

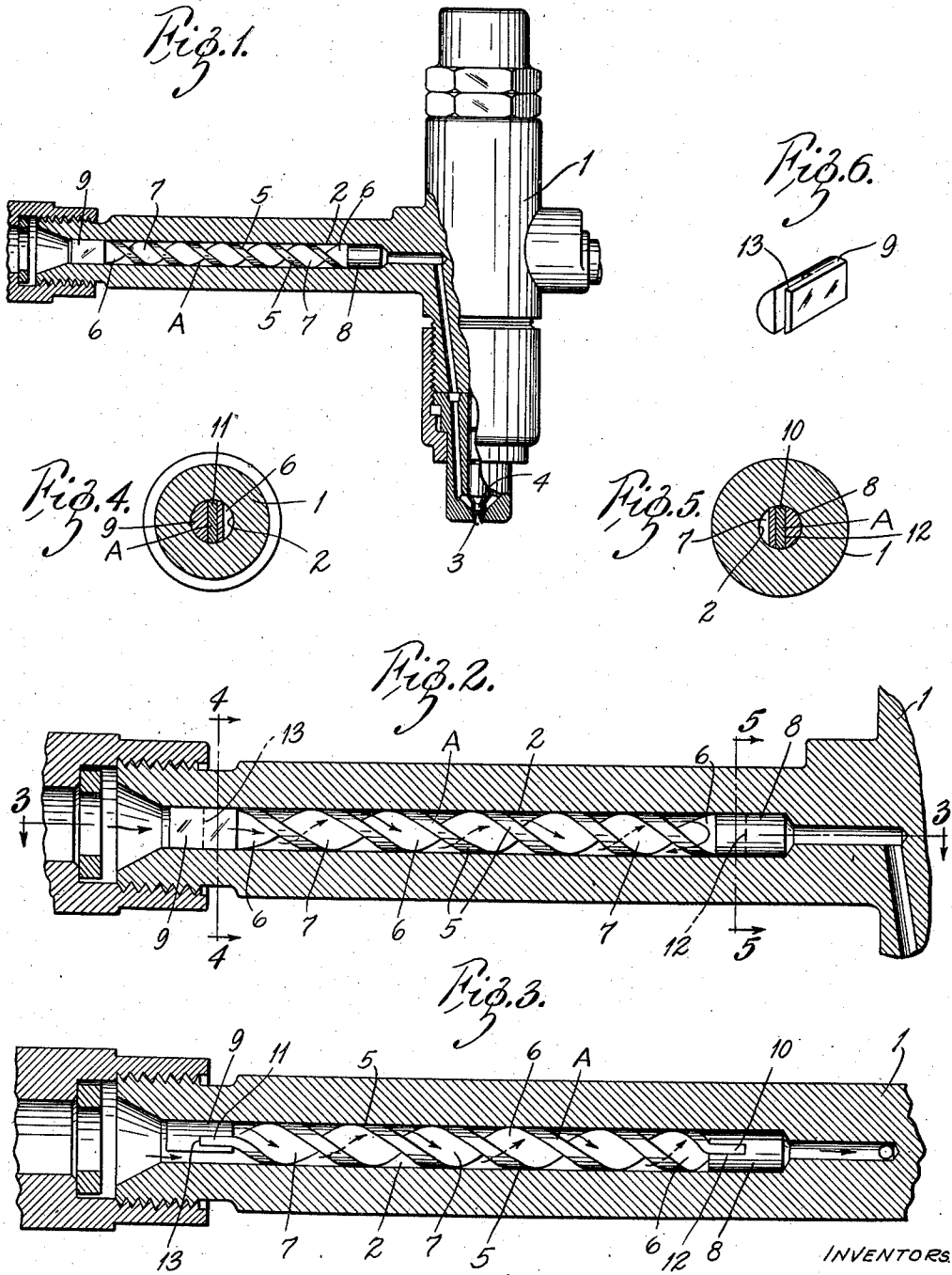
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H. C. EDWARDS ET AL

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FILTER

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INVENTORS
Herbert C. Edwards &
Albert T. Campbell
by *Carroll & Hovell*
THEIR ATTORNEYS.

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FILTER

Herbert C. Edwards, Massillon, and Albert F. Campbell, Canton, Ohio, assignors to The Timken Roller Bearing Company, Canton, Ohio, a corporation of Ohio

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5 Claims. (Cl. 210—169)

This invention relates to filters, particularly filters for the injection systems of internal combustion engines of the Diesel type. It has for its principal objects to provide the fuel supply passageway of such a system with a simple and efficient filter of economical construction and compact design. The invention consists in the filtering element and in the construction, combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawing, which forms part of this specification and wherein like symbols refer to like parts wherever they occur,

Fig. 1 is a part side elevational and part longitudinal sectional view of a fuel injector provided with a filter embodying my invention,

Fig. 2 is an enlarged fragmentary sectional view similar to Fig. 1,

Fig. 3 is a central longitudinal section on the line 3—3 in Fig. 2,

Figs. 4 and 5 are cross-sections on the lines 4—4 and 5—5, respectively, in Fig. 2; and

Fig. 6 is a perspective view of one of the end pieces for closing one end of the helical grooves of the filtering element.

For purposes of illustration, our invention is shown in and embodied in a fuel injector 1 of the kind used for supplying fluid fuel to an internal combustion engine of the compression-ignition type. Said injector has a fuel supply passageway 2 therein leading to a discharge orifice 3 controlled by a spring-loaded, hydraulically operated plunger valve 4. This construction of fuel injector is well known and it is considered unnecessary to illustrate it in detail.

According to the present invention, the fuel supply passageway 2 has a cylindrical filtering element A mounted therein having double helical ribs 5 that fit said passageway and form a helical inlet groove 6 and a helical outlet groove 7. The end of the helical inlet groove 6 that faces the direction of fuel flow is left open; and the opposite end of said groove is closed by a semi-cylindrical dam or barrier 8. The end of the helical outlet groove 7 that faces the direction of flow of the fluid is closed by a semi-cylindrical dam or barrier 9; and the opposite end of said groove is left open. The filtering element A is preferably made from a flat strip of metal that is twisted into the form of a double helix having flat end portions 10 and 11, respectively, that are welded or otherwise permanently secured in notches 12 and 13 provided therefor in the re-

spective semi-cylindrical end pieces or dams 8 and 9.

The operation of the filter is as follows: The fuel, which flows through the passageway 2 under pressure supplied by the usual injection pump 5 (not shown), enters the open end of the helical inlet groove 6 and follows said groove until stopped by the semi-cylindrical end piece or dam 8 at the rear end thereof. The fuel, after filling said inlet groove is then forced by the pressure exerted thereon between the wall of the fuel supply passageway and the peripheral surface of the double helical rib 5 into the helical outlet groove 7 and thence flows through the open end of said groove into said passageway. The double helical rib 5 is accurately ground to provide a fairly close fit in the fuel discharge passageway 2 and thus serves to hold back or strain out the sediment which might interfere with the operation of the injector, which sediment is retained in the inlet groove 6 of the filtering element and can be removed with said element when it is removed from the fuel supply passageway.

The hereinbefore described filtering device has several advantages; it can be easily and economically manufactured; it is adapted for use in passageways of small diameter; it can be readily removed, cleaned and replaced; and the filtering action can be easily controlled by grinding the double helical rib to the required diameter.

What we claim is:

1. A member having a passageway with a smooth portion and means in said passageway for filtering fluid passing therethrough, said means comprising a member fitting the smooth portion of said passageway and having two external helical grooves therein, one of said grooves being closed at one end of said member and the other of said grooves being closed at the opposite end of said member, said member being made from a flat strip twisted into the form of a double helix having separate end members rigid therewith that constitute closures for said ends of said grooves.

2. A fuel injector having a fuel delivery passageway with a smooth portion and means in said passageway for filtering fluid passing therethrough, said means comprising a member fitting the smooth portion of said passageway and having two external helical grooves therein, one of said grooves being closed at one end of said member and the other of said grooves being closed at the opposite end of said member, said member being made from a flat strip twisted into the

form of a double helix with its end portions left flat and having semi-cylindrical members secured thereto that constitute closures for said ends of said grooves.

- 5 3. An element for a filter of the kind described comprising a thin strip twisted to form two helical grooves and having its ends left flat and members secured to said flat ends for closing one
10 groove at one end of said element and the other groove at the opposite end of said element.

4. An element for a filter of the kind described comprising a strip of sheet metal twisted to form two helical grooves and having its ends left flat, semi-cylindrical end members for closing
15 one groove at one end of said element and the other groove at the other end of said element, said end members having slots therein adapted to receive the flat ends of said strip, and welds for securing said ends in said slots.

5. A member having a passageway with a smooth portion and means in said passageway for filtering fluid passing therethrough, said means comprising a member fitting the smooth portion of said passageway and having two external helical grooves therein, one of said grooves being closed at one end of said member and the other of said grooves being closed at the opposite end of said member, said member being made from a flat strip twisted into the form of a
10 double helix with its end portions left flat and having semi-cylindrical members secured thereto that constitute closures for said ends of said grooves, said members having slots therein adapted to receive the flat ends of said strip, and welds
15 for securing said ends in said slots.

HERBERT C. EDWARDS.
ALBERT F. CAMPBELL.