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DOOR

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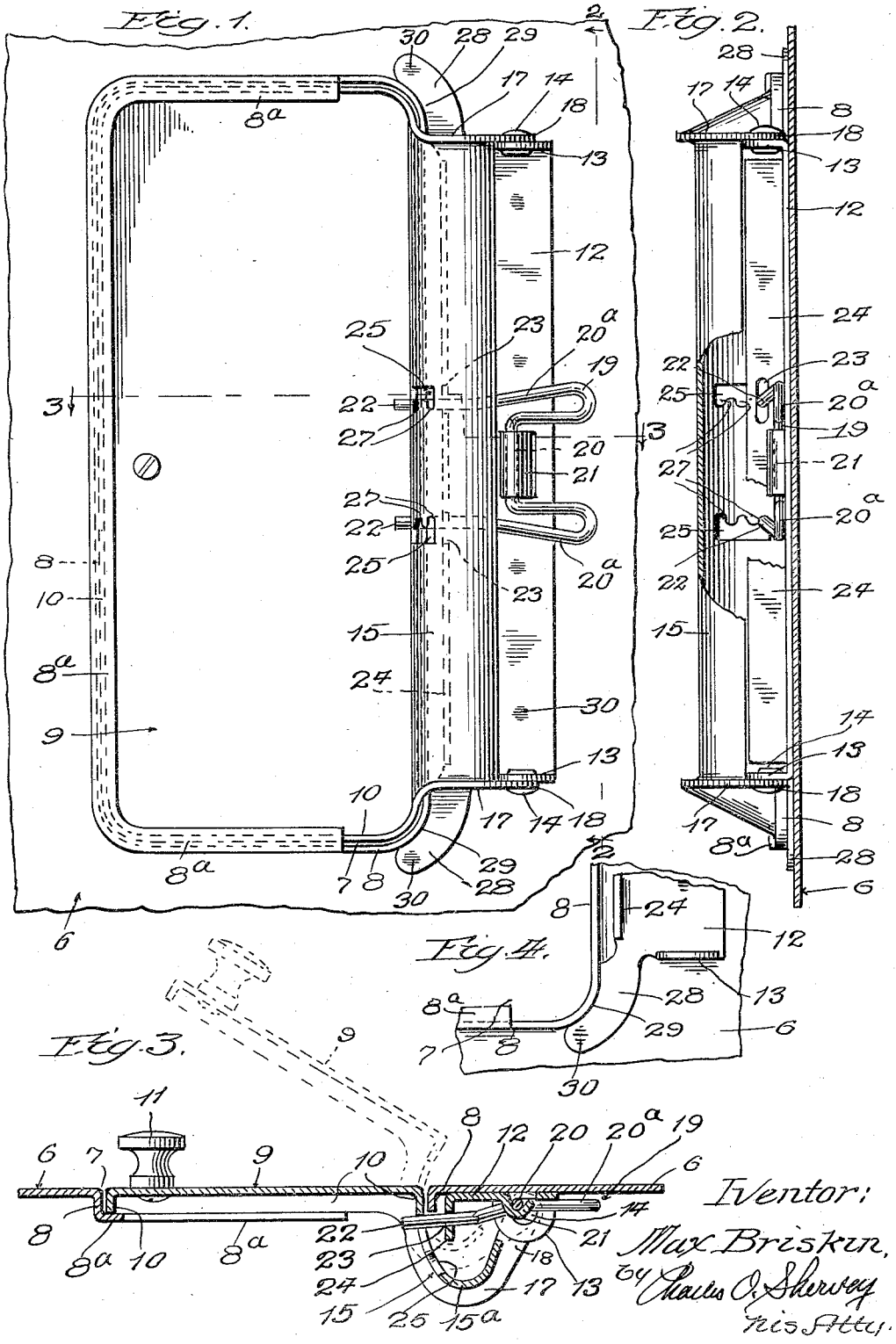

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UNITED STATES PATENT OFFICE

MAX BRISKIN, OF CHICAGO, ILLINOIS

DOOR

Application filed May 11, 1931. Serial No. 536,439.

This invention relates to doors, and in certain respects is in the nature of an improvement upon the door shown and described in my application for patent thereon filed November 8, 1930, under Serial No. 494,323, of which this application is in part a continuation.

This invention has reference more particularly to sheet metal door assemblies which embody their own hinges, and one of the objects of the inventin is to stiffen and strengthen the door, as well as the panel or other wall upon which the door is hung. Another object is to provide improved automatic means for holding the door closed as well as in a plurality of open positions.

Another object is to provide self-contained means whereby the door may be accurately positioned with respect to the door opening in the wall or other panel upon which it is hung so as to eliminate the necessity of a jig for accurately locating the door.

With these and other objects and advantages in view, this invention consists in the several novel features hereinafter fully set forth and claimed.

The invention is clearly illustrated in the drawings accompanying this specification in which—

Figure 1 is a side elevation of a fragment of a wall or panel, looking at the rear side thereof, upon which is hung a door embodying a simple form of the present invention;

Fig. 2 is a vertical cross section taken on the line 2—2 of Fig. 1, showing certain parts broken away to reveal other parts which would be otherwise hidden from view;

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 1; and

Fig. 4 is a fragmental side elevation of the wall and the hinge plate which forms part of the device and connects the door with the wall.

Referring to said drawings, the reference character 6 designates a panel or wall, usually formed of sheet metal and containing a rectangular door opening 7 and formed with an inturned marginal flange 8 around said opening. Along one side of the opening and along portions of the top and bottom thereof the flange 8 is bent over the opening to form a flange 8^a which lies parallel with the panel or wall 6 and serves as a positive stop for the door in its closed position. The corners of the opening and the flanges at said corners are rounded off, as shown, to improve the appearance of the device.

The door 9 is in the form of a rectangular sheet metal panel or plate having a marginal flange 10 which is turned in towards the flange 8^a and forms a reinforcement for the door. The corners of the door are also rounded off, as shown, and a very slight clearance space is left between the door and edge of the door opening. A knob or other handle 11 is provided upon the door by which it may be opened and closed.

Spot welded or otherwise rigidly secured to the inner face of the panel or wall 6, at the hinged side of the door, is a hinge plate 12 of rectangular form extending parallel with one side edge of the door. The hinge plate is formed with a longitudinally extending flange 24 along the edge adjacent the door, and said flange serves to materially stiffen the panel or wall 6 as well as to reinforce and stiffen the hinge plate. The flange 24 also serves to guide the hereinafter described door holding spring 19. The ends of the hinge plate 12 are bent up to form hinge ears 13 that cooperate with hinge ears on the door, as will be presently explained.

The side of the door 9 adjacent the hinge plate is formed with an arcuate flange 15 which extends from the marginal side flange 10 of the door and terminates in a U-bend 15^a. The ends of the arcuate flange 15 are bent up to provide end flanges 17 that terminate in ears 18 which are connected to the hinge ears 13 of the hinge plate 12 by rivets or the like 14.

Anchored upon the hinge plate 12 is the spring 19 which serves to hold the door closed as well as in a plurality of open positions. The spring is bent up from a piece of spring wire and comprises a middle section 20 from which extends two U-bends 20^a that terminate in arms 22 which pass through slots 23 formed in the flange 24 of the hinge plate and engage in notched slots 25 formed

in the arcuate portion 15 of the door. The arms 22 are adapted to engage in any of the notches 27 of the slots 25 to thereby hold the door closed or in any of several selected positions. With this form of spring greater resiliency for the arms 22 is obtained.

The arms 22 are capable of movement in a plane parallel with the plane of the door and wall and are urged into the notches of the notched slots 25. As shown, the arms are guided in the slots 23 for movement into and out of the notches of the notched slots 25 and are held against lateral movement in a direction transversely of the panel or wall 6 by the side edges of said slots 23, so that when engaged in any one of the notches 27, the arms will hold the door in the position controlled by the notches. The middle section 20 of the spring is held in place on the hinge plate 12 by a tongue 21 struck up from the hinge plate and bent over said middle section of the spring.

The hinged together door and hinge plate and the spring are assembled as a unit ready for installation upon a panel or wall. In order to accurately space the door in the door opening in the panel without the use of a jig or other mechanism, ears 28 are formed upon the ends of the hinge plate 12 and have curved edges 29 which correspond with and conform to the outer curved faces of the flange 8 of the panel or wall, whereby when the ears 28 are placed in register with the curved faces of the flange 8 (see Fig. 4) the entire door device is accurately positioned, with the door 9 itself properly spaced in the door opening. When thus properly located, the hinge plate is spot welded to the panel or wall 6 as at 30, thereby rigidly fastening the door assembly to the panel or wall.

It will be observed that the arcuate portion 15 and hinge plate 12 are somewhat shorter than the door 9 itself. The purpose of this is to permit the formation of the rounded corners on the door having relatively long radii.

The present door device is particularly useful in controlling the ventilating openings of hoods for automobile engines, although it is to be understood that its use is not to be limited thereto. Moreover, the door and hinge plate form two leaves of a hinge and when provided with the spring stop means, above described, is capable of use in connection with various types of closures for holding them in closed position as well as several selected open positions.

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

1. A hinged door device comprising in combination a panel having a door opening therein, a hinge plate secured to said panel adjacent the door opening, said hinge plate being formed with a flange throughout the major portion of its length extending parallel with an edge of said door opening and also being formed with a pair of hinge ears, a door for closing said door opening having hinge ears hingedly connected to the ears of the hinge plate, said door being formed with an arcuate flange integral with said ears and concentric with the hinge line of the hinge ears and having notched slots therein, and spring means anchored to said hinge plate and having arms guided in said flange and engaging in said notched slots.

2. A hinged door device comprising in combination a panel having a door opening therein formed with rounded corners, a hinge plate secured to said panel adjacent the door opening, said hinge plate being formed with a flange extending parallel with an edge of said door opening and also being formed with a pair of hinge ears, a door for closing said door opening, said door being of greater length than the hinge plate and having rounded corners conforming to the corners of the door opening, said door having also hinge ears hingedly connected to the ears of the hinge plate and being formed with an arcuate flange concentric with the hinge line of the hinges and having notched slots therein, and spring means anchored to said hinge plate and having arms guided in the flange thereof and engaging in said notched slots.

3. A hinged door device comprising in combination a panel having a door opening therein and a marginal flange surrounding said door opening and terminating on three sides in a flange paralleling the panel and serving as a stop shoulder, a hinge plate secured to said panel adjacent the door opening, said hinge plate being formed with a flange extending parallel with an edge of said opening and also being formed with a pair of hinge ears, a door for closing said door opening and having a flange entering said door opening adapted to abut against said stop shoulder, said door having hinge ears hingedly connected to the ears of the hinge plate and being formed with an arcuate flange concentric with the hinge line of the hinge ears and having notched slots therein, and spring means anchored to said hinge plate and having arms guided in the flange thereof and engaging in said notched slots.

4. A hinged door device comprising in combination a panel having a door opening therein, a hinge plate secured to said panel adjacent the door opening, said hinge plate being formed with a slotted flange extending parallel with an edge of said door opening and also formed with a pair of hinge ears, a door for closing said door opening and having hinge ears hingedly connected to the ears of the hinge plate, said door being formed with an arcuate flange concentric with the hinge line of the hinge ears and having notched slots therein, and spring means comprising a middle section anchored to the

hinge plate, and U-bends extending from the middle section and terminating in arms which extend through and are guided in the slots in said flange and engage in the notches of the notched slots.

5. A hinged door assembly comprising in combination a hinge plate fromed with a flange throughout the major portion of its length and also formed with a pair of hinge ears, a door having hinge ears hingedly connected to the ears of the hinge plate, said door being formed with an arcuate flange concentric with the hinge line of the hinge ears, and having a notched slot therein, and spring means anchored to said hinge plate guided in said flange and engaging in said notched slot.

6. A hinged door device comprising in combination a hinge plate formed with a flange and also formed with a pair of hinge ears, a door having hinge ears hingedly connected to the ears of the hinge plate, said door being formed with an arcuate flange concentric with the hinge line of the ears and having notched slots therein, and spring means comprising a middle section anchored to the hinge plate, and two U-bends terminating in arms which extend through and are guided in said flange of the hinge plate and engage in the notches of said slots.

7. A hinged door device comprising in combination a panel having a door opening therein formed with a marginal flange, a hinge plate formed with ears conforming to portions of said flange and adapted when placed against said flange to locate the hinge plate upon the panel, said panel and hinge plate being secured together, a door fitting in and conforming to the shape of the door opening and hinged to said hinge plate, and spring means secured to the hinge plate and engaging the door in a plurality of places whereby to hold the door in a plurality of positions.

8. A hinged door device comprising in combination a panel having a rectangular door opening therein formed with rounded corners and having a marginal flange around said door opening, a hinge plate having ears formed with rounded edges conforming to and adapted to engage the rounded corners of said flange to thereby position the hinge plate relative to the door opening, a rectangular door formed with rounded corners fitting in and conforming to said door opening and hingedly connected to said hinge plate, and spring means secured to said hinge plate and engaging the door in a plurality of places whereby to hold the door in a plurality of positions.

9. Hinge means comprising a hinge plate and a plate hingedly connected thereto and formed with an arcuate portion having a pair of notched slots therein, spring means comprising a middle portion anchored to the hinge plate, and two U-shaped portions terminating in arms guided to said hinge plate and engaging in the notches of the notched slots.

MAX BRISKIN.