J. H. KINEALY.

DIAPHRAGM.

APPLICATION FILED NOV. 18, 1910.

988,472. Patented Apr. 4, 1911.

Fig. 1.

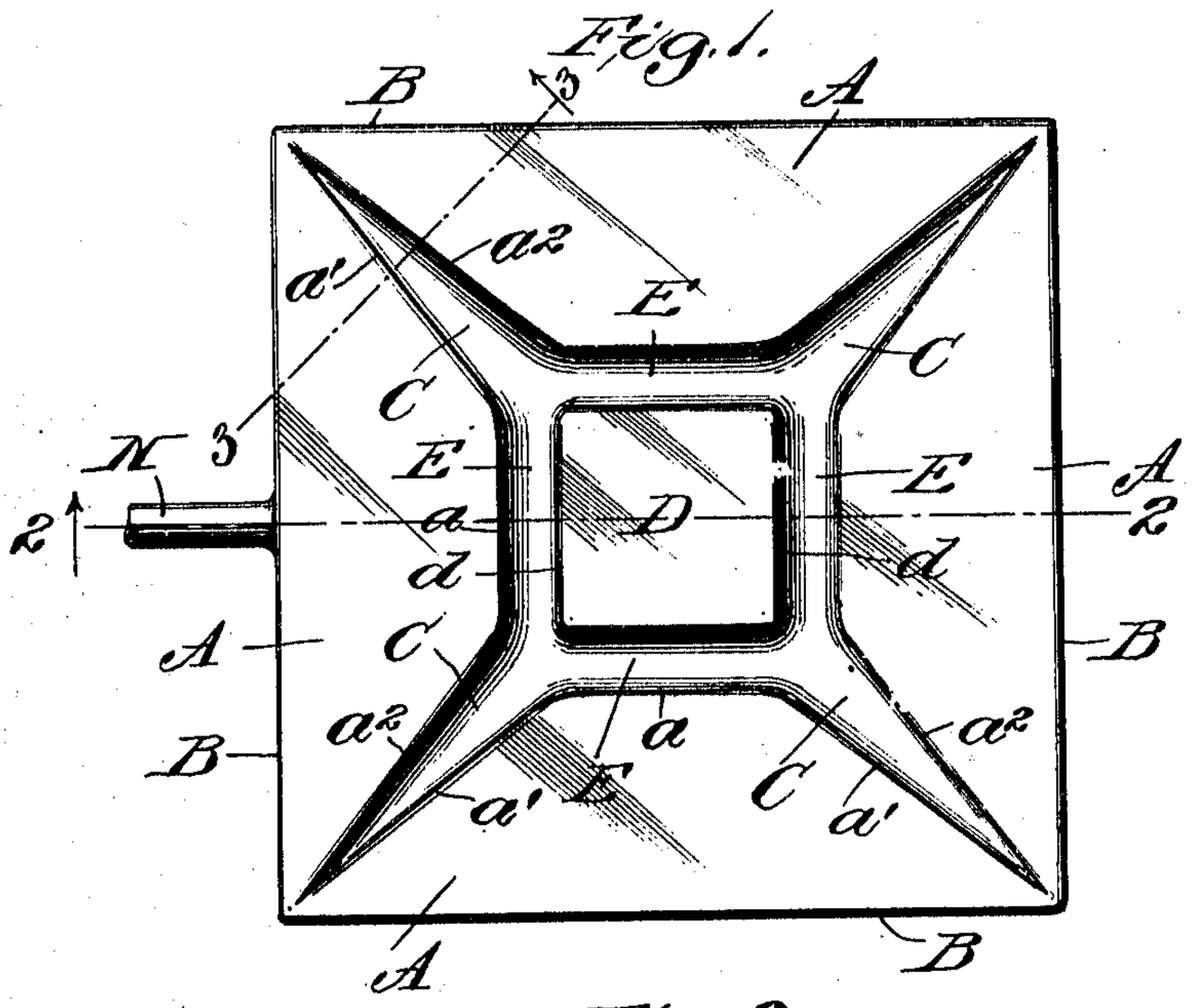


Fig. 2.

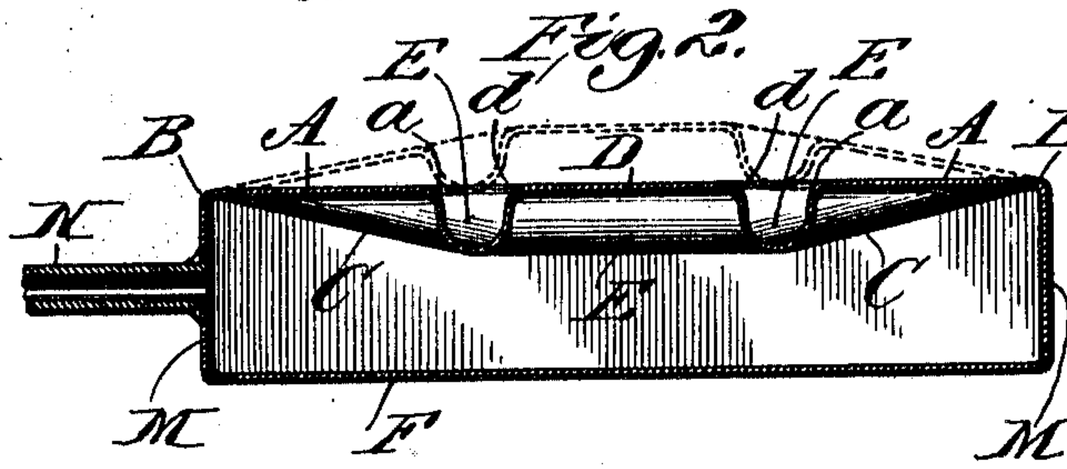


Fig. 3.

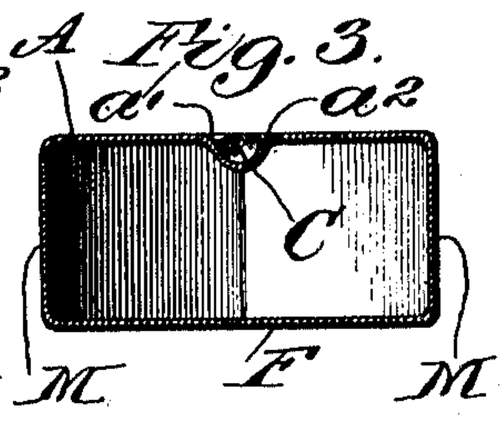
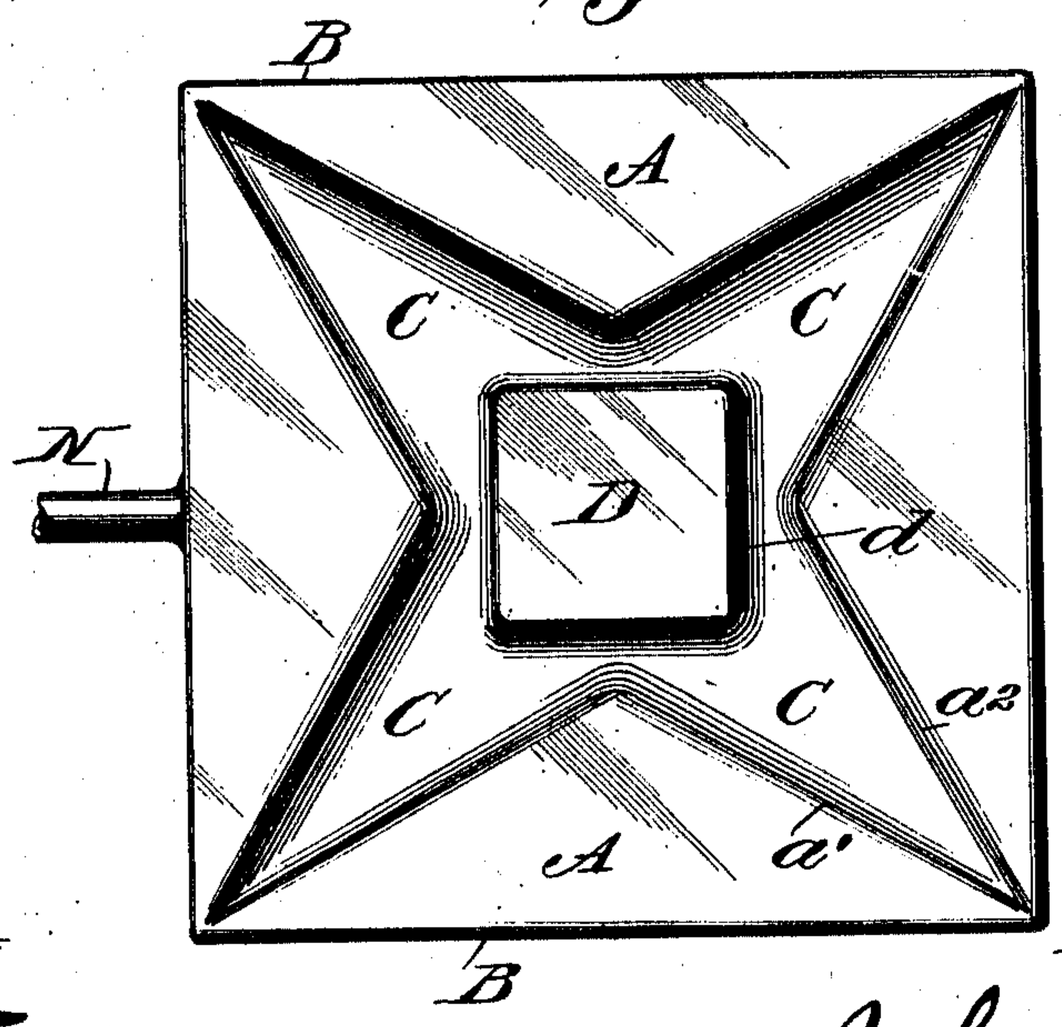


Fig. 4.



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DIAPHRAGM.

988,472. Specification of Letters Patent. Patented Apr. 4, 1911.

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To all whom it may concern:

Be it known that I, JOHN H. KINEALY, a citizen of the United States, residing at Ferguson, in the county of St. Louis and State of Missouri, have invented a new and useful Improvement in Diaphragms, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to diaphragms, particularly metal diaphragms, used in connection with thermal and other motors and other devices such as water, steam, and gas regulators where it is desirable to use a diaphragm that is capable of considerable motion and that requires only a slight pressure to make it move.

The object of my invention is to provide a diaphragm that can be stamped or pressed out of a single piece of metal; and a further object of my invention is to provide a diaphragm that will be of low cost and yet which will be capable of considerable movement without injury.

My invention is fully shown in the accompanying drawings where similar letters are used to designate similar parts.

Figure 1 is a view of one form of my improved diaphragm forming the upper part of a motor operated by internal pressure; Fig. 2 is a vertical section of Fig. 1 on the line 2—2; Fig. 3 is a vertical section of Fig. 1 on the line 3—3; and Fig. 4 is a view of another form of my diaphragm applied to the same motor used in Fig. 1.

Referring to the figures, A represents wings which form the diaphragm, each of which has a straight edge B by which it is attached to the sides M of the motor and about which it may turn through a small angle. C represents corrugations or depressions whose walls are flexible, lying between the adjacent edges a^1 and a^2 of the wings.

D is a central piece, lying inside of the inner ends or edges of the wings A.

E represents depressions or corrugations whose walls are flexible, lying between the edges d of the central piece D and the inner edges a of the wings A.

The straight edges B of the wings are arranged with respect to one another so that they form a polygon as illustrated in the figures of the drawings where the edges B form a square; and the adjacent edges a^1 and a^2 of adjacent wings diverge from the corners of the polygon toward the center thereof. The corrugations C increase in depth from the corners of the polygon toward the center thereof, and where the corrugations or depressions C meet the corrugations or depressions E the depressions C are preferably of the same depth as the depressions E.

The wings A and the central piece D may be made of stiff, rigid material provided, however, the straight edge B of each wing is so arranged that the wing may turn about it through a small angle. The walls or sides of the depressions C and E must, however, be sufficiently flexible as to give when the wings are made to turn about the straight edges B.

The operation of the diaphragm, when used in connection with a motor, is as follows: The diaphragm is attached to the walls M of the motor along the straight edges B of the wings. The bottom F of the motor may be rigid or flexible as desired. The motor is attached by means of the pipe N to a source of supply of fluid under pressure. When the fluid flows from its source of supply through the pipe N into the motor it presses against the sides and bottom thereof and also against the diaphragm which forms the top of the motor, as shown in Fig. 2. Because of the internal pressure exerted on them the wings A are made to turn about the straight edges B and the diaphragm is raised and assumes the position indicated by the dotted lines in Fig. 2. The walls of the depressions E give so as to allow the inner edges a of the wings to be separated somewhat from the edges d of the central piece D; and the adjacent edges a^1 and a^2 of adjacent wings separate somewhat and the flexible walls of the depressions C give so as to allow this separation of the adjacent edges of the wings. When the pipe N is disconnected from the source of supply of fluid under pressure, the pressure inside of the motor is reduced and the diaphragm returns to its original position shown by the full lines in Fig. 2.

It is evident that my invention may be embodied in a diaphragm having any number of wings, provided always that each wing has a straight edge about which it may turn.

What I claim as new and desire to secure by Letters Patent, is:

1. In a diaphragm, a plurality of wings

each of which has a straight edge about which it may turn, a flexible member connecting said wings in such a way that they may simultaneously turn each about its straight edge, substantially as described.

2. In a diaphragm, a plurality of wings each of which has a straight edge about which it may turn, a central piece, and a flexible member connecting the wings and the central piece, substantially as described.

3. In a diaphragm, a plurality of wings each of which has a straight edge about which it may turn, said straight edges being arranged with respect to one another so as to form a polygon with the wings lying inside thereof and the adjacent edges of the wings diverging from the corners of the polygon toward the center thereof, and a flexible member connecting said wings in such a way that they may simultaneously turn each about its straight edge, substantially as described.

4. In a diaphragm, a plurality of wings each of which has a straight edge about which it may turn, said straight edges being arranged with respect to one another so as to form a polygon with the wings lying inside thereof and the adjacent edges of the wings diverging from the corners of the polygon toward the center thereof, a central piece, and a flexible member connecting the wings and the central piece, substantially as described.

5. In a diaphragm, a plurality of wings each of which has a straight edge about which it may turn, said straight edges being arranged with respect to one another so as to form a polygon with the wings lying inside thereof and the adjacent edges of the wings diverging from the corners of the polygon toward the center thereof, corrugations connecting the adjacent edges of the wings, the depth of said corrugations increasing from the corners of the polygon toward the center, a central piece, and corrugations between the central piece and the inner edges of the wings, substantially as described.

6. In a diaphragm, a plurality of wings each of which has a straight edge about which it may turn, said straight edges being arranged with respect to one another so as to form a polygon with the wings lying inside thereof and the adjacent edges of the wings diverging from the corners of the polygon toward the center thereof, a central piece having the same polygonal shape as the polygon formed by the straight edges of the wings and lying inside of the inner edges of said wings, corrugations between the wings and the sides of the central piece, and corrugations connecting the adjacent edges of the wings, the depth of said corrugations between the wings increasing from the corners of the polygon toward the center until they meet with and have the same depth as the corrugations between the central piece and the inner edges of the wings, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. KINEALY.

Witnesses:

BELLE TIERNEY,

THERESA SUENIL.