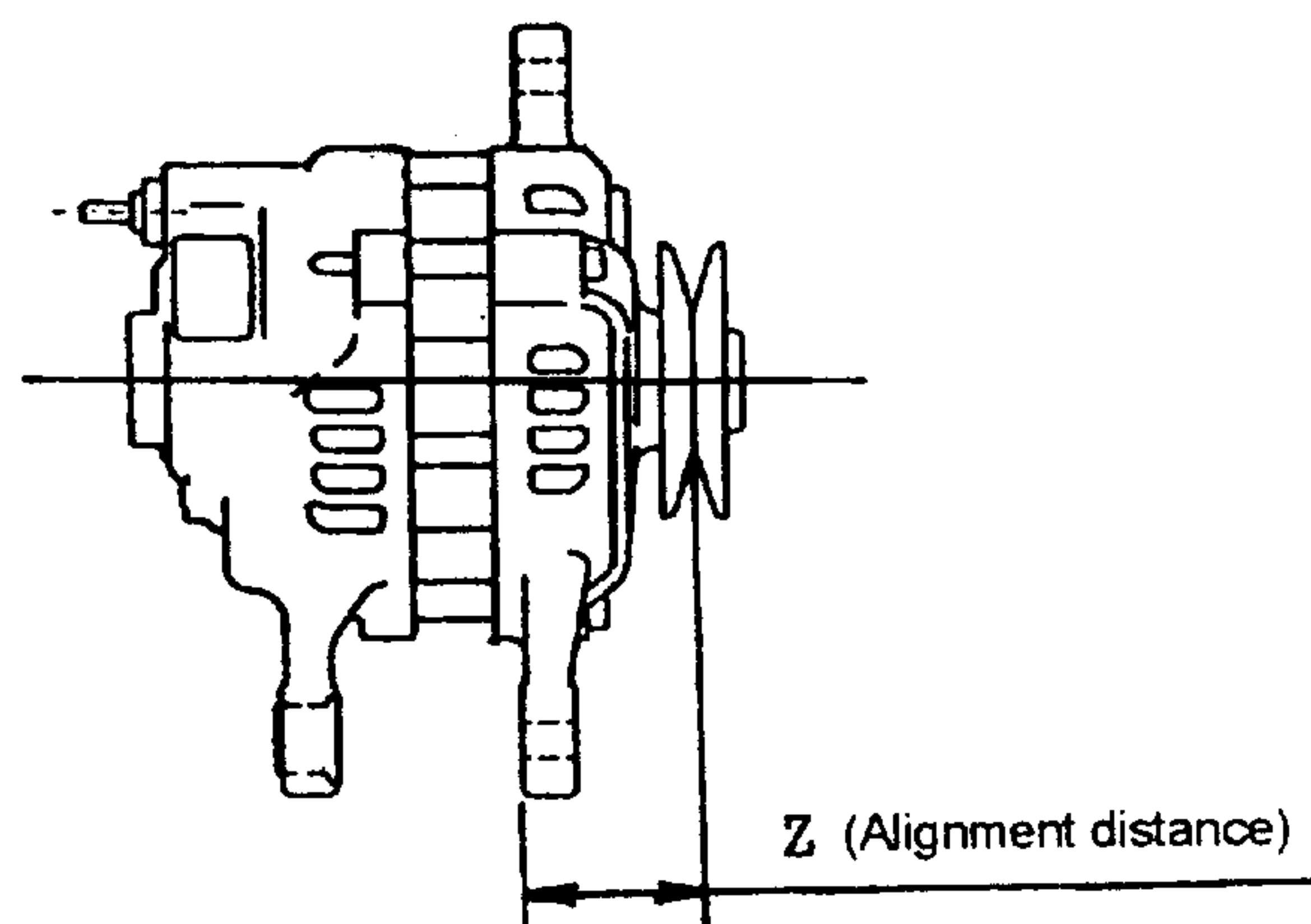


Figure 6

$$\textcircled{1} \quad A - B - C = Z \text{ (Alignment distance) or}$$

$$\textcircled{2} \quad A - D = Z \text{ (Alignment distance)} \quad * \quad \textcircled{1} = \textcircled{2}$$

5.3.2 When the bracket-alignment is separated from cylinder block (When the bracket-alignment is attached with cylinder block)

(1) Calculate (A) by the method equal to (1) of 5.3.1.

(2) Calculate the distance between side ϕ (Engine center or standard point) of cylinder block and attached hole (If there are many holes, select standard hole) in cylinder block where the bracket-alignment is attached.

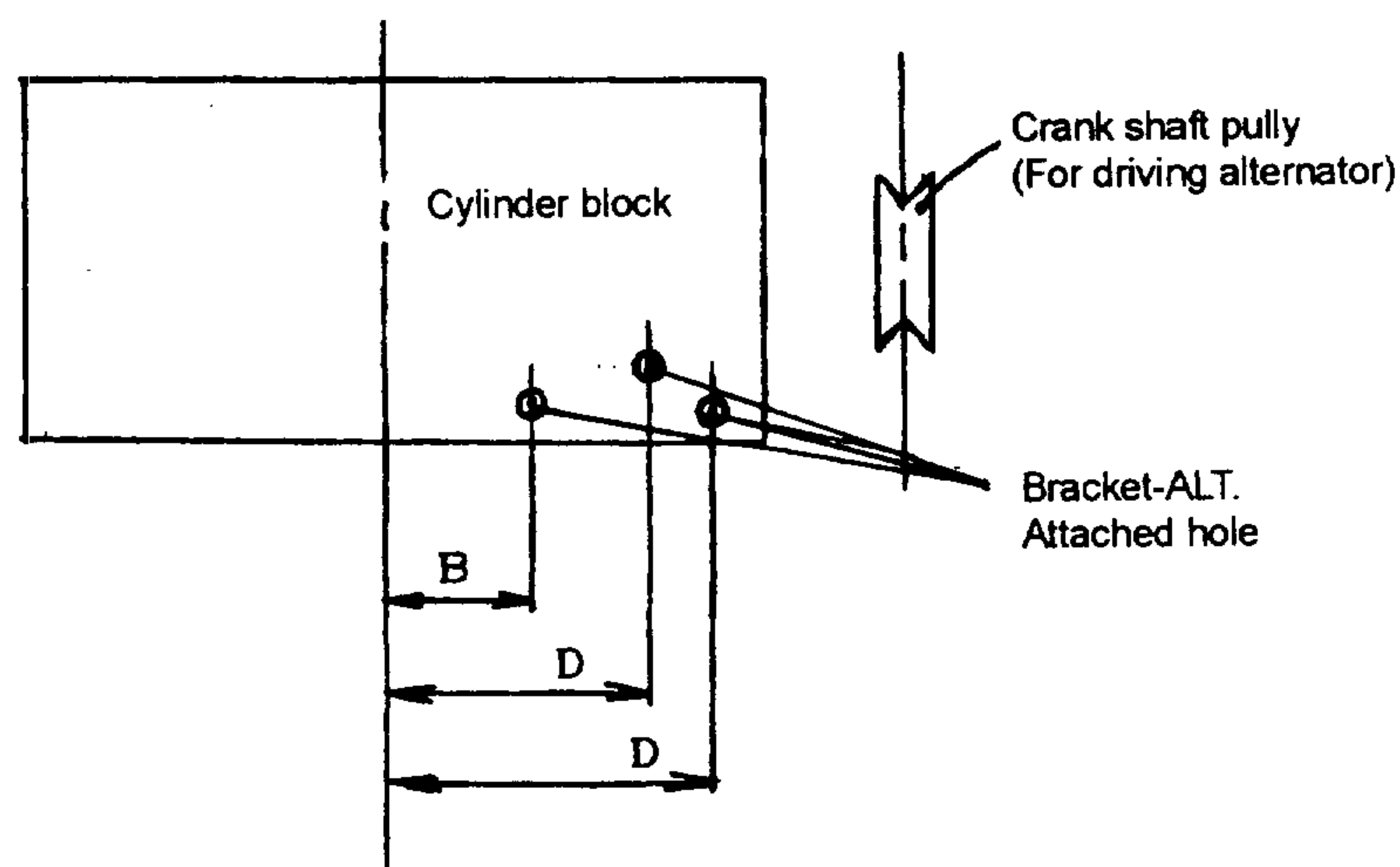


Figure 7