Jan. 20, 1931. A. J. WEATHERHEAD, JR 1,789,719

METHOD OF PRODUCING CARBURETOR JETS

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FIG. 1

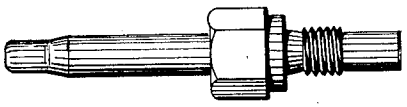


FIG. 2

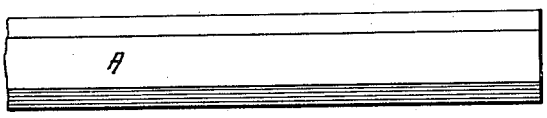


FIG. 3

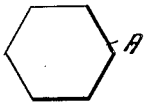


FIG. 4

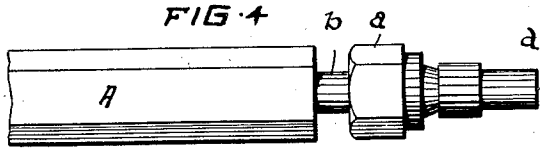


FIG. 5

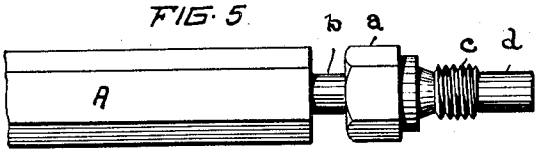


FIG. 6

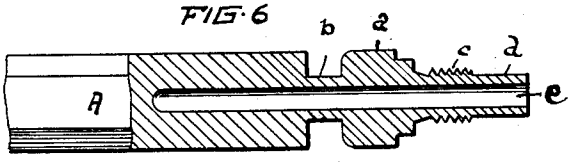


FIG. 7

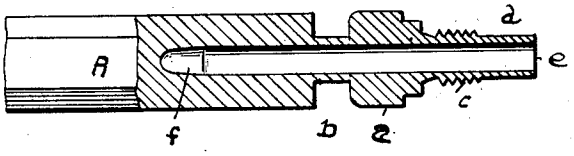
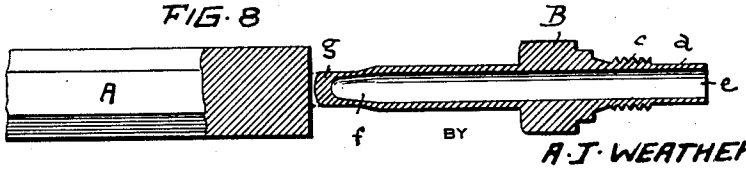


FIG. 8



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FIG. 9

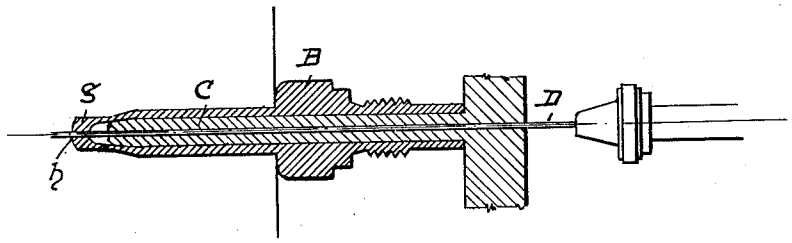


FIG. 10

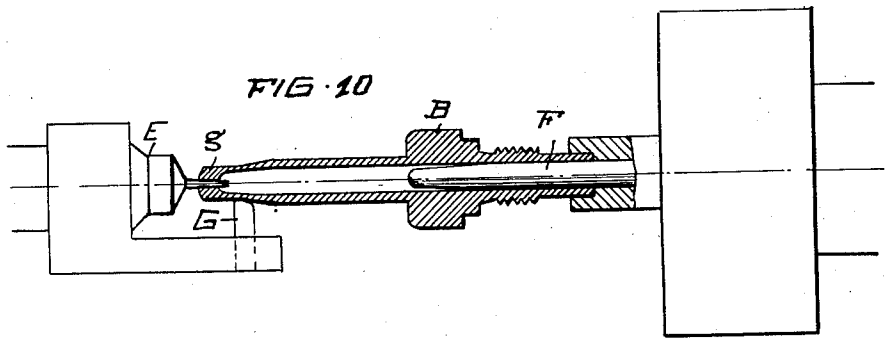


FIG. 11

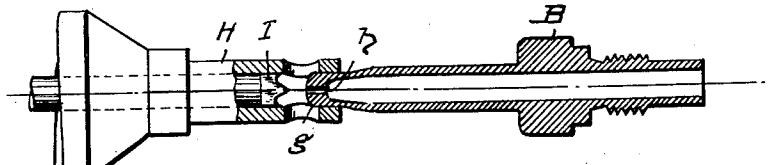
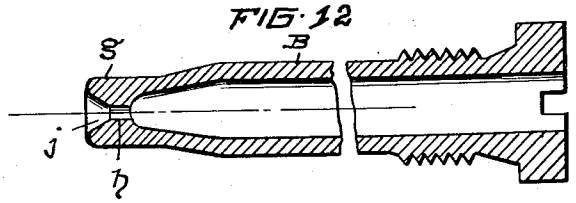


FIG. 12



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Patented Jan. 20, 1931 1,789,719

UNITED STATES PATENT OFFICE

ALBERT J. WEATHERHEAD, JR., OF CLEVELAND, OHIO

METHOD OF PRODUCING CARBURETOR JETS

Application filed March 19, 1929. Serial No. 348,296.

My invention relates to an improvement in carburetor jets or nozzles, and a method of producing the same, the object in general being to produce such jets in one piece with great accuracy and dispatch, and in quantities with a marked savings in cost. Such jets are relatively small and include a fluid passage terminating in a discharge orifice of very small diameter having a flaring mouth. Difficulties attend the manufacture of this device in quantities, especially in producing a central bore and jet orifice axially co-incident with each other and with the axis of the flaring mouth. Mis-alignment of these openings, in even slight degree, gives objectional results or produces malfunction in a carburetor, and the present steps of manufacture have been devised to eliminate faulty production and at the same time expedite the making of such jets in large quantities.

The jet itself, and the steps taken to produce the same, are substantially as delineated in the accompanying drawings, in which Fig. 1 is a side view of the jet, enlarged as compared with its actual size. Figs. 2 to 11, are side and sectional views illustrating the successive stages of manufacture from a solid bar or rod, Figs. 2 and 3, being side and end views, respectively, of a hexagonal rod; Fig. 4 is a side elevation of the same rod turned down in part; Fig. 5 a side elevation corresponding to Fig. 4 with a screw-thread developed thereon; Fig. 6 a sectional view showing the turned part and also an unturned part of the rod drilled axially; Fig. 7 a view corresponding to Fig. 6 but showing the bore reamed to a slightly different shape; Fig. 8 a sectional view of the rod and a partially completed jet severed therefrom; Fig. 9 a sectional view of the same jet sleeved upon an arbor and being operated upon by a drill to form the jet orifice; Fig. 10 a sectional view of the drilled jet sleeved upon a centering device and being machined at the tip concentric with the orifice axis; and Fig. 11 a sectional view of the jet showing its machined tip sleeved within a tool for producing a flaring mouth at the jet orifice. Fig. 12 is an enlarged sectional view of the finished tip of the jet.

In practicing the present method of manufacturing carburetor jets or nozzles, the first operations involve the use of an automatic screw machine through which bar or rod stock is fed at intervals and rapidly rotated while suitable tools are brought into engagement with the rod to form the desired object or product. In the present instance, a hexagonal rod A of brass is fed through the machine, and the first operation consists in turning an end portion of the rod to a cylindrical shape for a predetermined distance, leaving a part —*a*— thereof in its original state and producing a short connecting neck —*b*— between part —*a*— and the main body of the rod. The next operation involves the formation of a screw-thread —*c*— between part —*a*— and the outer end of the reduced stem portion —*d*—, which thread may be rolled into the stock. A gun drill is then brought axially in line with the screw-threaded stem and fed forward at intervals to produce an axial bore —*e*— throughout the length of the turned stock and beyond that into the solid rod to a predetermined depth. A reaming tool is then introduced into the bore which finishes the bore to the diameter desired and tapers the inner end —*f*— thereof. The neck —*b*— of the rod is now engaged by a swing tool which turns down the body of the rod for a predetermined distance to the same diameter as neck —*b*— and then to a still smaller diameter opposite the tapered portion —*f*— of the bore and for a short distance beyond the inner end thereof. In this operation the rod is fed forward in respect to the cutting tool. Then the turned part of the rod is severed from its main body, leaving a solid tip portion —*g*— upon the product B.

The next step in operations consists in sleeving member B over a mandrel C having an axial opening through which a small gun drill D is introduced to produce a jet orifice —*h*— in the solid tip —*g*—. The reamed bore fits the mandrel and the gun drill therefore forms the orifice axially co-extensive with the bore. Then member B is removed from the mandrel and the tip —*g*—turned or machined concentric with the axis of orifice —*h*—. This may be accomplished by sleev-

ing member B over a pair of centering devices E and F, respectively, while rotating member B and bringing a cutting tool G against the tip —*g*—. Obviously, with orifice —*h*— as the center of rotation the tool G will machine the tip absolutely concentric. The next step consists in using this concentric surface of the tip to produce a conical mouth or flaring cavity —*j*— within the tip so that the axis of the flaring cavity will be absolutely co-extensive with the axis of orifice —*h*—. This may be accomplished by sleeving a bushing or pilot member H over the tip and feeding an end finishing and countersinking tool I through this bushing into engagement with the end of the tip, the tool revolving on an axis co-extensive with orifice —*h*—. Thus, the outer surface of the tip, produced previously by using the orifice as a working center, finally centers tool I in respect to the orifice, and consequently the flaring cavity is centered accurately with the orifice, thereby completing a perfectly formed jet in an effectual manner as primarily desired.

What I claim is:

1. A method of producing carburetor jets or nozzles, consisting in turning a jet body from rod stock; drilling a central bore and end orifice within said body; countersinking the outer end of said orifice; and using a turned part of said body to effect countersinking co-axially of said orifice.

2. A method of producing carburetor jets or nozzles, consisting in forming a tubular body with a closed end; drilling an orifice axially within said closed end; forming a part of said body concentric with the axis of said orifice; and making a flaring cavity axially co-extensive with said orifice using the concentric surface as a guide.

3. A method of producing carburetor jets or nozzles, consisting in forming an axial bore and orifice in a cylindrical body; machining a part of said body concentric with said orifice; applying a pilot member to said concentric part; and guiding a cutting tool into engagement with the end of said body by means of said pilot member.

4. A method of producing carburetor jets or nozzles, consisting in forming an axial orifice in a cylindrical body; placing a centering element in said orifice, and revolving said body about the same; machining a portion of said body concentric with the axis of the orifice; and finally sleeving a revolving tool over the concentric portion of the body, and forming a cavity axially co-incident with said orifice.

5. A method of producing carburetor jets or nozzles, consisting in drilling a cylindrical body; forming a cylindrical tip on said body concentric with the axis of the drilled opening; sleeving a pilot member over said tip; feeding a cutting tool lengthwise of said pilot member; and forming a flaring cavity within the end of said tip.

6. A method of producing carburetor jets or nozzles, consisting in turning a longitudinal section of a solid rod to a predetermined shape; drilling said rod through and beyond the shaped section; turning additional stock from said rod where drilled and beyond the inner end of the drilled opening; severing the turned section from the rod at a point beyond the drilled opening to provide a closed end for said section; drilling an orifice axially through said closed end; and forming a flaring cavity within said end axially in line with said orifice.

7. A method of producing carburetor jets or nozzles, consisting in forming spaced cylindrical portions upon a solid rod; drilling and reaming said rod axially to a greater depth than the portion operated upon; forming a continuation of a cylindrical portion; reducing a part of the continued portion to a smaller diameter; severing the section formed by the foregoing operations from the rod; drilling an orifice axially within the outer end of said part; and finally forming a conical mouth therein axially in line with the orifice.

8. A method of producing carburetor jets or nozzles, consisting in forming a cylindrical body with an axial bore extending partially through said body; sleeving the bored part of said body upon a mandrel; drilling an orifice axially through the unbored end thereof; sleeving a pilot member over the drilled end of said body; and passing a cutting tool through said pilot member to produce an end cavity within said drilled end.

9. A method of producing carburetor jets or nozzles, consisting in forming an axial bore within a cylindrical body; sleeving the bored part of said body over a mandrel; passing a drill through said mandrel and forming an orifice co-extensive with said bore; placing said drilled end of said body upon a centering support and turning a part of the outer surface concentric with the axis of the orifice; applying a tool guiding element to said concentric part; and feeding a revoluble countersinking tool lengthwise of said guiding element into said drilled end.

In testimony whereof I affix my signature.

ALBERT J. WEATHERHEAD, JR.