

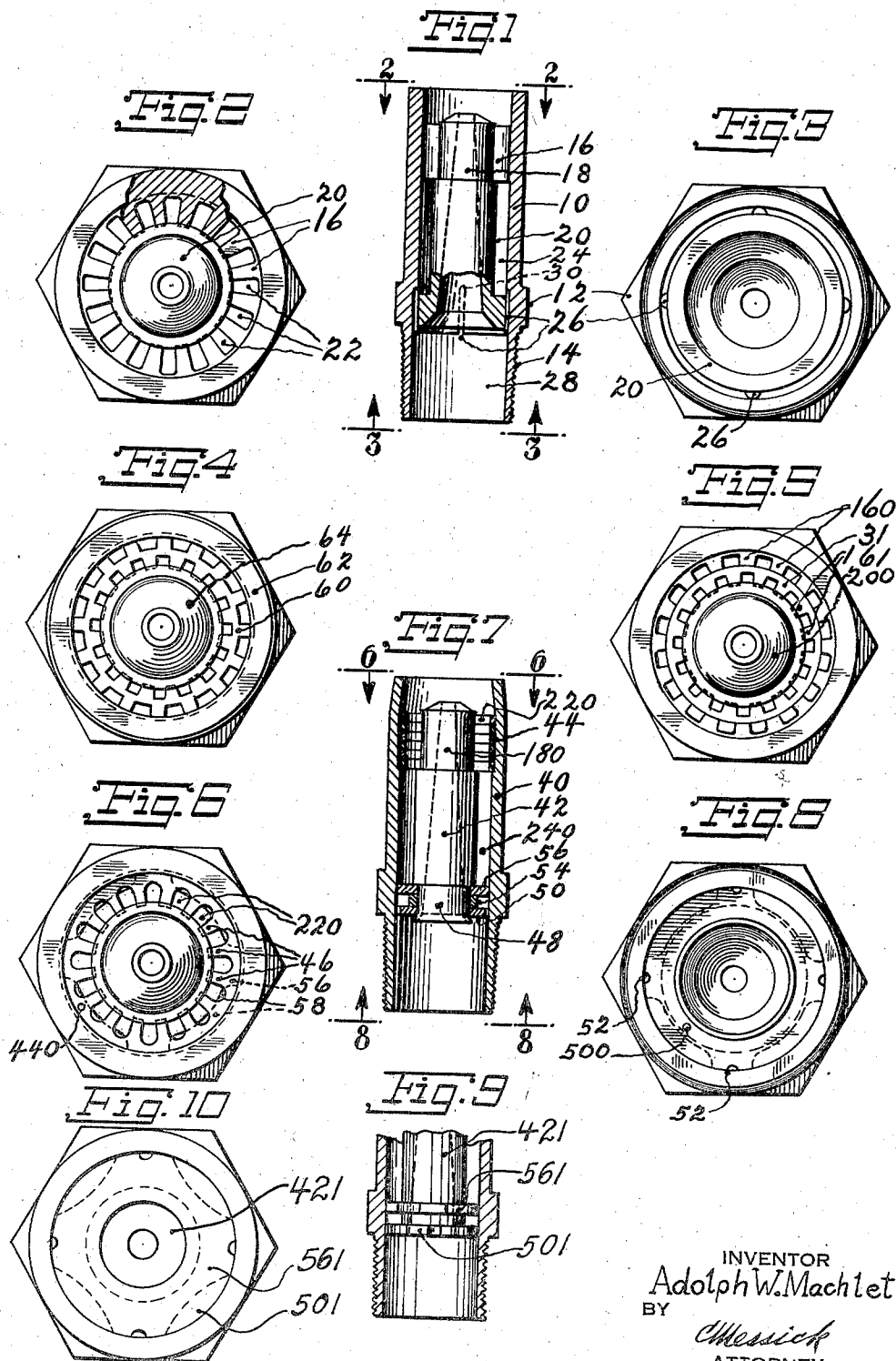
Jan. 10, 1939.

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2,143,128

NEEDLE POINT BURNER

Filed March 3, 1937



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2,143,128

NEEDLE POINT BURNER

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Application March 3, 1937, Serial No. 128,763

6 Claims. (Cl. 158—99)

My invention pertains to burners designed for operation with any combustible mixture of gases like, for instance, a mixture of acetylene and oxygen. My invention relates to burners generally and specifically to needle point burners such as are, for instance, conventionally used for forming useful articles out of glass tubes, either by hand or in conventional automatic glass working machinery.

An object of my invention is to provide a burner capable of being more precisely and or cheaply and or efficiently manufactured and or assembled than conventional types.

Another object is to harmonize the design of such an improved broached burner with advanced manufacturing methods.

Another object is to provide an improved design, suited to the manufacture of burner parts by means of a male broach, whereby the parts can be exactly duplicated. Thus the performance of several burners operating together in an automatic machine can be controlled with the desired exactitude.

Another object is to substitute slots, which can be machined in the burner parts with comparative ease, for the small drilled holes through which high pressure gas is conventionally lead into the expansion chamber at the bottom of the pilot nozzle. The drilling of small holes being somewhat slow and troublesome because of the liability of breaking small drills.

Other objects may appear from the following detail description of a preferred construction and may be pointed out in the appended claims.

Referring to the accompanying drawing:

Fig. 1 is a sectional elevation of my improved burner.

Fig. 2 is an enlarged view taken on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged view taken on the line 3—3 of Fig. 1.

Fig. 4 corresponds to Fig. 6, to be later described. It is a modification in which there are two rows of pilot nozzles.

Fig. 5 corresponds to Fig. 2 and is of a second modification in which there are also two rows of pilot nozzles. Figs. 4 and 5 both have two rows of pilot nozzles but there is only a single row of pilot nozzles in Figs. 1, 2, 3, 6, 7 and 8.

Figs. 6, 7 and 8 correspond respectively to Figs. 2, 1 and 3 and are of a third modification. In these figures both the pilot nozzles and the pilot nozzle supply chamber inlets are formed of punchings.

Fig. 9 corresponds to Fig. 7 and is a modifica-

tion of the device of Figs. 6, 7 and 8. On the device of Fig. 9, the main nozzle and the washers at its lower end are integrally formed from a single piece of metal rod or other refractory material, and

Fig. 10 is a plan view of the device of Fig. 9.

Referring to Figs. 2, 1 and 3, the numeral 10 indicates a screw machine part formed of a hexagon brass rod; the hexagonal shape appearing at the wrenchhold 12. The other parts of the hexagonal rod having been turned externally to cylindrical form, except at said wrench hold 12 and at the threaded portion 14, which is designed to be used to secure the burner in place in a conventional manner.

Part 10 is bored as indicated in Fig. 1 and has internally projecting teeth 16, which are preferably cut by means of a suitable male broach. The inner ends of teeth 16 surround the upper, reduced diameter portion, 18, of the central, main nozzle 20; the upper end of portion 18 being lightly riveted or staked over the tops of teeth 16, so as to secure members 10 and 20 in permanently fixed position with relation to each other. Pilot nozzles 22 are thus formed principally of teeth 16 and at the inner ends of said teeth, by member 18.

An annular expansion chamber 24, to supply the pilot nozzles 22, is formed between members 10 and 20, as best shown in Fig. 1.

At the lower end of chamber 24 four grooves 26, best shown in Fig. 3 are broached from the lower end of member 10, where the bore is slightly larger at the lower portion thereof, indicated by the numeral 28.

It will be observed that the grooves 26 terminate at right angles at their upper ends 30 so as to deflect inwardly the high pressure gas from the bore 28 and prevent it blowing up unevenly through the several pilot nozzles 22. Pilot frame nozzles are used in needle point and other burners to provide a pilot flame of low pressure to kindle the main flame, which is a high pressure flame. It would be apt to blow itself out occasionally if there was no pilot flame.

The modification of Fig. 5 differs from the device of Fig. 3 in that an internally toothed ring 31 is secured within the broached teeth 160. Ring 31 is provided with teeth 161 which are secured to a central main nozzle 200, in the same way that the teeth 16 and nozzle 20 engage, in the device of Figs. 1, 2 and 3.

The modification of Figs. 6, 7 and 8 comprises a screw machine part 40 and a main nozzle 42. Part 40 is bored a little larger at its upper end to receive the punchings 44, in which internally

projecting teeth, 46, are formed. The inner ends of teeth 46 surround the reduced diameter portion 180, of nozzle 42, and are lightly riveted in place on same. The upper end of member 40 is crimped, as indicated, to secure the members 44 in place.

Nozzle 42 is provided with a reduced diameter portion 48 at its lower end, upon which are lightly riveted a washer 50, which is provided with four high pressure gas admission grooves 52, a spacing washer 54 and a baffle washer 56. Baffle washer 56 is provided with cutaway portions 58 which permits jets of gas from grooves 52 to flow gently into the chamber 240, so as to distribute evenly to pilot nozzles 220. The several punchings 44 are held in alignment with each other, in the indicated position, by means of tits 440. Tits 500 align washers 50, 54 and 56 with each other.

Referring to Figures 9 and 10: This modification shows a device of the same shape as Figs. 6, 7 and 8. However, the washers 50, 54 and 56 are omitted, and corresponding flanges 501 and 561 are formed as an integral part of a main nozzle 421.

The modification of Fig. 4 differs from the device of Fig. 5 above described, in that its punched ring 60 has both internal and external teeth and there are no teeth on screw machine part 62. Ring 60 is crimped in place in the member 62 and secured by light riveting at its inner edge to main burner 64. Thus there are two rows of pilot burner nozzles formed between members 64, 60 and 62.

I do not limit myself to the exact construction above described and the scope of my invention will be pointed out in the appended claims.

I claim:

1. A burner provided with a main flame nozzle, a pilot flame nozzle surrounding same, a low pressure gas chamber below the pilot nozzle, a baffle washer at the bottom of the chamber, provided with an apertured portion at its outer edge, a lower chamber and a lower washer at the bottom thereof, provided with a small opening for high pressure gas, staggered with relation to the aperture.

2. A burner provided with a needle point nozzle, a surrounding pilot flame nozzle comprising

a tubular member in contact with free air surrounding said needle point nozzle and provided with internally projecting teeth; said needle point nozzle comprising a substantially round member, the outside of which substantially contacts the inner ends of said teeth, thus dividing said pilot nozzle into a ring of separate passages, substantially parallel with, and surrounding said needle point nozzle, said tubular member and said needle point nozzle forming therebetween a low pressure gas chamber below said pilot nozzle, and means partly on the inside of said tubular member and partly on the outside of said substantially round member forming baffled channels, whereby small, baffled streams of high pressure gas may flow into said chamber, expand therein, and thus supply low pressure gas to said pilot nozzle.

3. A burner as in claim 2 wherein said means forming said baffled channels comprise a plurality of washers on the lower portion of said round member, provided with notches in staggered relation.

4. A burner comprising a main nozzle and a pilot nozzle, provided with a hollow external member, designed to be connected, at its lower end, to a source of combustible gas under comparatively high pressure, a main nozzle member within said external member and provided with a main nozzle aperture, a pilot nozzle aperture surrounding said main nozzle member, comprising substantially longitudinal grooves formed between said main nozzle member and said external member, a low pressure chamber formed at the lower end of said pilot nozzle aperture, between said external member and said main nozzle member, and a pressure reducing slot formed between said external member and said main nozzle member, leading from said low pressure chamber to said source of comparatively high pressure gas, whereby said low pressure chamber may be supplied with gas for said pilot nozzle, at a comparatively low pressure.

5. A device as in claim 4 in which the pressure reducing slot is cut in the external member.

6. A device as in claim 4 wherein the main burner is designed to produce a needle point flame and has an aperture of substantially circular cross section.

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