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2,183,800

METHOD OF TREATING AND ASSEMBLING DIE ELEMENTS

Filed Oct. 16, 1937

FIG. 1.

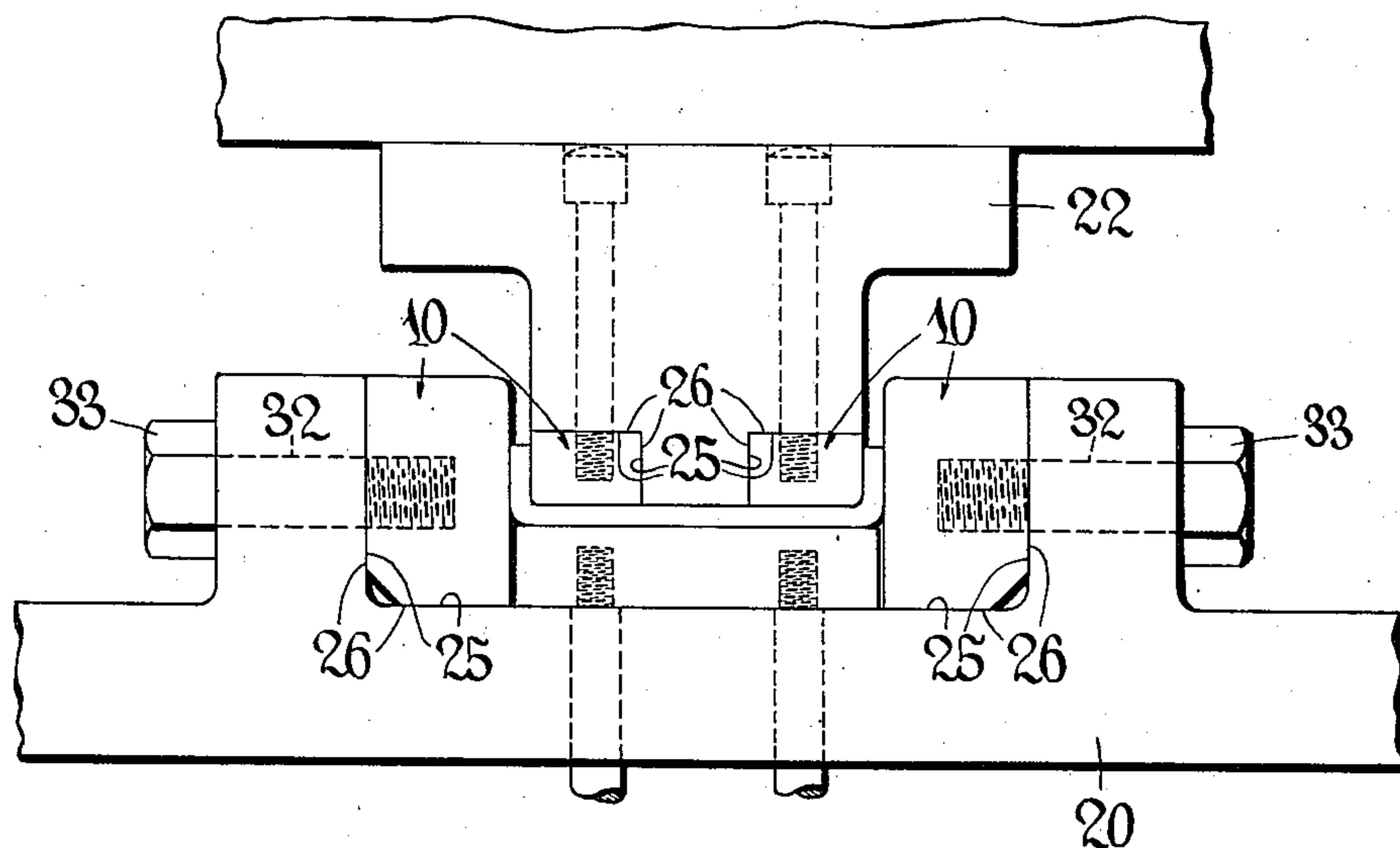


FIG. 2.

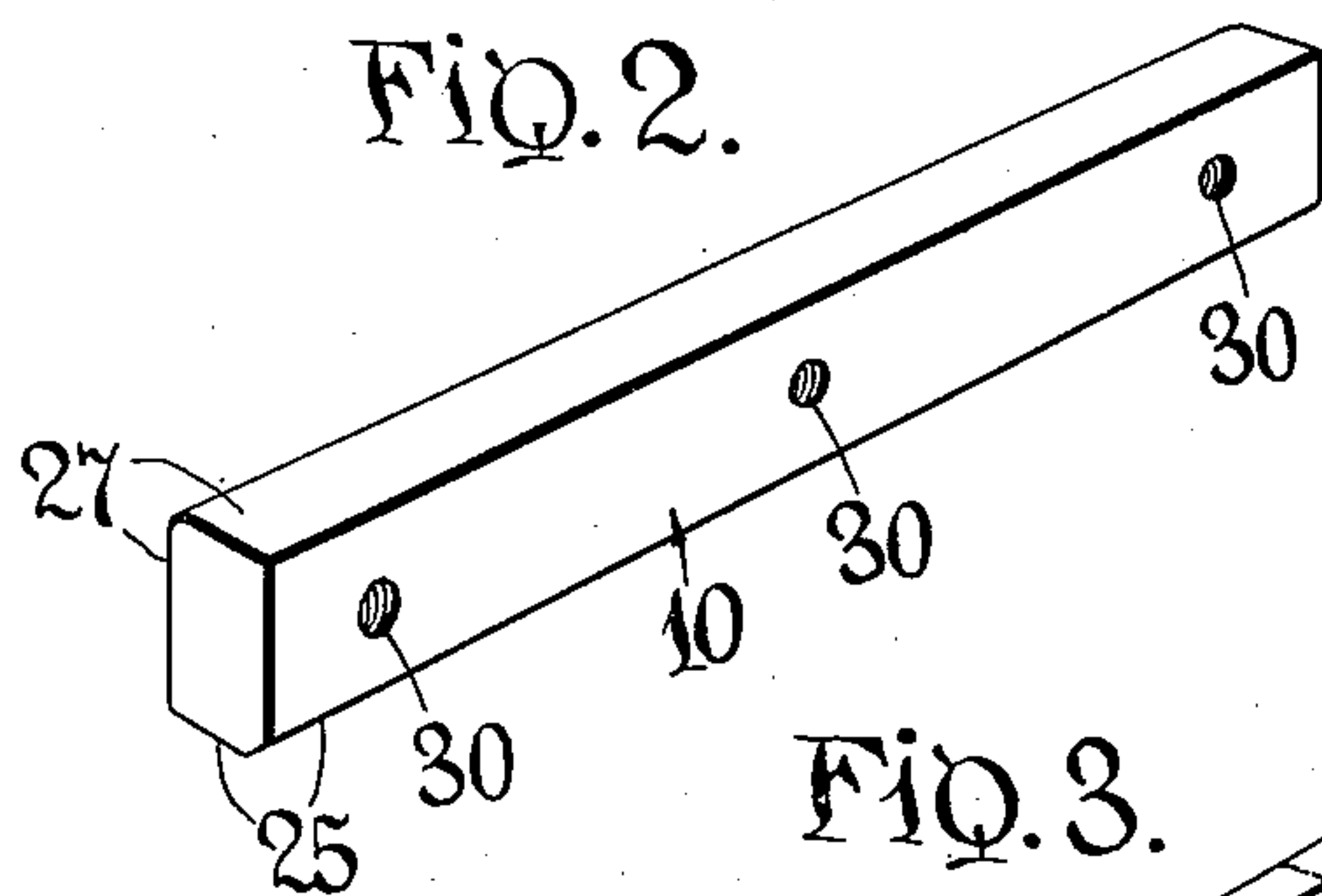


FIG. 3.

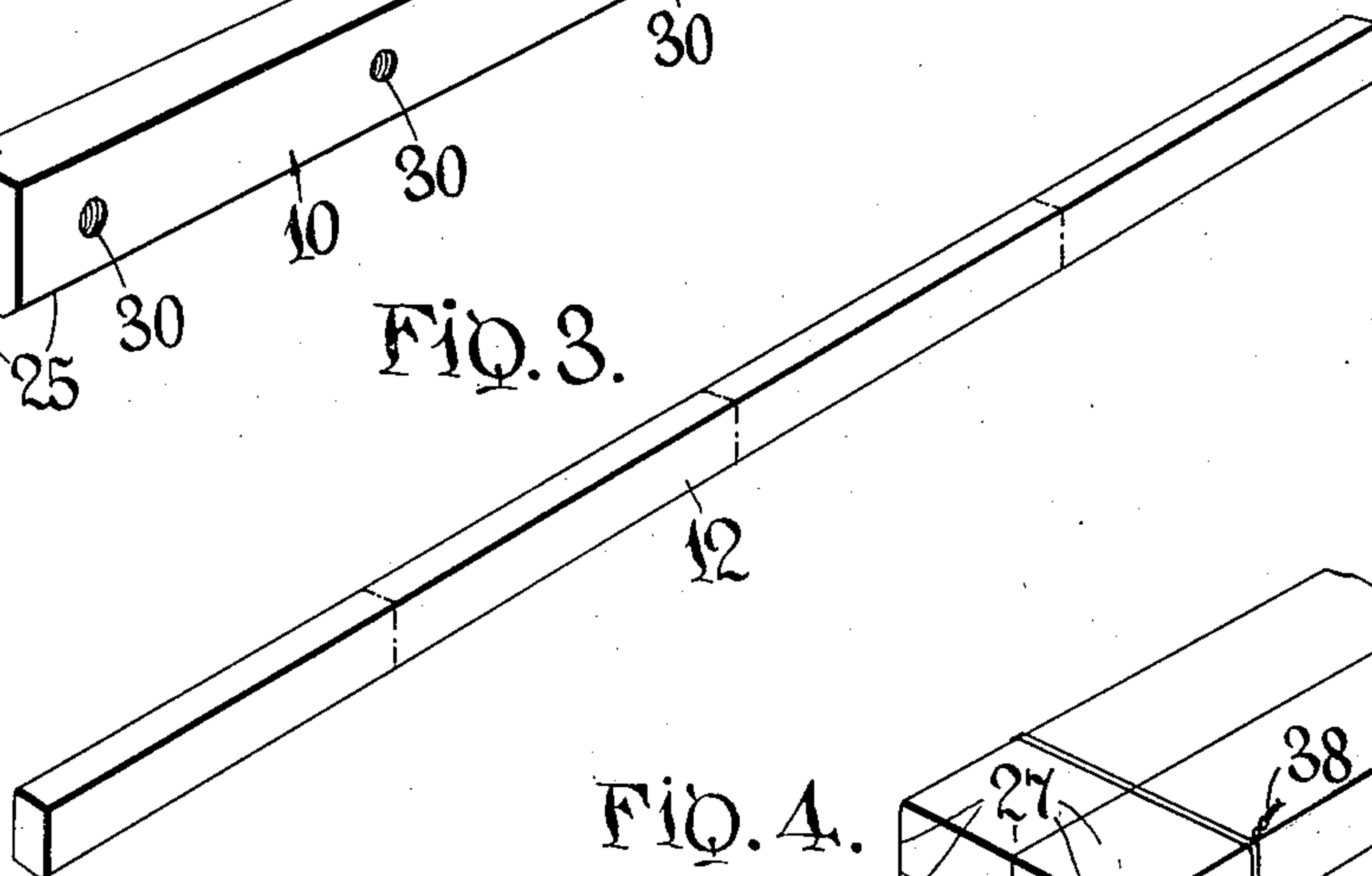
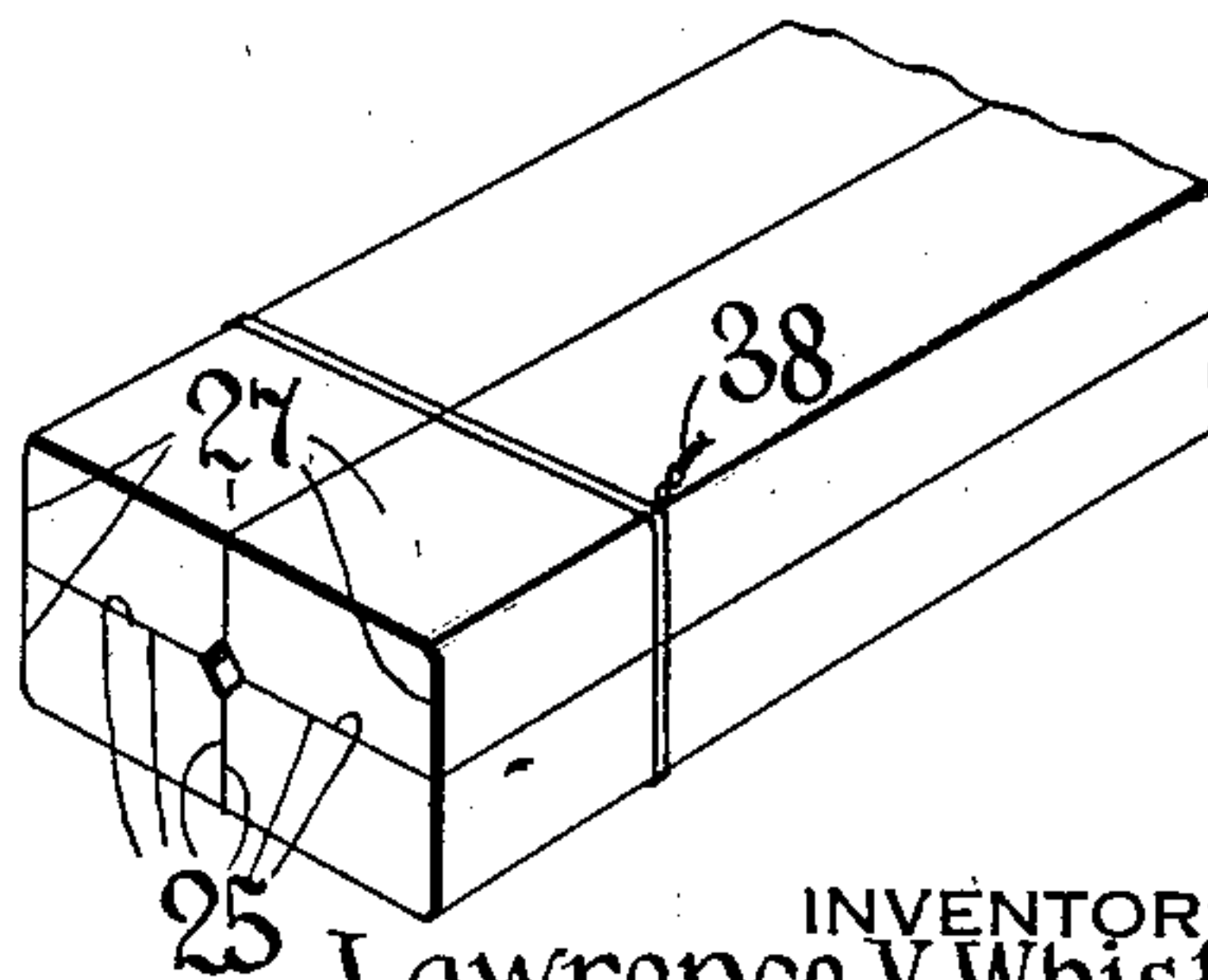


FIG. 4.



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METHOD OF TREATING AND ASSEMBLING
DIE ELEMENTSLawrence V. Whistler and Sanford A. Whistler,
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Application October 16, 1937, Serial No. 169,503

2 Claims. (Cl. 76—107)

This invention relates to die structure or machinery and it has particular relation to methods of treating and assembling elements of such structure.

5 One object of the invention is to provide an improved method of treating die members of either a die shoe or die punch.

Another object of the invention is to provide a method of improving the adaptability of die
10 elements for assembly in die shoes or punches.

Another object of the invention is to provide an improved method of partially carburizing surfaces of die steels, or the like, in groups.

Another object of the invention is to provide
15 an improved method of carburizing surfaces of die steels, or the like, in groups whereby certain surfaces of each of the several die steels of each group protect one another from the carburizing action.

20 It is customary in operating die machinery to provide removable or replaceable die steels or elements composed of steel alloy, each of which is case hardened or pack hardened. Dies are normally custom built, i. e., every individual die is designed for a definite particular purpose. Accord-
25 ing to conventional methods it has been customary to design the die, form each individual piece, and then subject it to refinement or machining to conform to particular specifications. These
30 conditions are particularly true with regard to removable or replaceable die steels which were placed in a die shoe or punch holder for the purpose of spotting or indicating locations of holes to register properly with corresponding holes in
35 punch and die shoes.

The die steels were then drilled and tapped and usually an allowance for shrinkage was made with regard to the length of the die steel, in addition to an allowance for grinding with respect
40 to the width and thickness. Then the steels were hardened, ground and refitted in assembled relation in its proper place in the die machinery. Such hardening was accomplished as a separate order for each job because more than one set of
45 die steels were seldom ready for hardening at the same time. Such procedure almost inevitably involved undesirable delay, and in addition to this delay, difficulty was experienced in assembling the die steel sections in the punch or die
50 shoes because of shrinkage of the tapped holes. If the die steel, as is often the case, had been drilled to form dowel holes that must register with dowels in the die punch or shoe, such difficulty was even more pronounced.

55 This invention is designed to obviate the in-

convenient and disadvantageous features of the process set forth above and to insure an immediate and simple method of treating and simplifying the assembling of die steel sections or the like, in the die shoe or punch of the die structure. 5

In the drawing:

Fig. 1 is a diagrammatic end elevation of a die structure including a punch and die shoe;

Fig. 2 is a perspective of a die steel, or like
10 element;

Fig. 3 is a perspective of a bar from which die steels are formed; and

Fig. 4 is a fragmentary perspective of an assembled group of die steel elements. 15

In practicing the invention die steels 10 are provided, preferably in the form of sections, which can be cut from a relatively long bar 12 to various lengths, and can vary in width and thickness or height according to requirements for assembling
20 in a die shoe 20 or punch 22. These die steel elements are polygonal in cross section and in assembling them in the die shoe 20 or punch 22, each element has one or more of its sides 25
25 fitted against companion offset aligning surfaces 26 formed in the die structure. Outer surfaces 27 of the die steels are thus disposed in proper exposed position for application thereto of the work or material to be shaped.

Suitable threaded openings 30 are formed in
30 one side of each die steel 10 and are designed to register with similar openings 32 formed in the punch or shoe members of the die structure. Conventional bolts 33 are threaded into the openings 30 and secure the elements 10 in rigidly
35 assembled relation in the structure.

The die steels 10 are hardened only on the exposed sides 27 while inner sides 25 fitting upon companion surfaces 26 remain relatively soft. An efficient and satisfactory method of hardening
40 the surfaces 27 comprises the assembling of a plurality of sections 10 in the manner shown in Fig. 4 in which it is apparent that the opposed sides 25 are disposed in abutting relation and in relatively close surface contact. The outer sides
45 27 are thus exposed and in this relation, the sections 10 are subjected to a hardening process, such as carburizing. Since the surfaces 25 are in contacting relation the carburizing action occurs only on the outer surfaces 27. 50

The carburizing or hardening treatment can be accomplished in a conventional furnace (not shown) in which an assembled group or several groups of sections, such as shown in Fig. 4 are subjected to proper heat after they have previous- 55

ly been packed in suitable carbonaceous material. If desirable, a member 38, such as a wire or the like, can be wound one or more times about the die steels 10 and secured to maintain the latter in assembled relation during the hardening process.

The elements 10 must then be finished along their hardened surfaces in exactly the form desired and after such finishing the sections are spotted along their unhardened sides for formation of the openings 30 registering with the openings 32 of the supporting die structure. Since the hardening process along the exposed surfaces 27 at this stage has already been accomplished before the formation of the openings 30, the latter can be disposed, as is sometimes desirable, immediately adjacent the edges of the sections 10 because there is no danger of shrinking or cracking which would otherwise occur in the event the holes were formed before subjecting the sections to the hardening process.

This invention also provides for convenient stocking of various lengths, widths and thicknesses of die steel sections 10 properly hardened on the sides indicated because they can then be adapted immediately to the die shoe or punch and thus a supply can always be available for immediate application without the delay heretofore experienced when it was necessary to design each set of the elements especially for each particular dieing operation.

Although only one form of the invention has been shown and described in detail it is apparent to those skilled in the art that the invention is not so limited but that various changes may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

We claim:

1. A method of making die structure having spaced sets of openings for receiving fastening elements and adapted to have a plurality of die members fitted into the structure of a die shoe or punch holder with a portion of each die mem-

ber exposed for dieing out operations, which comprises bringing together a plurality of substantially uniformly shaped die members substantially polygonal in cross section with sides thereof in face to face contact, subjecting the assembled die members to carburizing process while maintaining said sides in face to face contact whereby said sides remain free from carburizing action, said sides being adapted to be fitted in facing contact against companion surfaces of said die structure, grinding the carburized sides of the die members to finish them, subsequently forming sets of openings in uncarburized sides of the die members in spaced relation according to the spacing of the sets of openings in said die structure, and rigidly assembling the die members in said die structure by securing the fastening elements in said openings with the hardened surfaces exposed to contact work to be operated upon and with the unhardened surfaces disposed against companion surfaces of said die structure.

2. A method of making metal stamping dies including a die holder and a steel die block of rectangular cross section, said method comprising exposing two adjacent longitudinal faces of said die block to the action of carbonaceous material at temperatures sufficient to cause carburization of such surfaces while at the same time protecting the remaining longitudinal faces of said die block from said carburization, surface grinding the carburized surfaces to render them straight and square, machining the uncarburized surfaces to fit into proper relation with respect to the die holder and to receive fastening elements, and subsequently assembling the die block into the die holder with the uncarburized surfaces in contacting engagement with the die holder and the carburized surfaces exposed for stamping metal when the die is in use and securing the die block and holder by fastening elements.

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