

Jan. 4, 1949.

F. WRIGHT

2,458,458

CUSHIONING MEANS FOR ENGINE STARTERS

Original Filed Aug. 11, 1943

Fig. 1.

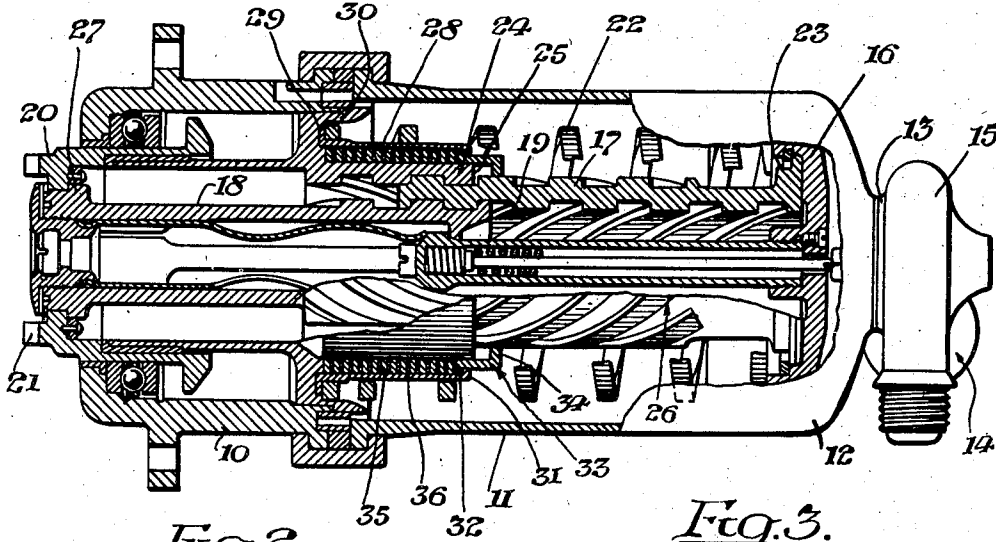


Fig. 2.

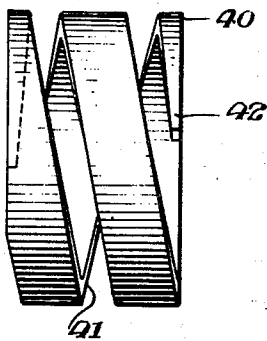


Fig. 3.

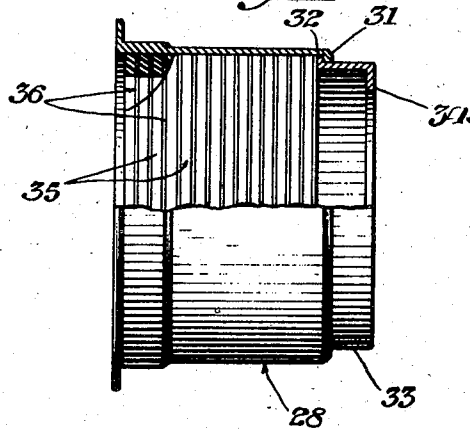


Fig. 4.

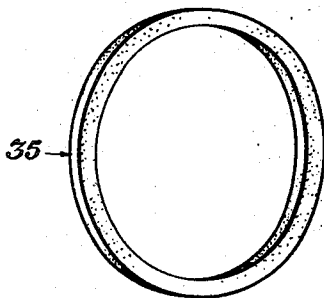
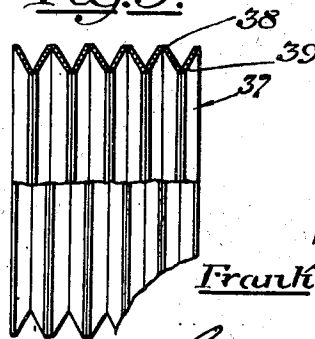


Fig. 5.



INVENTOR.

Frank Wright

BY *Housins & Housins*
ATTORNEYS,

UNITED STATES PATENT OFFICE

2,458,458

CUSHIONING MEANS FOR ENGINE
STARTERS

Frank Wright, Moreno, Calif., assignor to Breeze
Corporations, Inc., Newark, N. J., a corporation
of New Jersey

Original application August 11, 1943, Serial No.
498,441. Divided and this application July 8,
1947, Serial No. 759,633

2 Claims. (Cl. 123—179)

1

This invention relates to improvements in starters for internal combustion engines, and is a division of Patent No. 2,429,863, issued October 28, 1947.

An object of this invention is to simplify the construction of starters by reducing the number of parts, and so arranging the parts as to be more readily accessible in assembling and disassembling.

A further object of this invention is to provide a cushioning device to receive the impact of the main moving part, preventing upsetting and consequent malformation of parts to the extent of impeding, even actually obstructing action thereof.

The invention consists of the construction, combination and arrangement of parts, as herein illustrated, described and claimed.

In the accompanying drawings, forming part hereof, are illustrated three forms of embodiment of the invention, in which drawings similar reference characters designate corresponding parts, and in which:

Figure 1 is a longitudinal sectional view of a complete embodiment of the invention, showing a cushioning means to absorb the impact of the drive member.

Figure 2 is a side elevational view of an alternative type of cushioning spring.

Figure 3 is a partial side, partial sectional view of the shock absorbing means shown in Figure 1, somewhat enlarged.

Figure 4 is a perspective detail of one of the absorbing elements shown in Figures 1 and 3.

Figure 5 is a partial side, partial sectional view of a form of spring which may be substituted for the element shown in Figure 4.

Referring to the drawings, and particularly to Figure 1, 10 designates a cylindrical base bracket having a cylinder 11 attached thereto. The rear end of the cylinder 11 is closed as at 12 and provided with a screw-threaded axial bore 13, by which is attached one or more housings 14. The housing 14 communicates with a circuitous passage 15 by means of which the expanding gases are led into the cylinder 11. The gases bear against a piston 16 secured to a driving member 17 within the cylinder 11. As the driving member 17 is urged forward, it rotates a driven member 18 engaged therewith through helical splines 19. This motion in turn is transmitted to a barrel 20 held by the front end of the starter base bracket 10. Teeth 21 on the barrel 20 engage the engine shaft (not shown) to start it in the well known manner.

2

Although a stiff spring 22 is provided to oppose the power stroke of the piston 16, and return it to its initial position at the end of the stroke, it is not possible to prevent occasional striking of the reciprocating parts against stationary parts.

Thus, for example, the flange 23 on the drive shaft 17 at times will strike the end of the stationary nut-like hub element 24, which supports the said drive member 17. The impact of this action will eventually deform the outer spline or threads 25, causing them to bind on the splines or threads 26, and thus prevent rotation and reciprocation of the drive shaft 17.

The inner end of the drive shaft 17, striking against the end 27 of the driven shaft 18, also becomes battered or upset, creating further binding, to the extent of preventing proper action of the engine starter.

These harmful conditions are overcome by the device shown in Figures 1 to 5, in which a thin walled cylindrical casing 28 is fastened by its outstanding base flange 29 to the inner face of an abutment ring 30 formed upon the hub element 24. The casing 28 has an interned annular bead 31 at its end opposite the abutment ring 30.

Fitted to move freely within the casing 28 is a flange 32 of a plunger ring 33, movable over the peripheral surface of the internally threaded hub element 24. This ring 33 is provided with an inreaching annular flange 34 which clears the drive shaft 17.

Mounted to move freely within the casing 28, circumjacent the hub element 24, are a plurality of flat, highly elastic rings 35, such as synthetic rubber, having interposed therebetween rigid washers 36. The washers 36 are of a slightly larger diameter and of lesser thickness than the rings 35, thereby constituting a stack of cushion elements seated at one end against the abutment ring 30 and at its opposite end in contact with the slidable flange 32. This flange 32 moves inwardly of the casing, under impact of the drive member 17, preventing its deformation by absorbing its energy at the end of the stroke.

From this it will be seen that the hammer-like blows of the drive shaft 17, including its head 23, are very materially cushioned, preventing damage to the splines and likewise to the stationary parts engaged by it.

In the modification shown in Figure 5, a series of inclined flat springs 37 are contained within the casing 28. Each spring 37 is shaped as the frustum of a cone, their outer edges being in

3

contact as at 36, while their inner edges abut one another, as at 38.

Figure 2 shows another spring device consisting of a strip 40 of material of such thickness as to be contained within the casing 28, and of considerable width. The strip 40 is helically wound, each convolution being spaced as at 41, from the next adjacent convolution, and its ends 42 finished square across.

While the foregoing is descriptive of the best known embodiments of the invention, it is not to be held as restrictive, but rather suggestive, within the scope of the annexed claims.

Having thus fully described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States, is:

1. An engine starter comprising in combination, a gas expansion motor including a fixed cylinder, a piston movable therein and a spring to return the piston to its initial position; a hollow drive shaft rotatably mounted in said piston, said shaft having coarse helical internal and external concentric screw threads, a stationary nut to engage the external threads, a clutch shaft to engage the internal threads to be driven thereby, a fixed casing spaced circumjacent said nut, a plunger ring movable in said casing, and a plurality of resilient elements disposed in said casing adapted to force said plunger ring outwardly to intercept said drive shaft near the termination of its outward stroke thereby to prevent malformation of the parts in contact.

4

2. An engine starter comprising in combination, a gas expansion motor including a fixed cylinder, a piston movable therein and a spring to return the piston to its initial position; a hollow drive shaft rotatably mounted in said piston, said shaft having coarse helical internal and external concentric screw threads, a stationary nut to engage the external threads, a clutch shaft to engage the internal threads to be driven thereby, a fixed casing spaced circumjacent said nut, a plunger ring movable in said casing, and a plurality of flat elastic rings loosely confined in said casing and rigid washers interposed therebetween, constituting a stack of cushion elements urging said plunger ring into position to receive the thrust of said drive shaft near the end of its outward movement thereby preventing damage to the threads in contact.

FRANK WRIGHT.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,080,900	Durno	Dec. 9, 1913
2,262,432	Rodder et al.	Nov. 11, 1941
2,429,863	Wright	Oct. 28, 1947