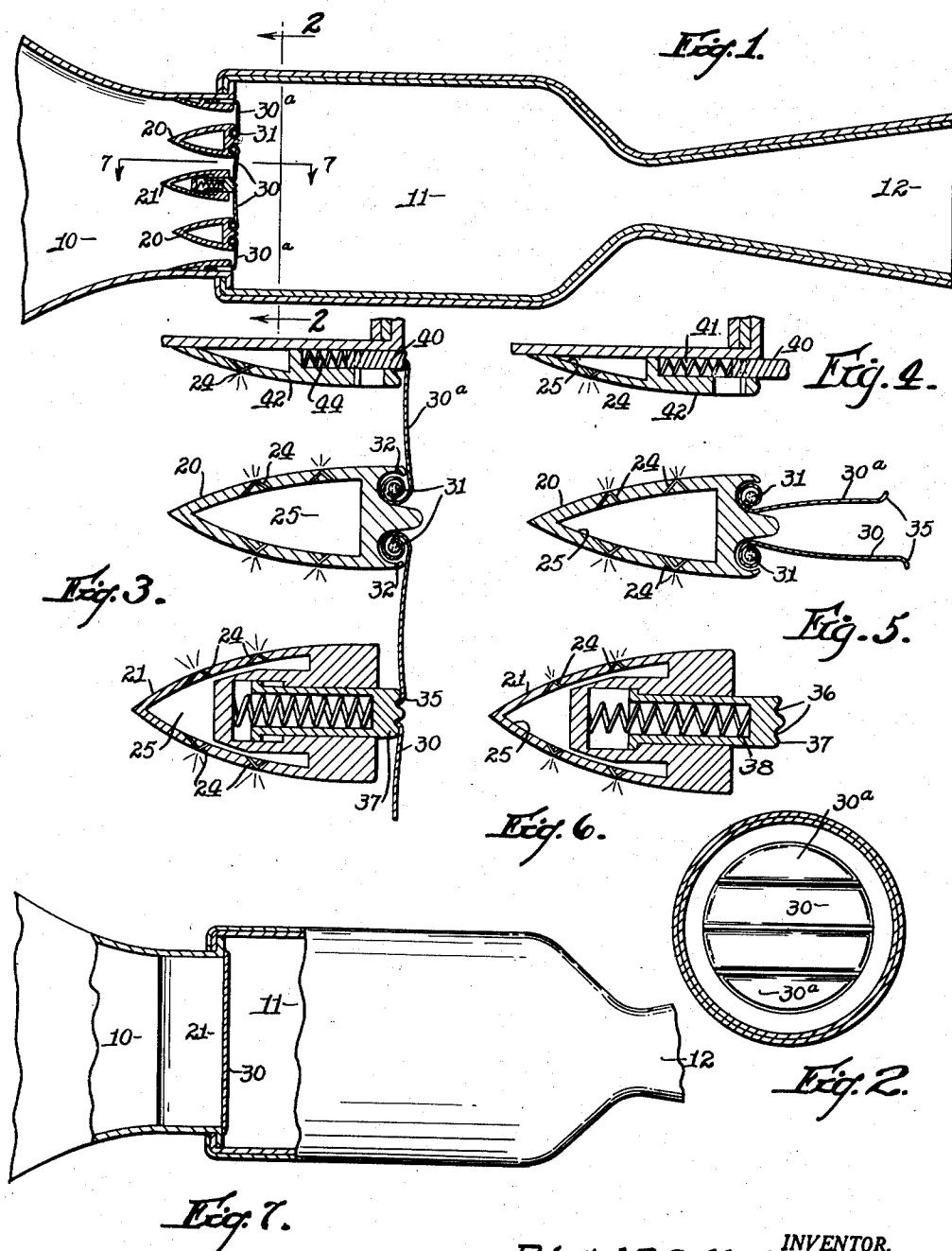


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ADMISSION VALVE MECHANISM FOR RESONANCE  
COMBUSTION CHAMBERS  
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## UNITED STATES PATENT OFFICE

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## ADMISSION VALVE MECHANISM FOR RESONANCE COMBUSTION CHAMBERS

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2 Claims. (Cl. 277-60)

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This invention relates to resonance combustion chambers as used in rocket apparatus of the general type shown in the prior patent to Robert H. Goddard, #1,980,266, issued November 13, 1934.

It is the general object of this invention to provide an improved and simplified valve mechanism for controlling the admission of air from the collector tubes to the combustion chambers in such resonance combustion apparatus.

Further features relate to reducing the number of movable parts in such valve mechanism, and to providing for cushioning the movable valve members and thereby preventing shock thereto.

The invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a partial sectional side elevation of resonance combustion apparatus embodying this invention;

Fig. 2 is a transverse sectional elevation, taken along the line 2-2 in Fig. 1;

Fig. 3 is an enlarged sectional detail of certain parts shown in Fig. 1;

Figs. 4, 5 and 6 are sectional views of separate parts shown in Fig. 3 but in different operative positions; and

Fig. 7 is a plan view of the apparatus shown in Fig. 1, but partly in section along the line 7-7 in Fig. 1.

Referring to the drawings, resonance combustion apparatus is shown comprising an air-collecting tube 10, a combustion chamber 11, and a discharge nozzle 12. A plurality of streamlined bars 20 and 21 extend across the inner end of the air-collecting tube 10 and these bars are preferably made hollow and provided with openings 24 through which liquid fuel supplied through passages 25 may be sprayed into the air stream as it enters the combustion chamber 11.

Valve plates or shutters 30 are made of thin resilient sheet material and each is spirally coiled along one edge portion. Each such coiled edge portion is secured to a rod 31 mounted in a pocket 32 in the rear end portion of one of the cross bars 20. Preferably a pair of shutters 30 is mounted on each cross-bar 20, as shown in Figs. 3 and 5.

The outer edge of each valve plate or shutter 30 is provided with a flange 35 which is normally seated in a groove or recess 36 extending

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lengthwise of a bar 37 which is slidably mounted within a cross bar 21 and which is yieldingly pressed outward by one or more springs 38. Each cross bar 37 is commonly provided with two grooves 36 as shown in Figs. 3 and 6 and seats two adjacent flanges 35. The plates 30 are so coiled that they normally assume the positions shown in Fig. 3.

When the combustion chamber 11 is exhausted, air from the collecting tube 10 opens the shutters 30, and mixed air and fuel flows into the combustion chamber. As the charge is thereafter compressed by resonance, the plates or shutters 30 close rapidly against the air stream, in part from resilience and in part from the rising combustion chamber pressure.

When the shutters are thus moved to closed position, the edges 35 seat in the grooves 36 and the cross bar 37 yields to soften the abrupt contact and to relieve the shock on the plates or shutters 30. This relatively slight yielding of the cross bar 37 causes the shutters to come to rest during a perceptible period instead of instantaneously, and thus prevents the sudden jar which would otherwise take place.

The shutters 30 are preferably slightly concave in cross section as indicated in Fig. 4 to better preserve their longitudinal alignment.

The outer shutters 30a are segmental as shown in Fig. 2 and engage plungers 40 (Figs. 3 and 5) which are longitudinally curved and which are seated in correspondingly curved slots 41 in segmental guide-bars 42 secured to the curved inner surface of the air-collecting tube 10. Springs 44 hold the bars 40 normally in the position shown in Fig. 4 but yieldably movable to the position shown in Fig. 3.

Having been thus described, the invention is not to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what is claimed is:

1. Valve structure for closing a passage comprising an elongated dual supporting member, oppositely-disposed sheet metal valve plates each resiliently secured along one longitudinal edge to said member and having an angularly-disposed flange along its free edge, additional elongated supporting members fixed in parallel spaced relation at each side of said dual-supporting member, an elongated seating bar movably mounted in each of said additional supporting members and each bar being engaged by the angularly-disposed flange of one of said resiliently-mounted valve plates when said plate is in passage-closing position, said seating bar

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being yieldingly movable when thus engaged by said flange, means being provided to resist such yielding movement of said bar, and said bar having a longitudinal groove to receive said flange and to thereby prevent relative transverse slipping thereof.

2. The combination in valve structure as set forth in claim 1, in which each valve plate is loosely and spirally coiled along the unflanged longitudinal edge thereof, and in which the extreme edge of said coiled portion is secured to a rod which is fixed in a longitudinal pocket in the rear face of the associated supporting member, and said pocket loosely enclosing and protecting said coiled edge portion.

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