May 28, 1929. B. J. GOLDSMITH ET AL 1,714,979

SHEET METAL DOOR

Filed May 5, 1925 5 Sheets-Sheet 1



Fig. 1

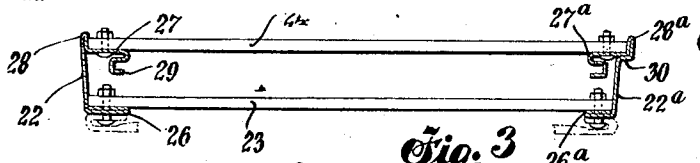


Fig. 2

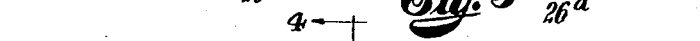
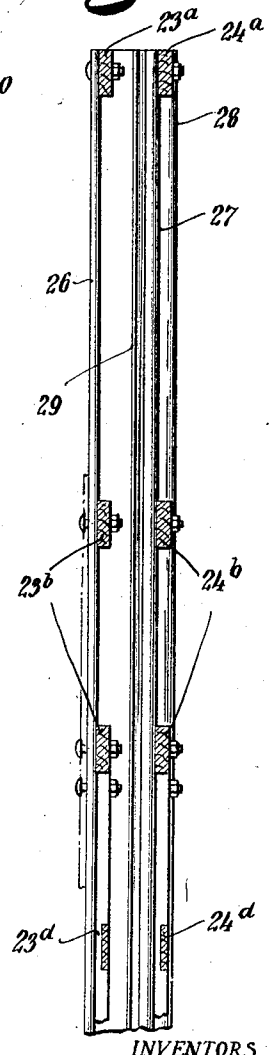


Fig. 3

Fig. 4



INVENTORS
Bertram J. Goldsmith.
Emil Koeb.

BY Townsend & Dyker
ATTORNEYS.

May 28, 1929. B. J. GOLDSMITH ET AL 1,714,979

SHEET METAL DOOR

Filed May 5, 1925 5 Sheets-Sheet 2

Fig. 5

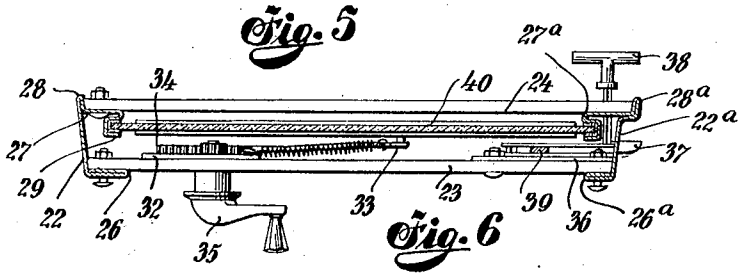


Fig. 6

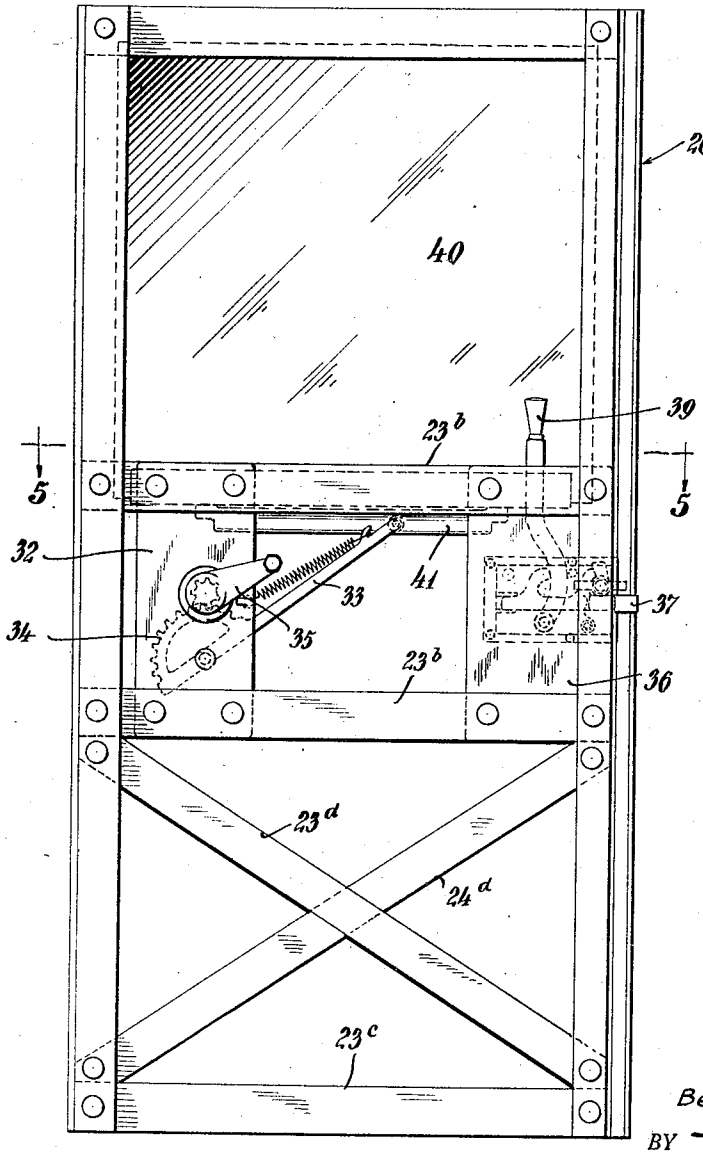
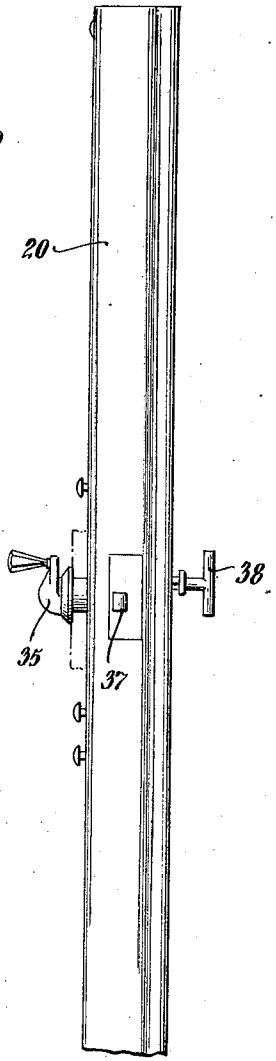


Fig. 7



INVENTORS
Bertram J. Goldsmith.
Emil Koeb.
BY Townsend & Decker
ATTORNEYS

May 28, 1929. B. J. GOLDSMITH ET AL 1,714,979

SHEET METAL DOOR

Filed May 5, 1925 5 Sheets-Sheet 3

Fig. 6

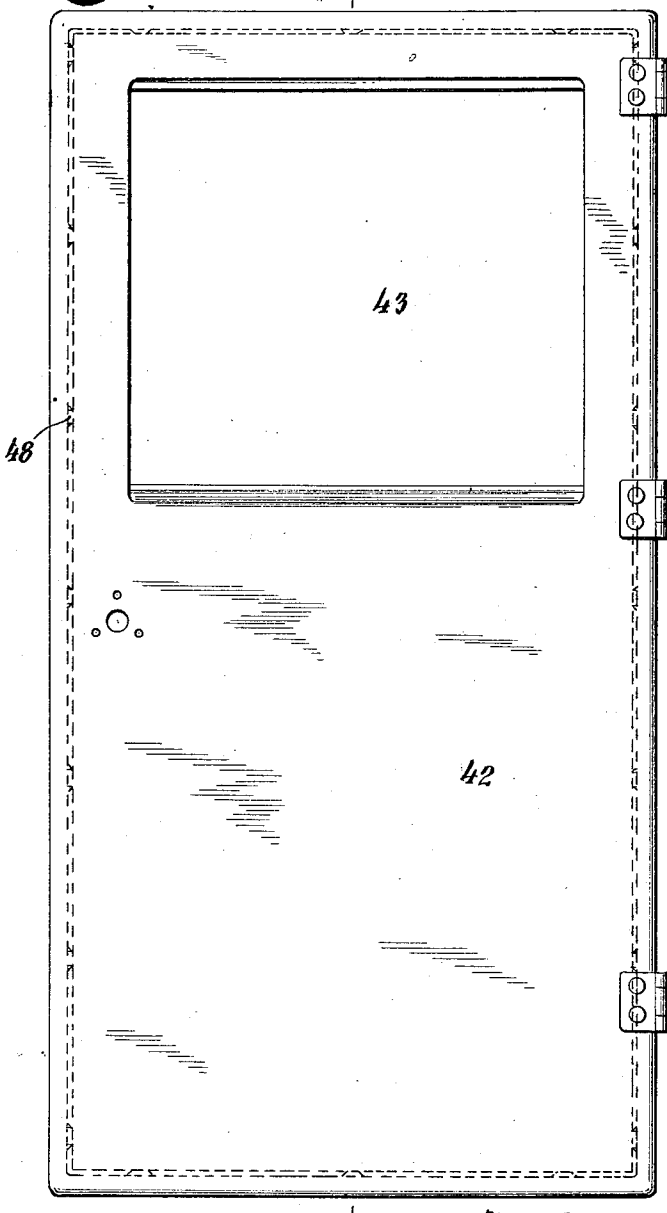


Fig. 9

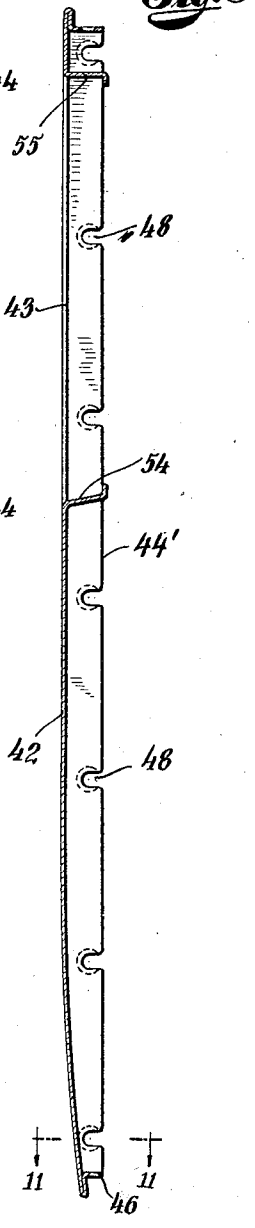
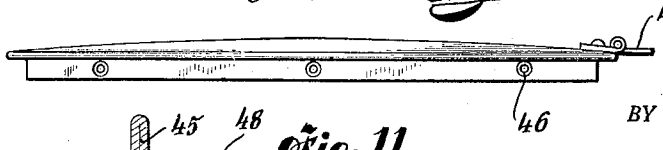


Fig. 10



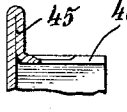


Fig. 11

INVENTORS
Bertram J. Goldsmith.
Emil Koeb.
BY Townsend & Decke
ATTORNEYS.

May 28, 1929. B. J. GOLDSMITH ET AL 1,714,979

SHEET METAL DOOR

Filed May 5, 1925 5 Sheets-Sheet 4

Fig. 12

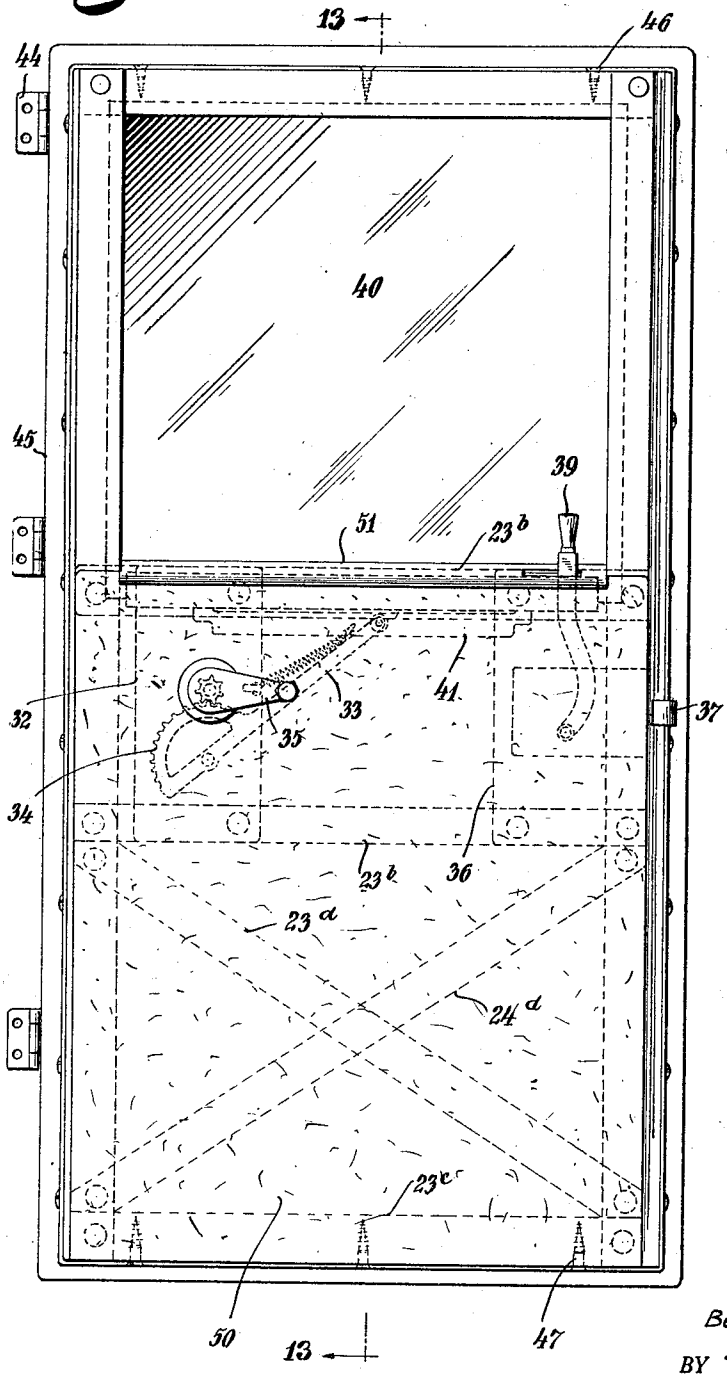
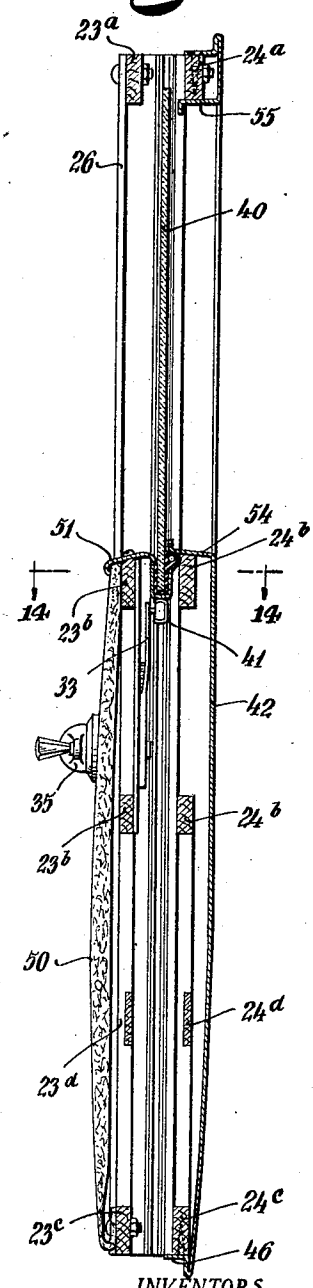


Fig. 13



INVENTORS
Bertram J. Goldsmith
Emil Koeb.
BY Townsend & Decker
ATTORNEYS.

May 28, 1929. B. J. GOLDSMITH ET AL 1,714,979

SHEET METAL DOOR

Filed May 5, 1925 5 Sheets-Sheet 5

Fig. 14

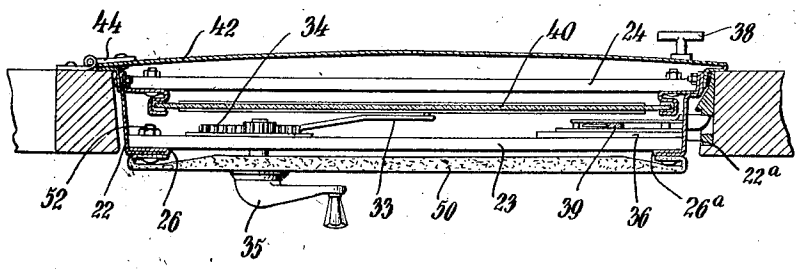


Fig. 15

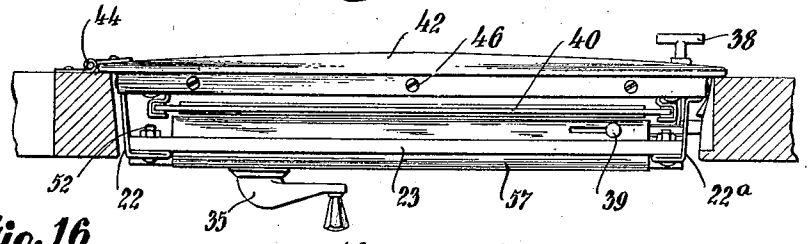


Fig. 16

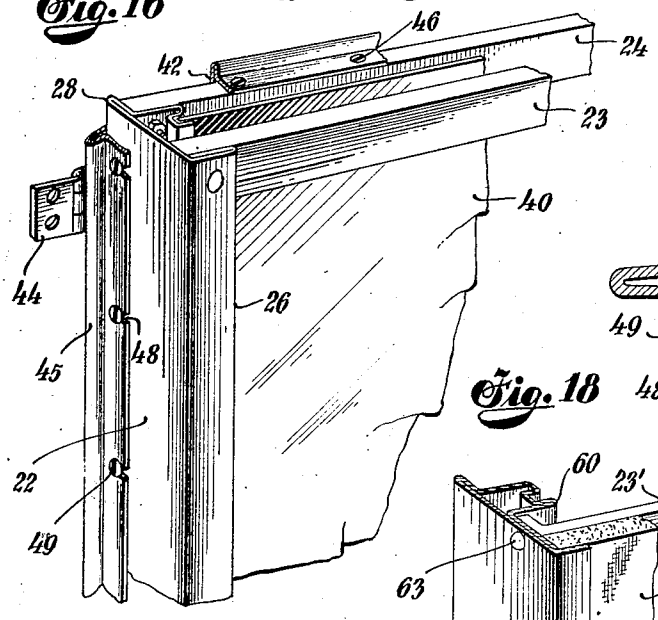


Fig. 17

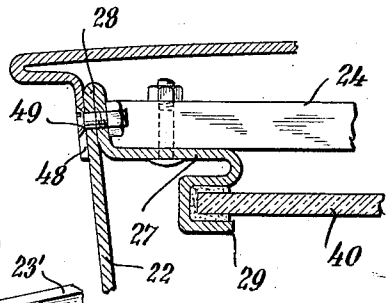
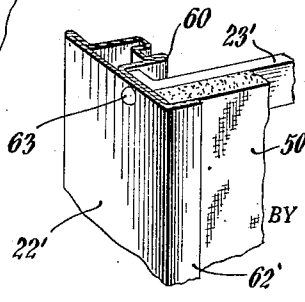


Fig. 18



INVENTORS
Bertram J. Goldsmith.
Emil Koeb.
BY
Townsend & Decker
ATTORNEYS.

Patented May 28, 1929. 1,714,979

UNITED STATES PATENT OFFICE.

BERTRAM J. GOLDSMITH AND EMIL KOEB, OF NEW YORK, N. Y., ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE ENGLISH & MERSICK COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

SHEET-METAL DOOR.

Application filed May 5, 1925. Serial No. 28,080.

This invention relates to improvements in sheet metal doors designed primarily for use in closed automobile constructions.

It is one of the primary objects of the invention to provide an improved supporting frame which can be cheaply and simply constructed and which will support the operating mechanism of the door such as the window regulator and latch mechanism and which can be covered after these parts are installed by an outer facing which will further support the frame and add to the neatness of the appearance thereof.

It is another object to provide improved side members for the door frame which can be constructed of sheet metal if desired and which will receive the cross pieces of the door, the cover and the sliding window.

Other and more specific objects will appear from the following description taken in connection with the drawings in which,

Fig. 1 is a plan view of the side members of the door frame showing them spaced as the initial step in the manufacture of the door.

Fig. 2 is a section on the line 2—2 of Fig. 3 showing the cross members of the door in position.

Fig. 3 is an elevational view of the assembled door frame.

Fig. 4 is a section thereof on the line 4—4 of Fig 3.

Fig. 5 is a section on the line 5—5 of Fig. 6.

Fig. 6 is an elevational view of the completed frame showing the window, the widow regulator, and latch mechanism installed in position thereon before the outer facing is secured in position.

Fig. 7 is an edge view thereof.

Fig. 8 is an elevational view of the outer face of the sheet metal facing for the door.

Fig. 9 is a section thereof on the line 9—9 of Fig. 8.

Fig. 10 is a bottom plan view of the structure shown in Fig. 8.

Fig. 11 is a section thereof on the line 11—11 of Fig. 9.

Fig. 12 is an inner elevational view of the completed door.

Fig. 13 is a section thereof on the line 13—13 of Fig. 12.

Fig. 14 is a horizontal section on the line 14—14 of Fig. 13.

Fig. 15 is a plan view of the structure shown in Fig. 14.

Fig. 16 is a broken perspective view of a portion of the automobile door.

Fig. 17 is an enlarged horizontal section of the door taken on substantially the same plane as Fig. 14.

Fig. 18 is a perspective view of a modification of the vertical frame member.

In the construction of a door according to this invention the first step is the formation of a rigid inner frame designed to receive all of the operative parts of the door so that the inner and outer coverings may be secured over the same and will not need to be disturbed for the later installation of the window, for example. The description of the various steps in the formation of the door will be taken up in connection with the description of the parts forming the door.

The rigid inner supporting frame indicated generally at 20 includes the vertical side members or pillars 22, 22^a connected by the inner cross members 23 and the outer cross members 24. The posts or pillars 22 are preferably formed as inwardly opening channels and include the inner flange 26 and the outer flange 27. The flange 26 may be re-bent upon itself so as to be reinforced adjacent its point of connection with the cross member 23. The side member 22 has provision for receiving the outer facing of the door and to this end is formed with a re-bent section forming a flange 28 adjacent the base of the inwardly extending flange 27 and is also formed with the inwardly facing channel 29 forming a guide for the window, the channel 29 preferably being formed as an extension of the flange 27. The side member 22^a is constructed similarly to the side member 22 but includes, in addition to the flanges 26^a, 27^a and 28^a the offset shoulder 30 forming the abutment for the swinging edge of the door.

Referring to Figs. 2, 3 and 4, it will be seen that the cross pieces 23 and 24 are formed in pairs throughout and include the top cross braces 23^a, 24^a, the two intermediate spaced cross bars 23^b and 24^b and the lower cross members 23^c and 24^c, the lower section of the frame within the window well being braced by additional diagonal cross braces 23^d and 24^d. The cross members 23 and 24 may be conveniently attached to the flanges

26 and 27 and 26[a] and 27[a] by means of bolts or rivets or in any other preferred manner, the frame when completed as shown in Fig. 3 for example, constituting a strong and durable supporting frame ready for the installation of the various window attachments.

The next step in the construction of the door according to our invention is the assembling of the operative parts of the door as follows. The inner cross members 23[b] have secured thereto as by bolts, rivets or otherwise, the supporting plate 32 supporting the window regulator constructed in any preferred manner. As shown the regulator includes the operating arm 33 and rack 34 controlled by the handle and gear 35 although any other construction thereof would operate satisfactorily. The window 40 is slidably mounted in the guides 29 on the vertical frame members and carries adjacent the lower edge thereof a transverse guide 41 designed to receive the free or extended end of the operator 33 so that upon movement of the operating handle 35 the window 40 will be raised or lowered with respect to the frame. It is preferred to interline the channels 29 with a felt packing to reduce the danger of breakage and to cause the window to operate without noise. It will be seen that the mounting of the window 40 in the frame at this stage in the construction is relatively simple since the top of the door is entirely open and the regulator mechanism is entirely accessible, neither the inner nor outer covering having been placed upon the door.

The latch mechanism for the door may likewise be constructed in any preferred manner and supported upon the plate 36 mounted between the cross bars 23[b] and which may also be secured to the vertical side member 22[a]. The latch mechanism includes the bolt 37, the outside operating handle 38, and the inner vertically extended handle 39 so that the latch bolt may be controlled from within or without the door as is usual in this type of construction.

When this stage in the construction of the door has been reached, that is when all of the moving parts of the door have been assembled in position, the door is ready for its final step, namely the securing of the inner and outer coverings or facings thereon. The inner face of the door is arranged to be covered by means of any preferred type of upholstery 50 mounted in position as follows. The upper portion thereof is clamped by means of the inner sill member 51 against the upper cross member 23[b], the sill 51 extending inwardly so as to engage the window when in its raised position as shown in Fig. 13. The sides of the inner covering 50 are secured in position by means of the bolts 52 which hold the side and cross members together. The upholstery strip 50 is preferably mounted in position before the outer face is secured to the door and it is accordingly possible to fold the edges of the upholstery strip, as shown for example in Figs. 13 and 14, and thus to hide the heads of the bolts which hold the same in position. The outer facing is constructed in a particular manner so as to cover all of the parts above described after they have been assembled permanently in position on the frame.

To this end we have provided the sheet metal outer door casing 42 formed as an integral sheet metal body part including the window opening 43 adjacent the upper portion thereof and carrying the supporting hinges 44. The inner face of the body member 42 is stamped or drawn inwardly to provide the securing flanges 44′ preferably entirely encircling the same but spaced from the outer edge thereof as shown in Fig. 11 for example, to provide the re-bent outwardly extending flange 45 designed to engage the supporting framework surrounding the door to form a tight seal thereof, as shown in Figs. 14 and 15 for example. The inwardly extending flanges along the upper and lower edge of the door may be formed with apertures 46 so that these edges may be secured to the cross pieces 24[a] and 24[c] as by means of the securing screws 47 or otherwise. Since the flanges on the vertical side edges of the door are secured to the flanges 28 and 28[a] of the side members of the door, it is preferred that the vertical flanges 44′ be formed with securing slots 48 which receive the securing bolts 49 passing through apertures in the flanges 28 and 28[a] so as to facilitate the final assembly of the plate upon the frame structure. By this construction the bolts 49 can be mounted in position with the nuts supported on the same and the outer casing then slipped into position with the heads of the bolts positioned in the slots 48, after which the bolts 49 can be tightened and the additional screws 47 secured in position through the bottom and top apertures of the frame part 42 and the door is completed and ready to be mounted in position on the frame as shown in Fig. 14 for example.

The outer covering 42 of the door is preferably formed adjacent the window opening 43 with the inwardly extended sill members 54 and 55 the lower of which engages with a suitable sealing strip on the window when the window is in raised position so as to entirely close the interior of the vehicle from the outside elements and the sides of the window opening may likewise be finished by means of inwardly extended flanges bent from the material of the covering 42 adjacent the sides of the opening 43.

In Fig. 18 we have shown a slightly modified form of construction in which the win-

dow guide 60 is formed within the main body of the side sill of the door, the upholstery 50′ being secured between a flange 62 of the side member 22′ and the cross member 23′. The cross member 23′ is shown with an angular extension bolted or riveted, as shown at 63, to the body of the side member 22′. This shows one of the many modifications which could be made within the spirit and scope of our invention.

It is believed that the construction, assembly and use of a door constructed according to this invention is clear from the above description. Attention is called to the fact that the first step in the formation of the door is the bending of the side members 22 and 22ª into the configuration shown in Fig. 1. The front and rear cross braces are then secured to the side members, the window regulator and door latch mechanisms are secured to the intermediate cross bars, the window 40 being mounted in position on the inner frame member, the parts at this stage of the procedure being shown in Fig. 6 for example. The inner covering 50 is then mounted beneath the window opening on the inner side of the door and thereafter the outer face of the door is entirely covered by means of the sheet metal covering member 42 and the door is then ready to be mounted in position for use.

The various steps in the formation of the door are such that they can be made within a minimum of time and with great accuracy and the door, when completed, in addition to its pleasing appearance is decidedly rugged in construction and is easily capable of withstanding the wear to which it is subjected.

By this method of construction the frame constitutes practically a complete door so far as working parts are concerned. The mechanisms may be tested under conditions which will not change after the frame is mounted in the body panel, in particular the glass may be put into this frame, the regulator run up and down to see that it is working correctly and that the glass runs are free and the movable parts otherwise tested in situ. Furthermore, rather than to assemble such parts as the regulator, lock, glass runs and upholstery to a finished painted door, these devices are attached to the frame which when complete, is attached to the body panel and this avoids the possibility of damage to the painted door panel, during these various operations. By this method the body panel can come directly from paint shop to the body factory and the assembled door frame is then inserted either before or after the door panel is hung on the body. It is clear that in the event of a failure of either a lock or the regulator the frame may be removed without touching the upholstery to give access to the regulator and lock.

It is obvious that many changes may be made without departing from the scope of our invention.

We claim as our invention:

1. In a door construction, sheet metal side members, reenforcing cross members joining the corresponding inner and outer edges of said side members at the upper, lower and intermediate portions thereof, the free edges of said side members being bent to form window guides, and inner and outer coverings for said door.

2. In a door, a sheet metal side member formed with a section extending from the inner to the outer edge of the door, a flange constructed by rebending the material thereof upon itself adjacent the outer face of the door, said section being continued to form a guide member, and a sheet metal facing for said door secured to said flange.

Signed at New York in the county of New York and State of New York this 4 day of May, A. D. 1925.

BERTRAM J. GOLDSMITH.
EMIL KOEB.