

臺灣二〇〇三年國際科學展覽會

科 別：工程學科

作品名稱：修正駕駛汽車習慣之省油案

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作者簡介



我叫黃智揚,就讀南英商工機械科三年級,擔任機械製圖選手,因為教練對研究方面很感性趣也發明過幾件作品,常跟我分享他的心得,有時在面對問題時教練會先讓我動腦想想如何解答,然後才告訴我正確答案,使我慢慢培養出對研究方面的性趣和概念,也借此機會一直在學習著。



我是謝其宏，從小就對任何事情充滿好奇心。姐姐們和我相差很多歲，所以她們變成了我問問題的對象。爸爸買了很多課外讀物，我也都有在看。上了國中，我對理化科極感興趣，而且凡是遇到不懂的問題，我就會去問二叔(他是一位化工老師)，所以對科學的東西能了解得更徹底。這次參加了科展的比賽，在期間的過程也讓我學到了很多。

研究報告

作品名稱:修正駕駛汽車習慣之省油案

English summary:

The oil-saving project by adjusting the driving habits

To avoid the habit of easily step the pedal to speed up, we divide it into multi-step fuel-filling procedures. Therefore, they decrease the twisting strength of transistor inside auto speed-changing box and reach high-speed brake smoothly. As a result, it can save energy, reduce pollution and increase high efficiency.

中文摘要:

修正駕駛汽車習慣之省油案

修正汽車駕駛喜歡猛踩加油踏板之習慣,把一加油動作分解成多段階級式加油動作,使自動變速箱內扭力降低達到順利變換高速檔。達到節約能源,減少污染,提高效率之目的。

修正駕駛汽車習慣之省油案

壹.研究動機及目的:

每次乘坐母親駕駛的汽車加速時,發現引擎轉速提昇,時速提昇太慢,父親駕駛時則不然,向父親提及此問題,父親回答母親駕駛習慣錯誤浪費油料,故而引發如何解決此現象達到省油的目的。

貳.研究方法及過程:

把一個加油動作分解成多段階級式加油動作,使自動變速箱能依車速在較低引擎轉速下換檔,達到省油的目的,方法如下:

一.油壓式:如圖一所示

二.電子電腦式: 如圖二所示

三.因現代之汽車引擎室空間設計較緊湊很難加裝油壓式機構以進行實車測試,故將節汽門回拉彈簧換裝彈性係數較低之回拉彈簧,把一加油動作變成一個過大之加油動作及一個減速回油動作。

四.機械式: 如圖三所示

參.研究結果與討論:

一.油壓式試驗結果良好。

二.電子電腦式因設備及相關知識.技術不足僅能提供汽車廠商設計用。

三.修改零件最少,安裝方便。

四.機械式回拉位置固定,較難精確配合適當時機換檔,但仍有其相當之效果。

肆.結論與應用:

使用方法三修正設計,汽車加速性能提昇.又可省油約 5%,日產 2000c.c.甚至達到省油 10%之目標,油壓式及機械式因未能及時找到合適車種測試,目前僅找到和泰 2200c.c.之車種引擎室有空間加裝以上機構可供測試,但因時間緊迫未能完成測試,實在逼不得已。

伍.參考文獻:

1.汽車學(汽車引擎) 賴瑞海編著 全華

The policy of oil-saving by adjusting the driving habits.

Key words : Save energy . Reduce pollution . Increase efficiency

1.Motivation and purpose:

Every time I take my mother's car, I find that its engine speed increases while speed turns slowly. However, my father would not do the same thing. Asking him, my father answers that it will waste fuel because of bad driving habit of my mother. Therefore, I try to find how to solve the problem to save fuel.

2.Methods and procedure:

We can transform one step to multi-steps by cable mechanism to make the automatic transmission shift the gear position at lower engine revolution. By doing this, we can save the fuel and the methods are applied below:

- (1) Oil-press type: As shown in Fig 1.
- (2) Electrical computer type: As shown in Fig 2.
- (3) Because the design of the engine room is too close in modern cars. It's hard to put hydraulic mechanism in a real car for test. So, we use lower Spring-coefficient spring for throttle valve instead of hydraulic mechanism. It can convert a pedal action into a gaining response forward and backward respectively.
- (4)Mechanical type: As shown in Fig 3.

3.Result and discussion:

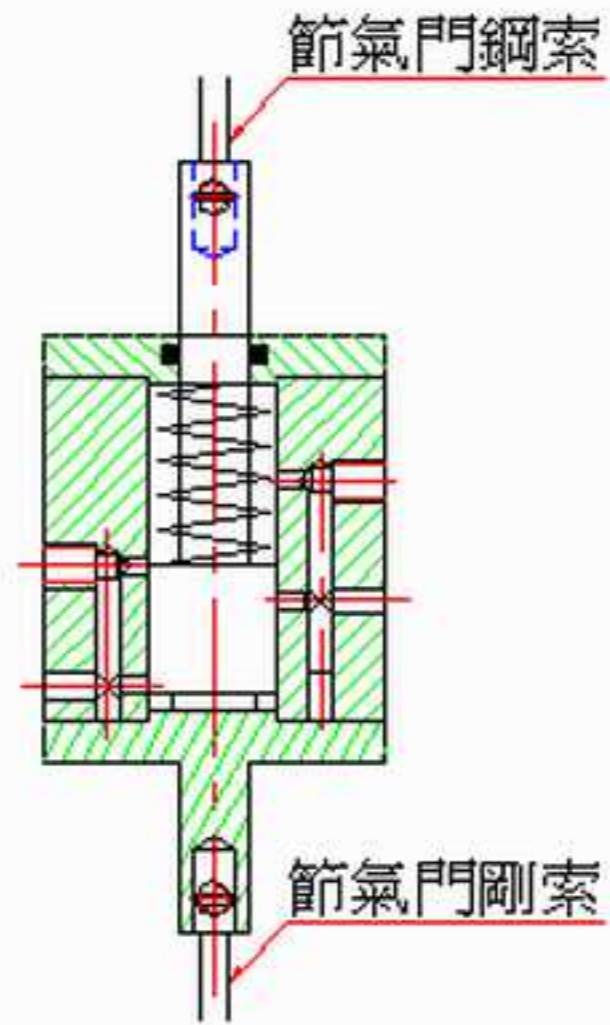
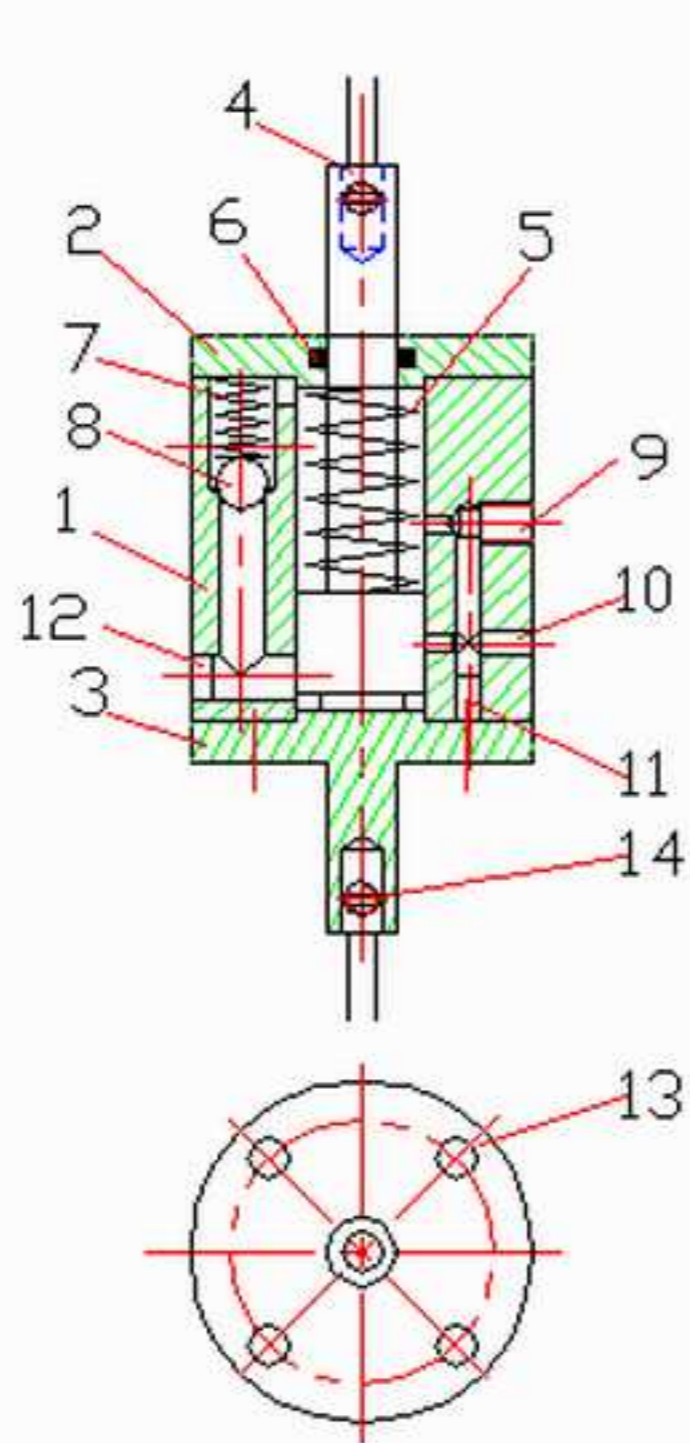
- (1)The test of oil pressure is good.
- (2)Lack of the equipment and related knowledge of electrical computer type, we can only offer suggestions to car manufacturer.
- (3)Change the parts least and install easily.
- (4)Also the range of mechanical type is limited, it's a little hard to shift the gear position at the right time correctly, the efficiency it quiet well.

4. Conclusion and application:

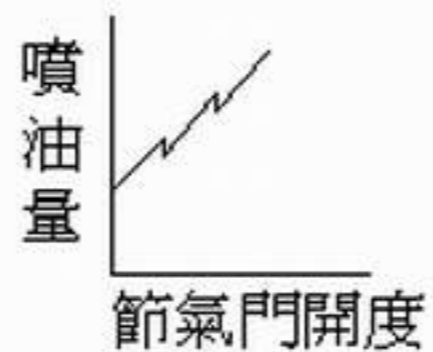
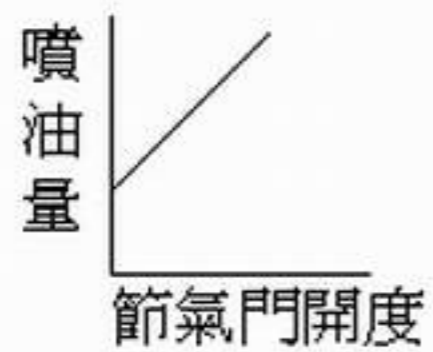
The design of method(3) can improve accelerative performance and save fuel about 5%. Some Nissan car even can reach 10%. Experiment for hydraulic and mechanical mechanism can not find the proper car in time. So far, we just found TOYOTA CAMRY 2200C.C. which has space to put above mechanisms inside. But time is not enough for us to finish the test.

5. Reference:

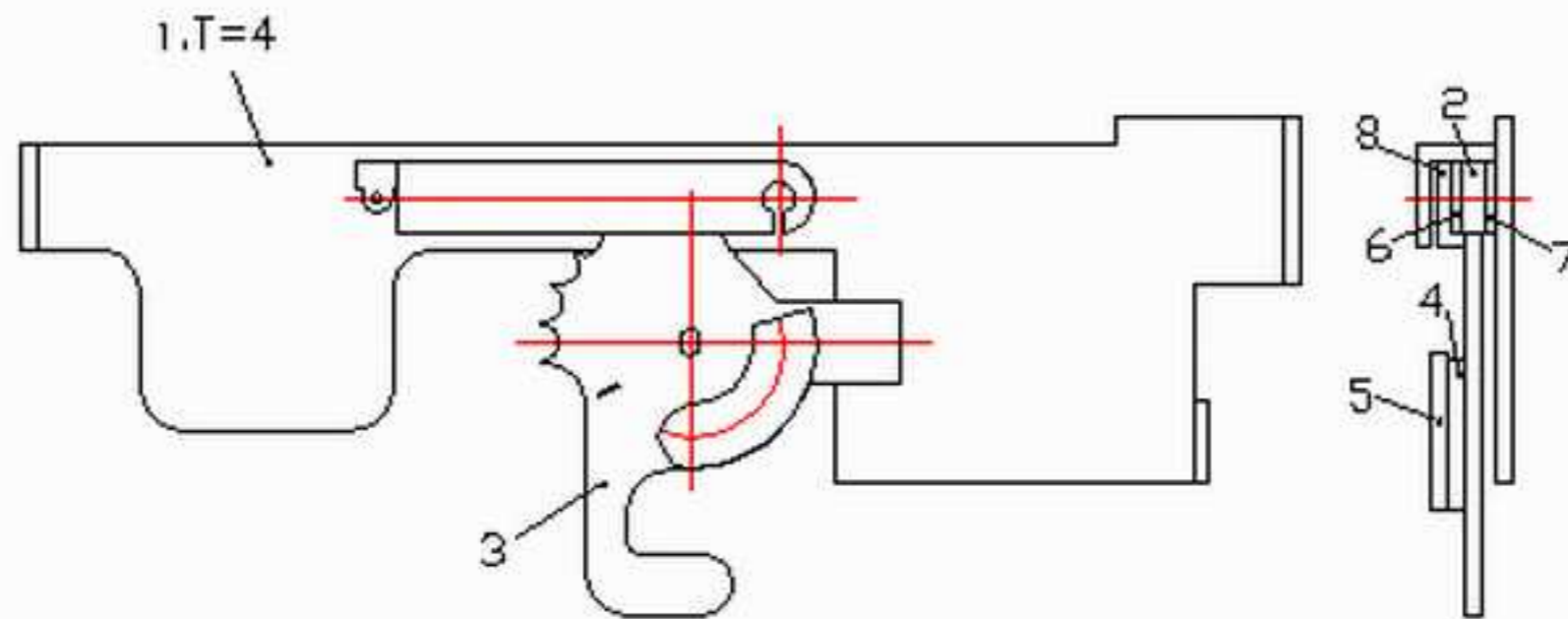
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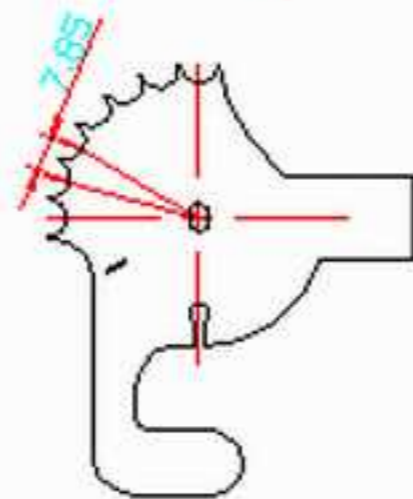
油壓式組合圖
圖一



電子電腦式
圖二



機械式組合圖
圖三



$$9 - 7.85 = 1.15$$

$$\frac{\pi D}{24} = 7.85$$