

No. 682,486.

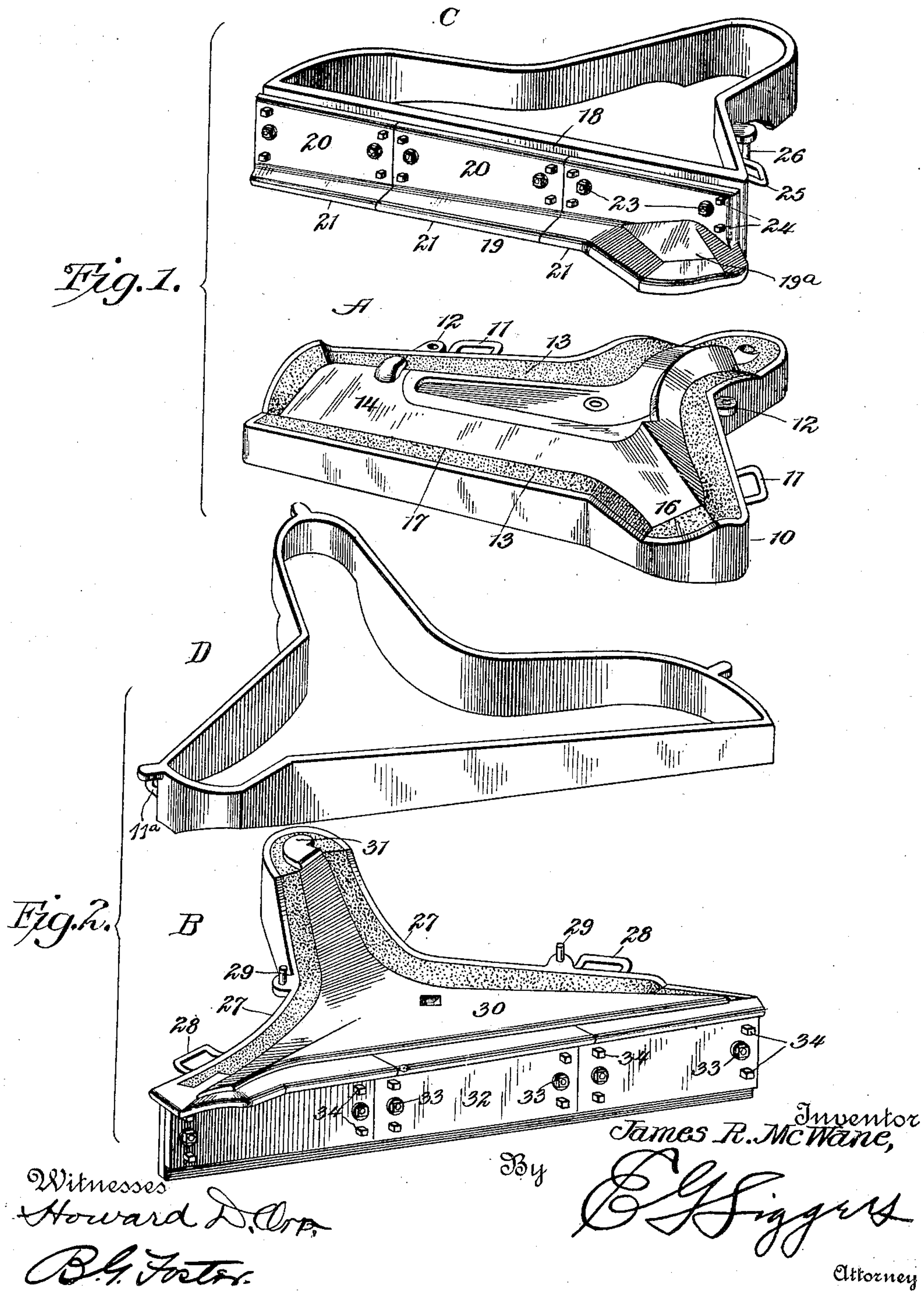
Patented Sept. 10, 1901.

J. R. McWANE.
MOLDING APPARATUS.

(Application filed Jan. 9, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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Fig. 3.

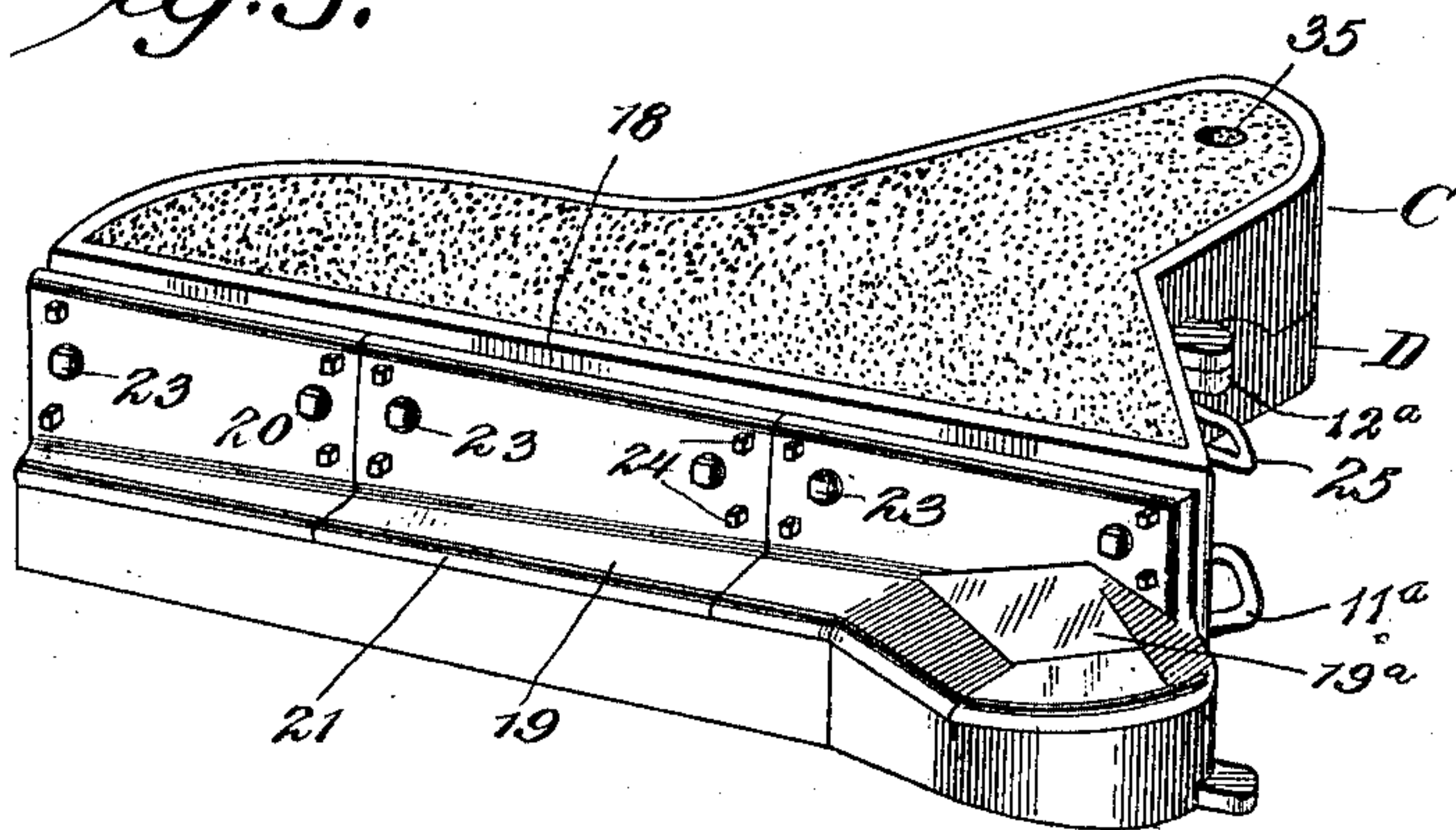


Fig. 4.

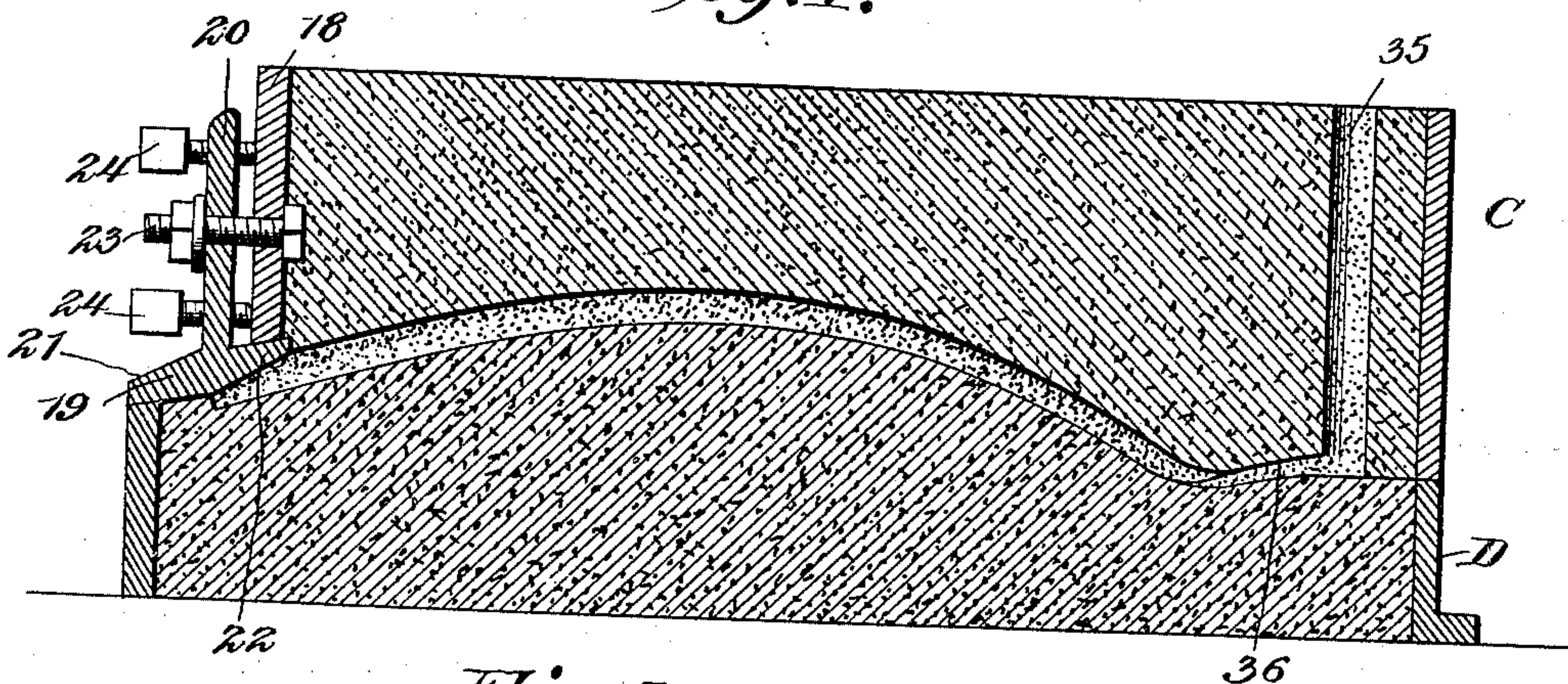


Fig. 5.

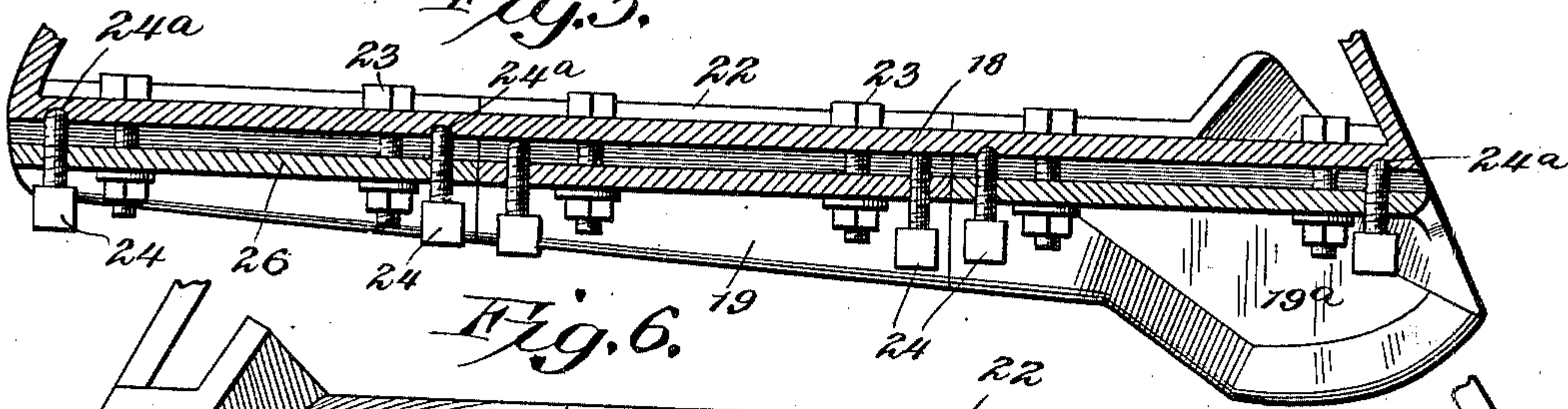
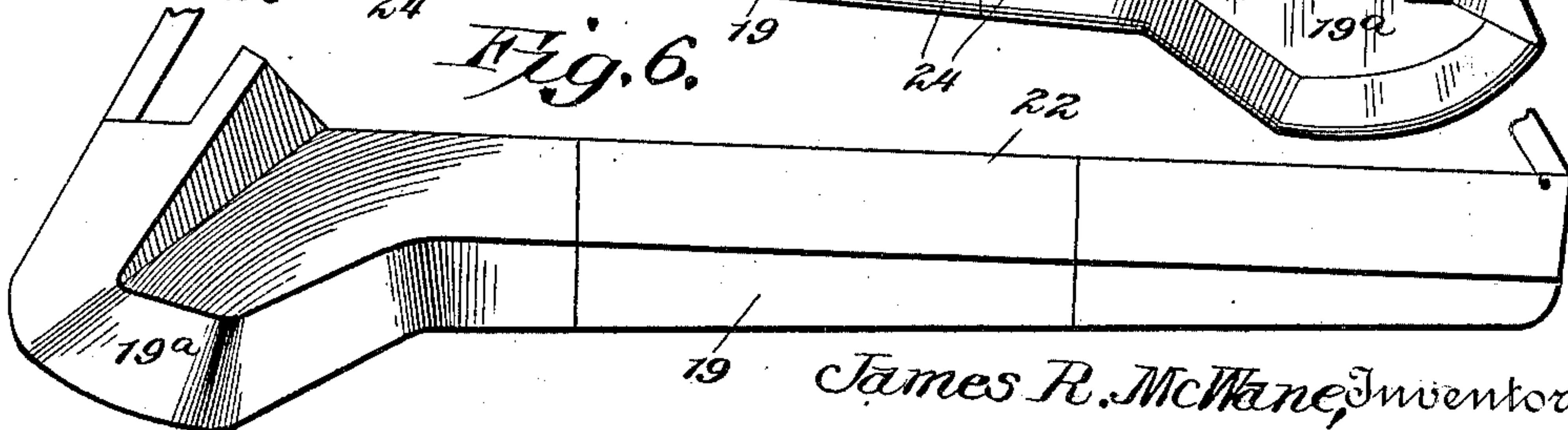


Fig. 6.



James R. McWane, Inventor.

By

E. G. Siggers

Attorney

Witnesses
Howard D. Orr
B. H. Foster

UNITED STATES PATENT OFFICE.

JAMES R. MCWANE, OF LYNCHBURG, VIRGINIA.

MOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 682,486, dated September 10, 1901.

Application filed January 9, 1901. Serial No. 42,667. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. MCWANE, a citizen of the United States, residing at Lynchburg, in the county of Campbell and State of Virginia, have invented a new and useful Molding Apparatus, of which the following is a specification.

In the construction of cast-iron plows certain portions that are subjected to excessive wear are hardened by being chilled during the process of casting—as, for instance, the working face of the moldboard and the cutting edge and nose of the point.

In the ordinary method of molding the points a follow-board and removable pattern are employed. The chill is first placed upon the follow-board and the pattern placed thereon. The “drag” of the flask is then placed upon the follow-board, filled with sand, and rammed up. It is then turned over and the “cope” placed thereon. This is also filled with sand and rammed up. The flask is then opened, the chills removed, and the pattern drawn, after which the chills are replaced and the casting made. When the casting has cooled sufficiently, the mold is broken and the casting removed. The chills also must be found and taken out of the sand. The chills must therefore be handled four times—first, in placing them in proper position upon the follow-board; secondly, in removing them from the pattern; thirdly, in replacing them in the mold, and, lastly, in taking them from the sand. Where large numbers of castings are made, it necessarily results that a large amount of time is used in this apparently insignificant part of the operation. A further drawback to this process is the amount of sand necessarily used in making the mold, which must be large enough to inclose and support the chill, thus making it heavy and cumbersome. Various attempts have been made to overcome these objections. For instance, a solid chill has been made and bolted to the inside of the flask, and, again, the chill has been made an integral part of the flask. These constructions have always been used, however, in connection with the above-described follow-board, and it is therefore necessary to adjust the chill to the pattern almost every time a mold is made. In the first instance this consumes

considerable time, and in the second instance it is impossible, the chill being made integral with the flask, and therefore not adjustable. Another objection to these constructions is that the chills are made of a single piece and are liable to become warped to a certain extent in being cast and from contact with the molten metal, and should this occur they cannot be properly adjusted to the pattern. For these several reasons the above constructions have met with little success.

The present invention relates to this art, and the object thereof is to provide a construction which will overcome all the above objections and will form practicable means whereby molds of this character may be made rapidly and efficiently and the proper position of the chills therein will be insured without the necessity of adjusting them at each operation.

Broadly the invention consists in one aspect in the combination, with a “match” element, of a “flask” element to which the chill is adjustably secured, said flask element being arranged to be rigidly fitted upon the match element, so that the chill carried thereby is necessarily properly positioned upon the pattern-section, which forms a part of the match element. This match element may be either in the form of “matches,” by which is meant the use of two distinct elements, one of which carries the pattern forming one side of the impression and the other forming the opposite side, or a “match-plate” may be employed, which comprises a plate or board upon the opposite sides of which the halves of a pattern are placed correspondingly, the plate being placed between the sections of a flask rammed up from both sides and removed, thus allowing the sections to be placed together with the impression in proper form. By the term “match” element is therefore meant an element from which the pattern is never removed as distinguished from a follow-board, from which the pattern must necessarily be removed in making the mold, and said term includes, therefore, either matches or “match-boards.”

A further feature of the invention is to construct the chill of separate sections, which are independently and adjustably secured to the flask, so that when the flask is first ap-

plied to the match element the chill may be adjusted as a whole or by sections, as may be necessary, and after such adjustment rigidly fixed by the same means which accomplish the adjustment. Therefore as the flask and match element will always assume the same relation when brought together the chill will necessarily be properly positioned upon the pattern.

10 A still further feature resides in providing the match element with an exact duplicate of the chill, which can be adjusted in the same manner as the chill and which will therefore form an impression in the mold to receive the chill. For the purposes of distinction this has been termed a "chill-pattern." It will of course be understood that in its broadest aspect the operative faces only of the chill and pattern therefor need necessarily be duplicates.

20 The preferred form of construction and the operation thereof is set forth in the following specification, and this construction is also illustrated in the accompanying drawings. It will be understood, however, that the construction shown and described is open to change and modification within the scope of the appended claims. In this form the match element is in the form of independent matches.

30 In the drawings, Figure 1 is a perspective view of a match-section used in making the cope impression of a plow-point and the cope-section of a two-part flask arranged thereover. Fig. 2 is a similar view of the match-section for the drag impression and the drag-section of the flask. Fig. 3 is a perspective view of the mold ready for pouring. Fig. 4 is a vertical sectional view, on an enlarged scale, through the same. Fig. 5 is a horizontal section through one wall of the cope and the chill. Fig. 6 is a bottom plan view of the chill.

45 Similar characters of reference designate corresponding parts in the several figures of the drawings.

As before explained, in the present construction the match element is in the form of matches. That match-section, therefore, which carries the pattern that forms the cope impression will be hereinafter termed the "upper" match-section and is designated in the drawings by the reference-letter A. The other section, or that which forms the drag impression, will be termed the "lower" match-section and designated in the drawings by the letter B. The cope and drag sections of the flask are designated C and D, respectively.

60 The upper match-section preferably comprises outer walls 10, having suitable handles 11 and eyes 12. The space between these walls is completely filled with a suitable hardened composite body 13, upon which is fixedly stationed the pattern 14, that forms the impression in the cope-section of the molds. While the body 13 may be constructed of any

material known to the art or adaptable for the purpose, in practice it has been found that a composition consisting of litharge, sand, and linseed-oil is very satisfactory. This pattern may be of any desired construction, a well-known form of plow-point being shown in the present case, the nose and cutting edge 16 and 17 representing the portions of the casting that are hardened by chilling. The walls of the cope C conform in contour to and fit snugly upon the walls of the upper match-section A, excepting that portion 18 which is adjacent to the portions of the point that are to be chilled. The lower edge of this wall is raised above and inset from the corresponding wall of the upper match-section when the two are together. Secured to the exterior face of this inset wall is the chill 19. This chill is preferably made up of a plurality of sections, each of which comprises a fastening-wall 20, having at its lower edge an outstanding bearing-flange 21, arranged to rest upon the upper edge of the upper match-section A, and an oppositely-disposed chilling-flange 22, against which the molten metal contacts when poured, as clearly shown in Fig. 4. The lower edge of the wall 18 of the cope rests upon the chilling-flange. These sections are independently secured to and adjustable upon the inset wall 18. This is accomplished by securing the fastening-wall of each section to the cope by means of tie-bolts 23 and providing a set-screw 24 at each corner of said fastening-walls, these set-screws bearing against the exterior face of the cope and those of the outer sections being preferably seated in sockets 24^a, as shown in Fig. 5. The section 19^a, which forms the chill for the nose, completely covers said nose. The walls of the cope are provided with lifting-handles 25 and dowel-pins 26, which fit in the eyes 12 of the upper match-section A, and thus hold the cope rigidly registered while the impression is being made.

The lower match-section B carries the pattern by means of which the drag impression is made, and in form it is an exact duplicate of the cope of the flask. It comprises suitable walls 27, which are provided with handles 28 and dowel-pins 29. This section B is also filled with a suitable composition, in which is embedded the pattern 30, that forms the impression in the drag of that face of the casting opposite to the one formed by the pattern of the upper match-section. It will therefore be seen that the pattern 30 forms a part of the match-section B. A suitable gate is formed in the sand by the portion 31. Secured to that wall of the match-section B which is adjacent to the portions of the pattern 30 that forms the impression for the cutting edge and nose of the point is an exact duplicate 32 of the chill 19. This duplicate is really a chill-pattern and forms the impression in the drag, in which the chill 19 of the cope fits. This chill-pattern 32 is adjustably secured to the wall of the match-section B in

the same manner that the chill 19 is secured to the cope by means of tie-bolts 33 and set-screws 34. The drag D of the flask is the same in form as the upper match-section A and is arranged to conform to and fit snugly upon the walls 27 of the lower match-section B, with the exception of one wall, which fits upon the outer edge of the chill-pattern 32. The drag is also provided with handles 11^a and has eyes 12^a, which receive the dowelpins 29 of the lower match-section, so that when in place the two are held in exactly registered relation.

The method of using the apparatus is as follows: The cope C is placed upon the upper match-section A and the chill is adjusted to the pattern. After the proper positions of the several sections are obtained wedges are temporarily inserted between the outermost sections and the adjacent wall of the cope and the set-screws are removed. The sockets 24^a are then drilled and the set-screws replaced, with their ends seated in said sockets. This construction, therefore, securely holds the several sections against longitudinal displacement, but permits free lateral adjustment. It will be observed that the chill-pattern 32 can be correspondingly adjusted to the pattern, so that the proper impression will be formed in the mold. After the several elements have been properly adjusted, the cope C is placed upon the upper match-section, filled with sand, and rammed up in the usual manner. The drag D is likewise applied to the lower match-section B and filled and rammed up. The two flask-sections are then removed from the matches and placed together, as shown in Fig. 3, the cope being provided with the usual pouring or sprue hole 35. The complete mold will therefore be formed and the chill will constitute the wall of that portion of the impression in which the cutting edge and nose of the point is formed, as indicated in Fig. 4. Upon pouring the molten metal into the sprue-hole 35 it will pass through the gate 36 and fill the mold, and that portion which comes into contact with the chill 19 will be suddenly cooled and excessively hardened. The mold can then be broken and the casting removed in any desired manner, leaving the flask and chill in shape to be immediately applied to the matches without the necessity of further adjustment. Furthermore, the flasks can be made considerably smaller, as it is not necessary to incase the chill within the sand.

By the above construction and combination several exceedingly important advantages are obtained. In the first place, by using the match element the patterns must necessarily always remain in the same position thereon. Likewise after the chill has been adjusted upon the flask it will always remain in the same relation. The result is that when the two are placed together for the purpose of molding the elements will register exactly and no adjustment is needed. The flask may

therefore be used repeatedly without any adjustment. This has been proven by actual use, and it is practically impossible to accomplish it with the use of the follow-board and movable pattern for the reason that the parts will not register at each operation, and the chill, therefore, must be adjusted. A further advantage resides in the construction and means for securing the chill. By making it in sections should one become warped it may be removed and replaced by another, and it may be readily adjusted to position by using the remaining sections as guides. Furthermore, a wide and varied adjustment may be obtained, as the chill may be moved as a whole or by sections.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In molding apparatus, the combination with a "match" element carrying a fixedly-positioned pattern, of a "flask" element arranged to be placed in coacting relation with the "match" element, means for holding the "match" element and "flask" element against relative movement when in coactive relation, and a chill adjustably secured to the "flask" element and arranged to register with certain portions of said pattern.

2. In molding apparatus, the combination with the "match" element carrying a fixedly-positioned pattern, of a "flask" element arranged to be placed in coacting relation with the match element, means for holding the "match" element and "flask" element against relative movement when in coactive relation, and a sectional chill adjustably secured to the "flask" element and arranged to register with certain portions of said pattern.

3. In molding apparatus, the combination with a "match" element carrying a fixedly-positioned pattern, of a "flask" element arranged to be placed in coacting relation with the "match" element, means for holding the "match" element and "flask" element against relative movement when in coactive relation, and a sectional chill, each section of which is independently secured to the "flask" element and arranged to register with certain portions of said pattern.

4. In molding apparatus, the combination with the "match" element carrying a fixedly-positioned pattern, of a "flask" element arranged to be placed in coacting relation with the "match" element, means for holding the "match" element and "flask" element against relative movement when in coactive

relation, and a sectional chill, each section of which is independently and adjustably secured to the "flask" element and arranged to register with certain portions of said pattern.

5 5. In molding apparatus, the combination with a "match-section" carrying a pattern, and a "flask-section" arranged to be placed in coacting relation with the "match-section" and carrying a chill arranged to register
10 with certain portions of said pattern, of another "match-section" carrying a pattern the operative face of which is similar in shape to the chill of the "flask-section," and another "flask-section" arranged to be placed
15 in coacting relation with said second "match-section."

6. In molding apparatus, the combination with a "match-section" carrying a fixedly-positioned pattern, and a "flask-section"
20 arranged to be placed in coacting relation with the "match-section," and carrying an adjustable chill adapted to register with certain portions of said pattern, of another
25 "match-section" carrying an adjustable chill-pattern similar to the chill of the "flask-section," and another "flask-section" arranged to be placed in coacting relation with said second "match-section."

7. In molding apparatus, the combination
30 with a "match-section" carrying a fixedly-positioned pattern, and a "flask-section" arranged to be placed in coacting relation with the "match-section," and carrying an adjustable sectional chill adapted to register
35 with certain portions of said pattern, of another "match-section" carrying an adjustable sectional chill-pattern similar to the chill of the "flask-section," and another "flask-section" arranged to be placed in coacting
40 relation with said second "match-section."

8. In molding apparatus, the combination with a "match-section" carrying a fixedly-positioned pattern, and a "flask-section"
45 arranged to be placed in coacting relation with the "match-section," and carrying an adjustable sectional chill, each section of which is independently and adjustably secured to the flask element and is arranged to register with certain portions of said pattern,
50 of another "match-section" carrying an adjustable sectional chill-pattern similar to the chill of the "flask-section," and another "flask-section" arranged to be placed in coacting relation with said second "match-section."
55 section."

9. In molding apparatus, the combination with a "match-section" carrying a fixedly-positioned pattern, and a "flask-section" ar-

50 ranged to be placed in coacting relation with the "match-section," and carrying an adjustable sectional chill, each section of which is independently and adjustably secured to the
65 "flask" element and is arranged to register with certain portions of said pattern, of another "match-section" carrying an adjustable sectional chill-pattern similar to the chill of the "flask-section," each section of said chill-pattern being independently and adjustably
70 secured to said "match-section," and another "flask-section" arranged to be placed in coacting relation with said second "match-section."

10. In molding apparatus, the combination with a "flask" element, of a sectional chill
75 adjustably secured to the "flask" element.

11. In a molding apparatus, the combination with a "flask" element, of a sectional
80 chill, each section of which is independently and adjustably secured to the "flask" element.

12. In molding apparatus, the combination with a "flask" element, of a chill adjustably
85 secured to the exterior face of the "flask" element, and provided with a chill-flange arranged beneath the edge of the "flask" element.

13. In molding apparatus, the combination with a "flask," of a sectional chill adjustably
90 secured to the exterior face of one section and provided with a bearing-flange arranged to rest upon the upper edge of the other section, said chill being provided with a chilling-flange disposed beneath the edge of the first-named section.

14. In molding apparatus, the combination
95 with a "flask" element, of a sectional chill, bolts for independently securing each section of said chill to the "flask" element, and set-screws carried by the chill-sections and engaging the "flask" element.
100

15. In a molding apparatus, the combination with a "flask" element, of a chill comprising a plurality of sections, tie-bolts arranged intermediate the side edges of the
105 chill-sections for securing them to the "flask" element, and set-screws carried by the chill-sections on opposite sides of the tie-bolts and engaging the "flask" element.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in
110 the presence of two witnesses.

JAMES R. MCWANE.

Witnesses:

S. G. STEVENS,

A. R. CARRINGTON.