

G. KURSCHUS.

DIE.

APPLICATION FILED SEPT. 8, 1915

1,163,933.

Patented Dec. 14, 1915.

3 SHEETS—SHEET 1.

FIG. 1.

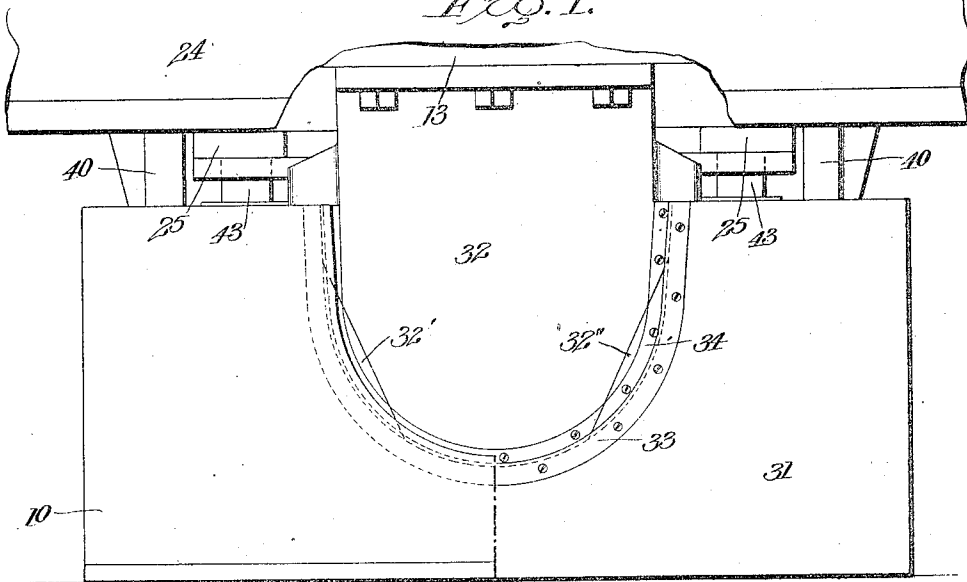
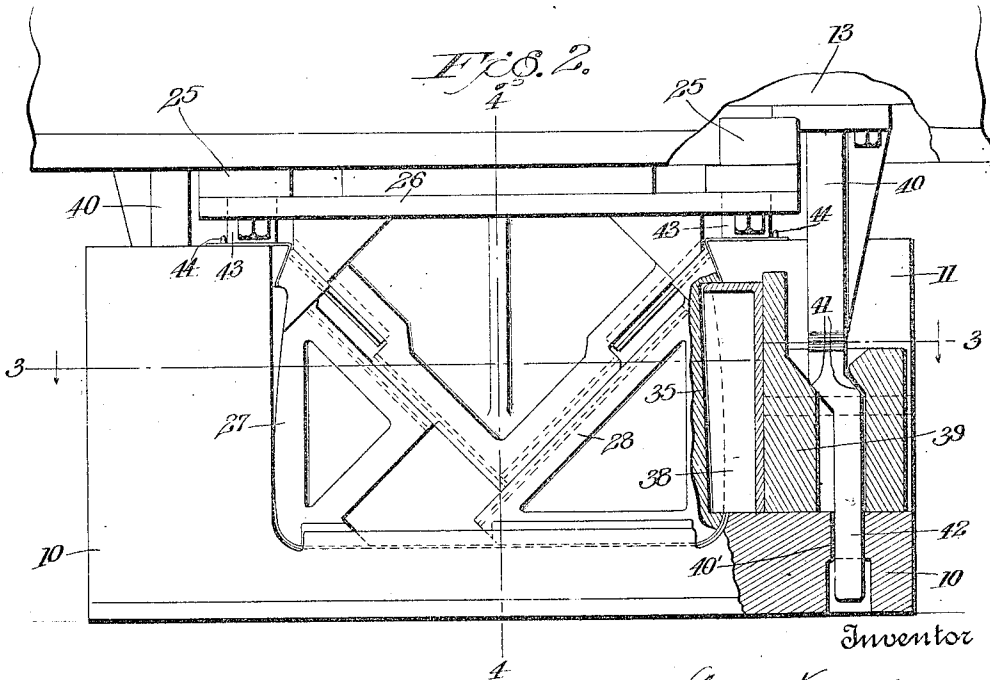


FIG. 2.



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3 SHEETS—SHEET 2.

FIG. 3.

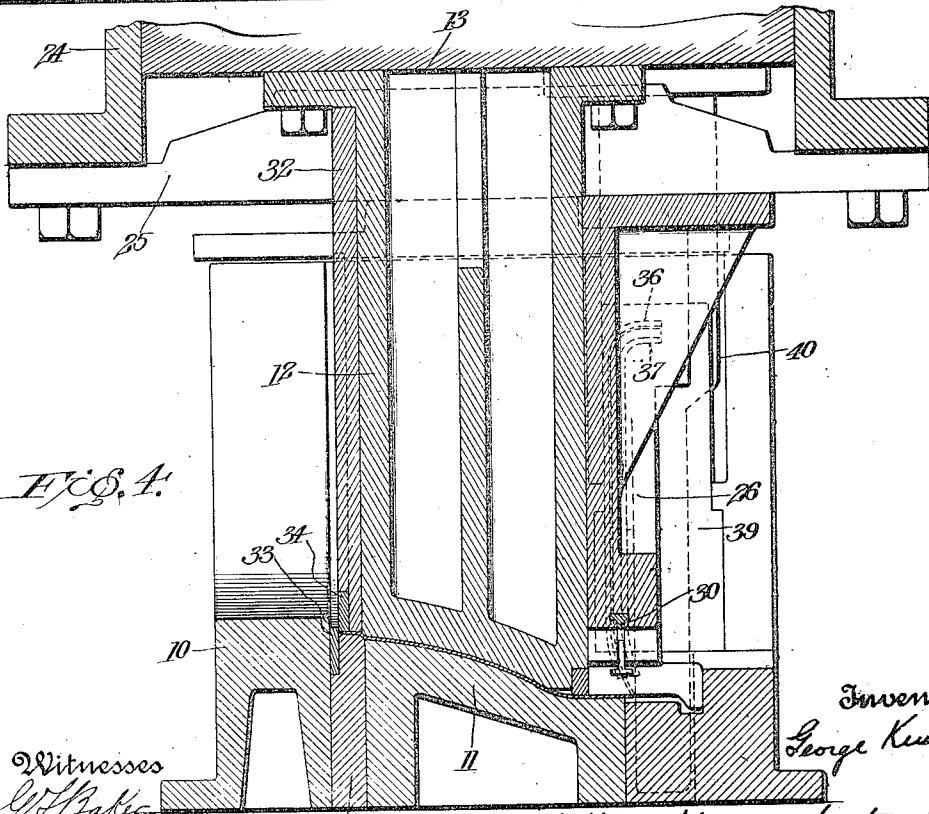
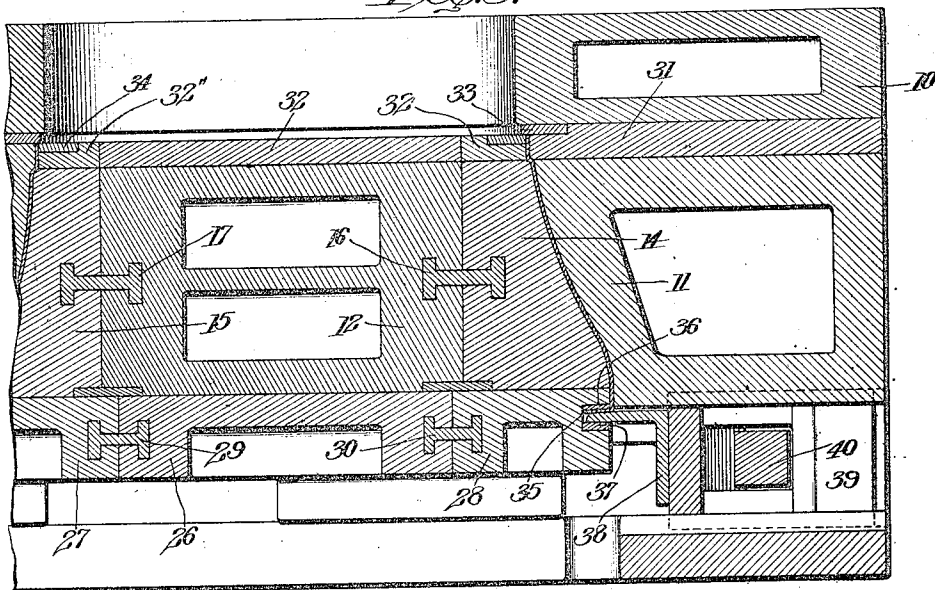


FIG. 4.

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3 SHEETS—SHEET 3.

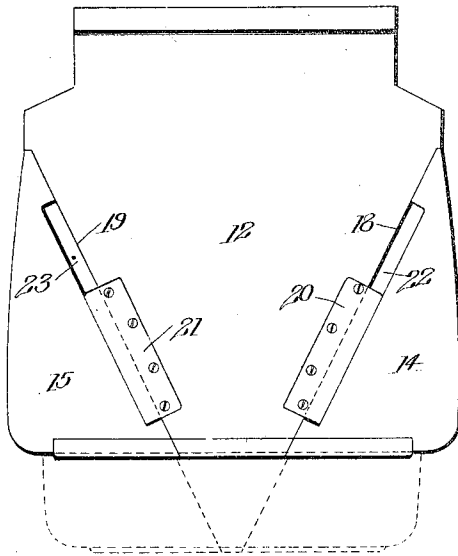


FIG. 5.

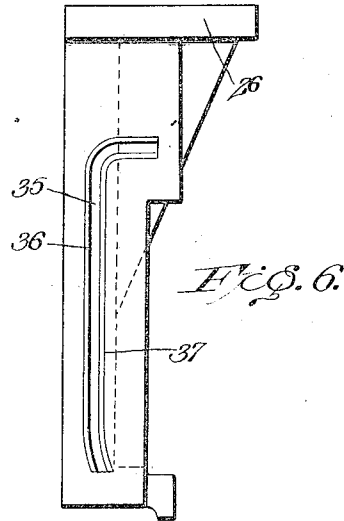


FIG. 6.

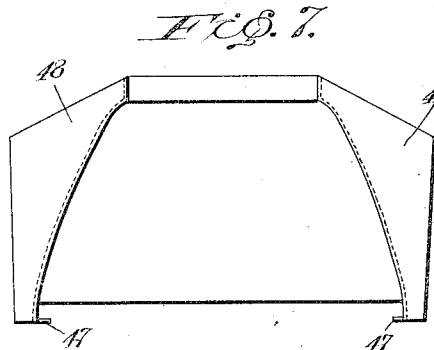


FIG. 7.

FIG. 8.

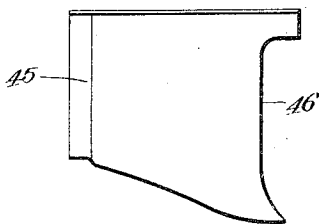
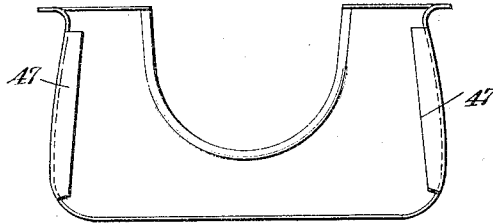


FIG. 9.



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UNITED STATES PATENT OFFICE.

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1,163,933.

Specification of Letters Patent.

Patented Dec. 14, 1915.

Application filed September 3, 1915. Serial No. 49,452.

To all whom it may concern:

Be it known that I, GEORGE KURSCHUS, a citizen of the United States, and resident of Flint, county of Genesee, State of Michigan, have invented certain new and useful Improvements in Dies, of which the following is a specification.

This invention relates to dies for double acting presses and more particularly to dies for expanding, forming, trimming, and flanging sheet metal at one operation.

One of the objects of the invention is to provide a die of the class described which shall be capable of producing a one-piece shroud for automobile bodies.

A further object of the invention is to provide a die for the above purpose which shall be of simple and substantial construction and which may be operated conveniently and rapidly.

Other objects and the features of novelty will be apparent from the following description taken in connection with the accompanying drawings in which:—

Figure 1 is a side elevation of a die embodying my invention; Fig. 2 is an elevation of the opposite side of the die with parts shown in section; Fig. 3 is a section on the line 3—3 of Fig. 2; Fig. 4 is a section on the line 4—4 of Fig. 2; Fig. 5 is a side elevation of the expanding punch; Fig. 6 is an end elevation of a part of the draw ring; Fig. 7 is an inverted plan view of the shroud as formed by the die; Fig. 8 is a side elevation; and Fig. 9 is an end elevation thereof.

Referring to the drawings 10 indicates the body of the die which is in the form of a hollow rectangle and contains the female die 11. An expanding punch comprising a central part 12, which is secured to the plunger 13 of the press, and side members 14 and 15 which are slidably connected with the member 12 by the keys 16 and 17 coöperates with the female die 11. Referring to Fig. 5 it will be seen that the member 12 is provided with the downwardly converging sides 18 and 19 against which the side members 14 and 15 are arranged. In the operation of this part of the die the side members 14 and 15, when the die is in the "up" position stand substantially as indicated in dotted lines in Fig. 5 so that when the plunger descends the side members 14 and 15 first engage the material and the member 12 acts as a wedge to separate the members 14 and 15 so that the latter are caused to assume the

position shown in full lines in Fig. 5. In order to hold the side members 14 and 15 against displacement laterally the cheek plates 20 and 21 are provided, these plates moving in recesses 22 and 23 respectively, the ends of the recesses coöperating with the ends of the plates to limit the movement of the members 14 and 15 on the surfaces 18 and 19.

In addition to the plunger 13 the press, on which the improved die is employed, will also have a plunger or blank holder 24 surrounding the plunger 13 and operated in proper relation to the latter. The plunger 24 is provided with cross-rails 25, these cross-rails supporting the wedge shaped member 26 of an expanding draw ring which also comprises the side members 27 and 28. The members 27 and 28 are slidably arranged on the inclined sides of the member 26 and secured thereto by the keys 29 and 30. The expanding draw ring descends ahead of the expanding punch, above described. When the members 27 and 28 reach the limit of their lower position the continued downward movement of the member 26 effects the separation of the members 27 and 28, these members being moved to the position shown in full lines in Fig. 2 and carrying the sheet metal against the surface of the female die. The expanding punch then completes its downward movement and forces the sheet metal against the body of the female die, the edge portion of the metal being held during the operation of the expansion punch by the members 26, 27 and 28.

In order to form the ledge at the front of the shroud, for supporting the engine hood, there is secured to the female die 11 a former 31 with which a clamping ring comprising the part 32, carried by the punch member 12, and the parts 32' and 32'' carried by the members 14 and 15, respectively, coöperate. The former 31 carries a trimming die with which a punch 34 on the clamping ring 32, 32', 32'' coöperates, the parts 33 and 34 trimming the edge of the sheet metal as clearly indicated in Figs. 3 and 4.

The members 27 and 28 are provided with recesses 35 in their sides in which the forming plates 36 and trimming plates 37 are arranged (see Figs. 3 and 6). The laterally movable punches 38 carried by the members 39 are movable into and out of the recesses 35 one edge of the punches coöperating with the plates 36 to turn or flange a part of the

sheet metal inwardly to form one edge of the front door of the body, the other edges of the punches 38 coöperating with the plates 37 to trim the sheet.

5 The punches 38 operate after the members 27 and 28 have been expanded and in order to move the punches 38 cam members 40 are provided, these cam members having inclined surfaces 41 which coöperate with surfaces on the members 39 to move the latter
10 into and out of the recesses 35. The cam members 40 are carried by the plunger 13 and have their lower ends 42 guided in suitable openings 40' in the body 10 of the die.

15 The cross-rails 25 carry the blank holding clamps 43 which secure the edge portions of the blank against the top of the female die 11, pins 44 being also provided for the purpose of securing the blank.

20 The product formed by the die is generally U-shaped as shown in Figs. 7, 8 and 9 and tapers from the engine hood ledge 45 to the front door openings 46. The front door openings 46 are provided with the in-turned flanges 47 which are formed by the
25 punches 38. The completed article, when taken from the die has the wings 48 thereon which are subsequently trimmed by any suitable means.

30 In the operation of the die a sheet of metal of the proper size which has been previously bent into a substantially U-shaped form, is placed in the female die 11 and then the plunger 24 descends the clamps 43
35 pressing the sheet against the top of the female die. The members 27 and 28 are first expanded and then the plunger 13 of the press descends and expands the members 14 and 15 so as to cause the sheet to be pressed
40 against the interior surface of the die 11. At the same time the plates 33 and 34 coöperate to trim off the front edge of the sheet. After the members 27 and 28 have reached the limit of their outward or ex-
45 panding movement and while the member 12 is completing its downward movement the cams 40 move the members 39 inwardly and the punches 38 enter the recesses 35 and trim the rear edge of the sheet and also turn
50 the flanges 47 inwardly as shown in Fig. 3. This completes the forming of the product and on the return stroke of the press the member 12 first collapses the members 14 and 15 and the cam 40 withdraws the
55 punches 38 from the recess 35. Then the expanding draw ring, comprising the parts 26, 27 and 28 is collapsed and the plungers 13 and 24 move to a position which permits the formed sheet to be withdrawn from the fe-
60 male die and a new sheet inserted.

It will be evident from the foregoing that various changes may be made in the details of construction of the die, without departing from the spirit of the invention as defined
65 in the claims and therefore I do not wish to

be limited to the exact form of the invention illustrated.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. In mechanism of the class described, the combination of a female die, a male die comprising a plurality of expansible sections, and means for operating said sections of the male die independently and in suc- 70
cession.

2. In mechanism of the class described, the combination of a female die, a male die comprising a plurality of expansible sections, means for operating said sections of the male die independently and in suc- 80
cession, and a laterally movable die coöperating with one of said sections and actuated simultaneously with another of said sections.

3. In mechanism of the class described, the combination of a female die, a male die comprising a plurality of expansible sections, means for operating said sections of the male die independently and in suc- 90
cession, a laterally movable die coöperating with one of said sections after the latter has completed its operation, and actuating means for said laterally movable die operated simultaneously with another of said 95
sections.

4. In mechanism of the class described, the combination of a female die, a male die comprising a plurality of independently operable sections, a laterally movable die co- 100
operating with one of said sections, and means for actuating said laterally movable die simultaneously with another of said sections.

5. In mechanism of the class described, the combination of a female die, a male die comprising a plurality of independently operable sections, a laterally movable die co- 105
operating with one of said sections after the latter has completed its operation, and a cam movable with another of said sections to operate said laterally movable die.

6. In mechanism of the class described, the combination of a female die, a male die comprising a plurality of independently operable sections, a laterally movable die carried by said female die and adapted to co- 115
operate with one of said sections, and means for actuating said laterally movable die simultaneously with another of said sections.

7. In mechanism of the class described, the combination of a female die, a male die comprising a plurality of independently operable expansible sections, means whereby said sections are expanded, a laterally mov- 120
able die coöperating with one of said sections after the latter has been expanded, and means operating simultaneously with the expansion of another of said sections to actuate said laterally movable die. 125
130

8. In mechanism of the class described, the combination of a female die, a plurality of plungers, a male die comprising a plurality of expansible sections each of which is carried by one of said plungers, a laterally movable die cooperating with one of said sections and a cam carried by the actuating plunger of another of said sections and adapted to actuate said laterally movable die. 15
9. In mechanism of the class described, the combination of a female die, a plurality of plungers, a male die comprising a plurality of expansible sections each of which is carried by one of said plungers, a laterally movable die cooperating with one of said sections and a cam carried by one of said plungers and adapted to actuate said laterally movable die. 10

In testimony whereof I affix my signature.

GEORGE KURSCHUS.