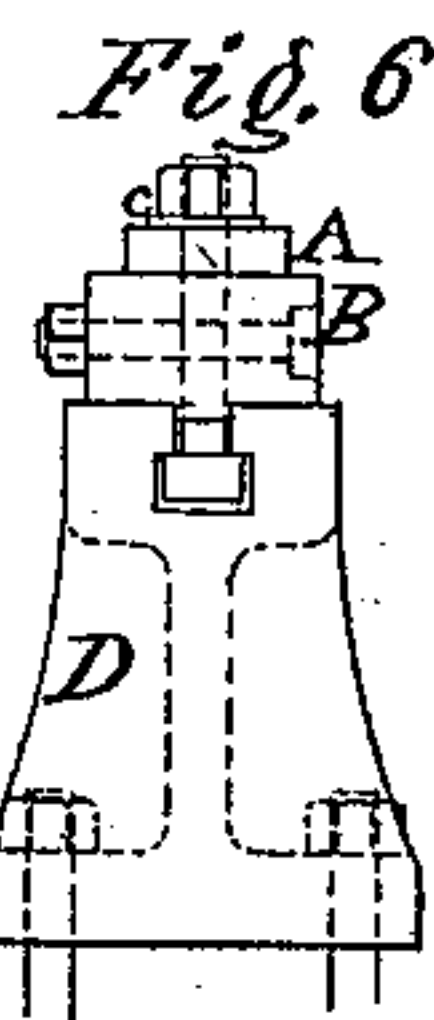
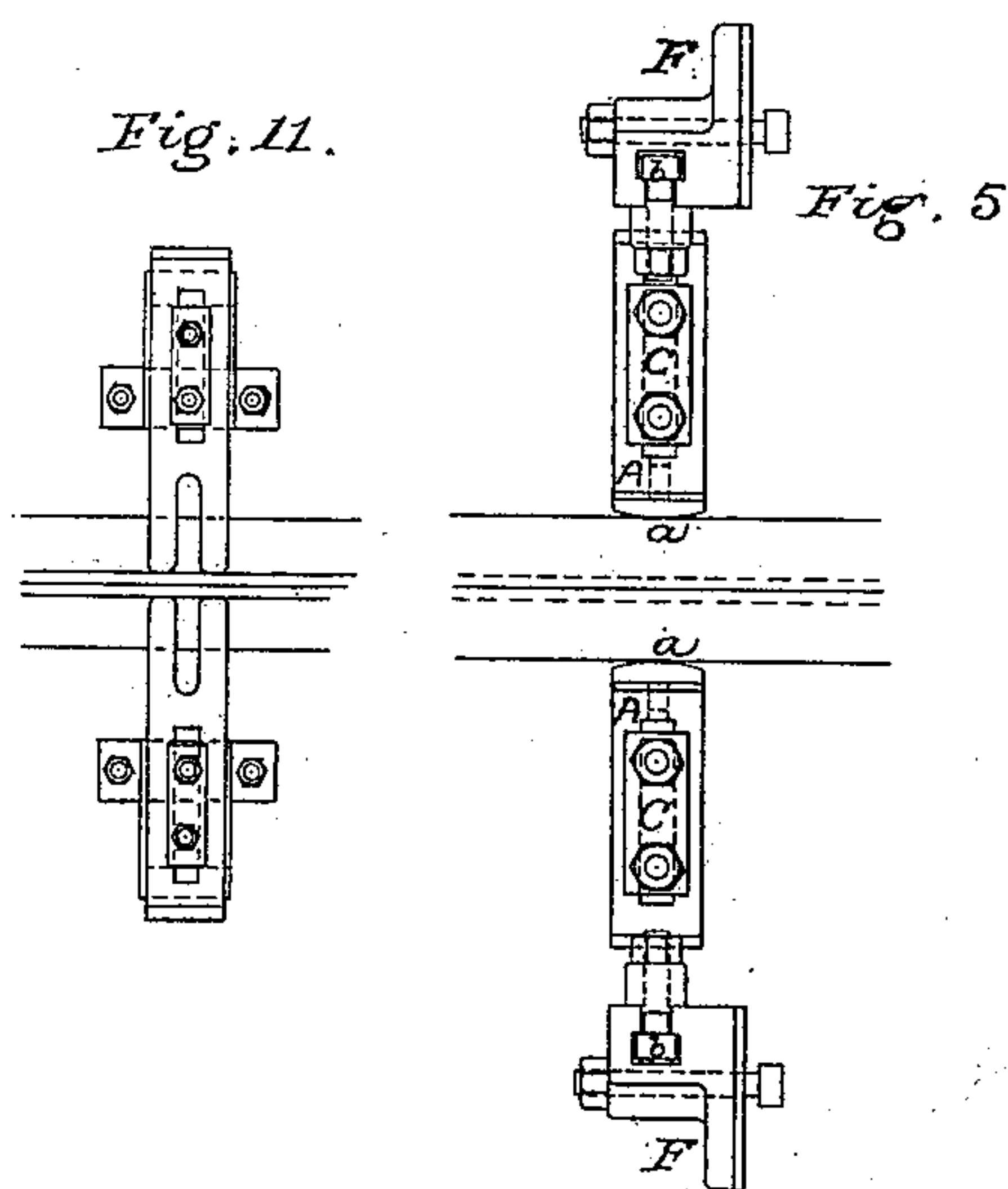
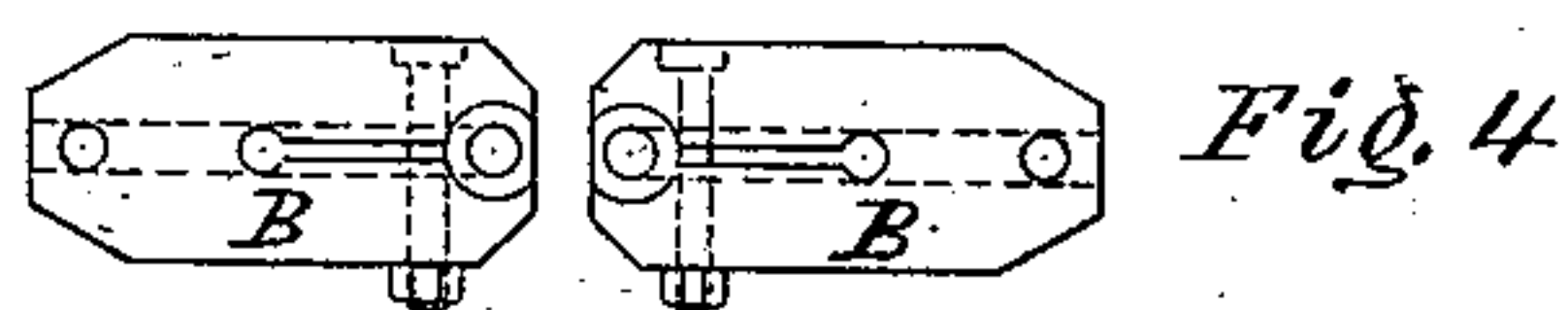
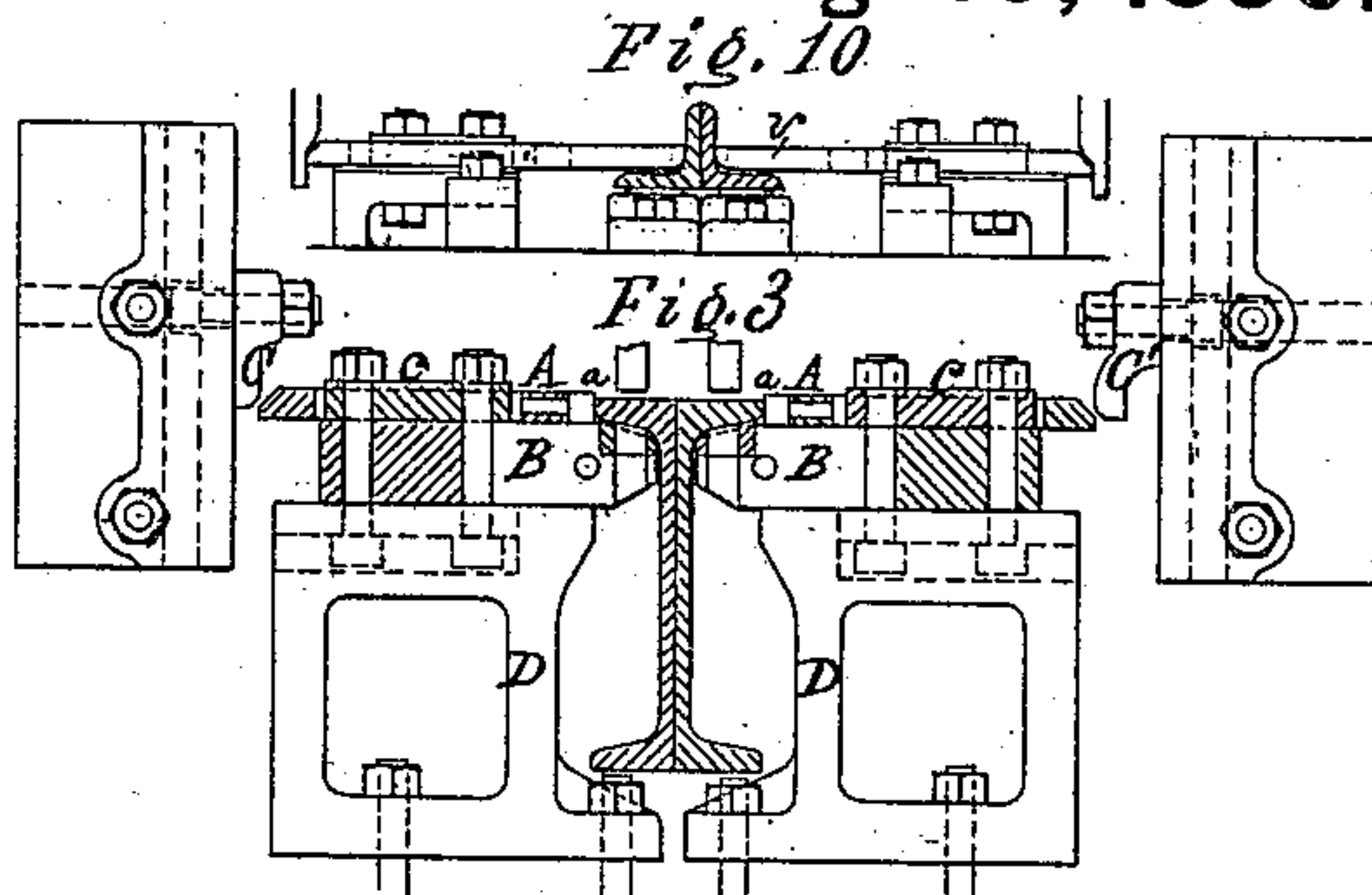
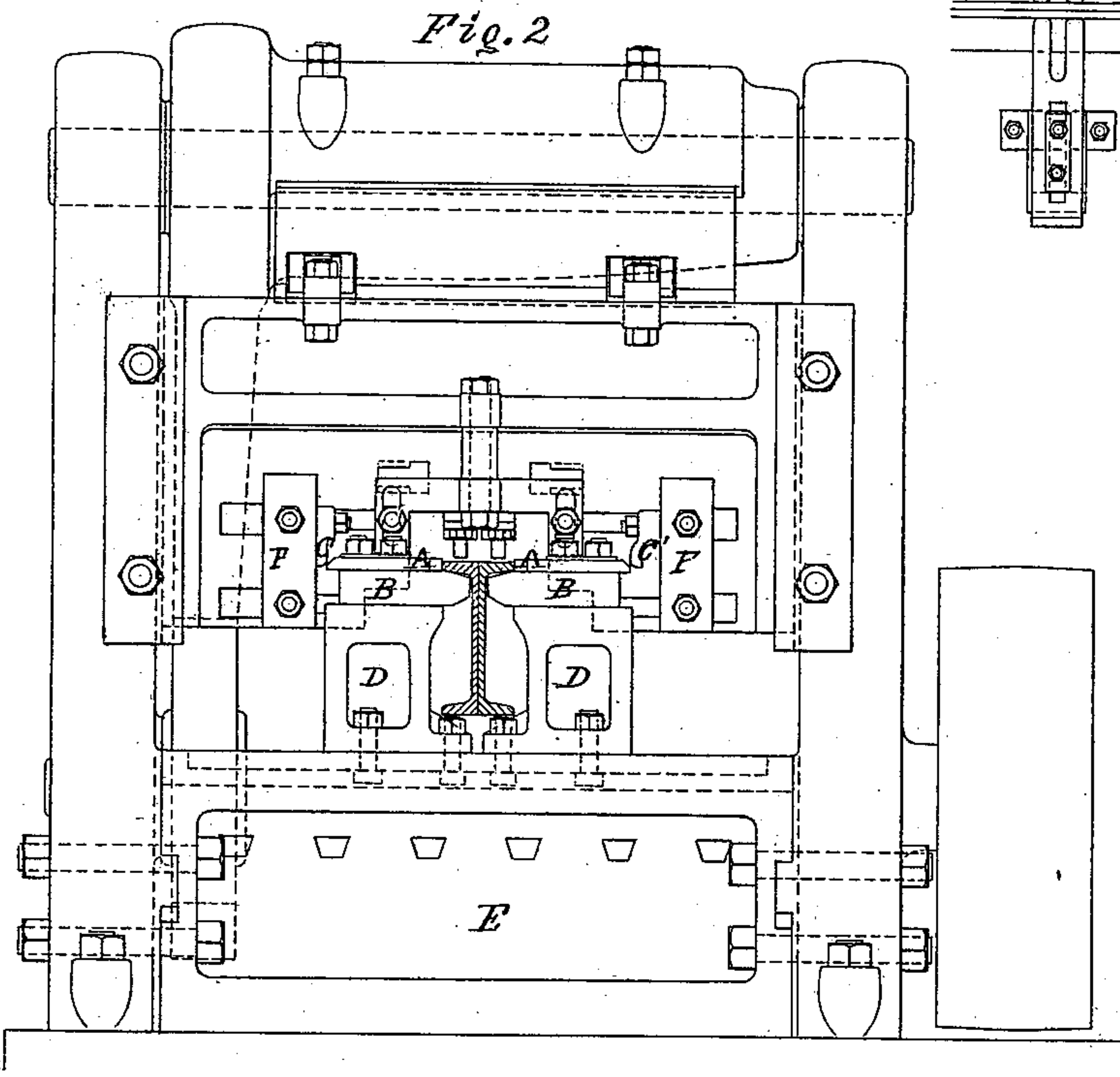
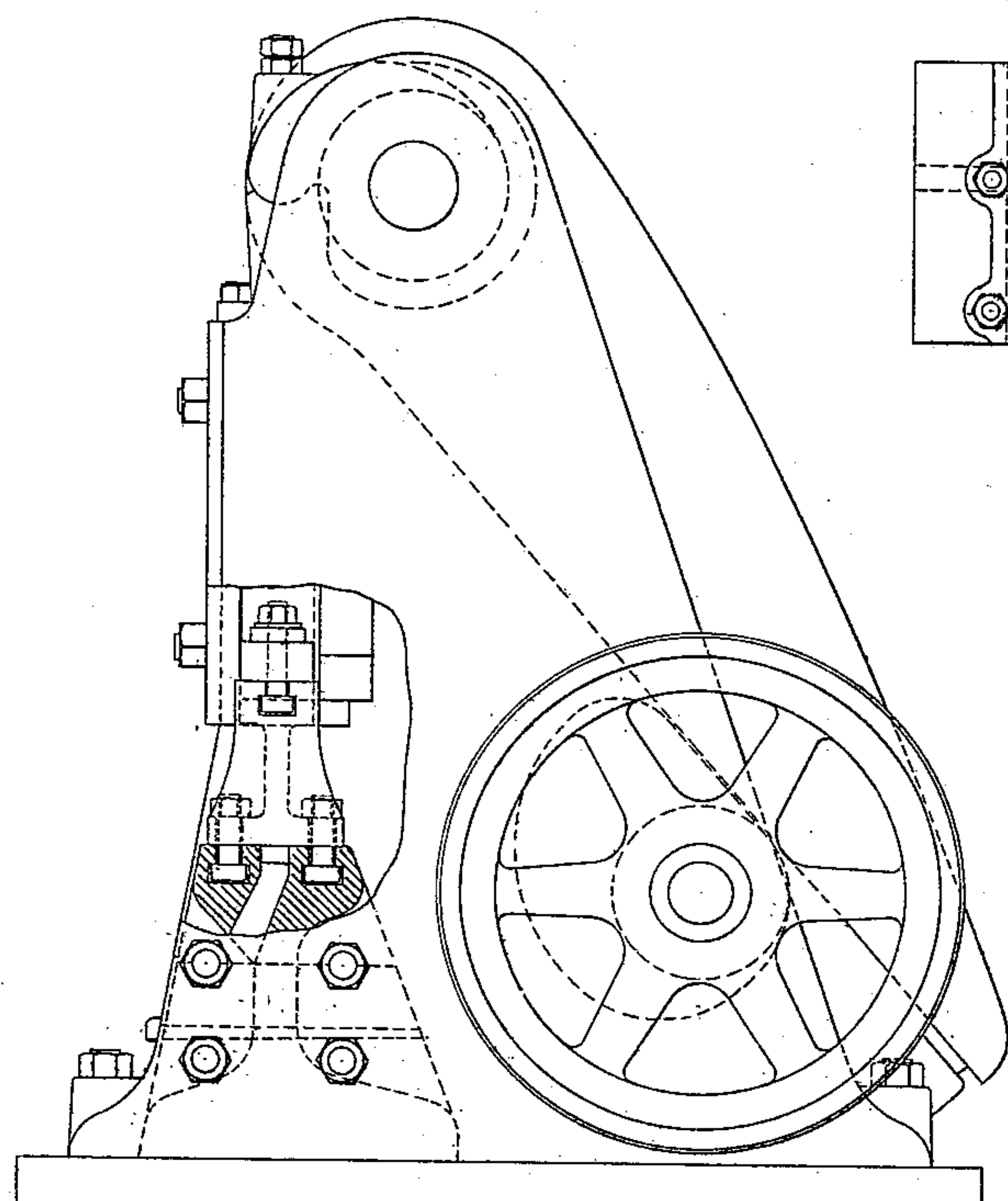


G. H. SELLERS.

Machine for Punching Angle Bars and Channel Bars.
No. 230,968.

Patented Aug. 10, 1880.



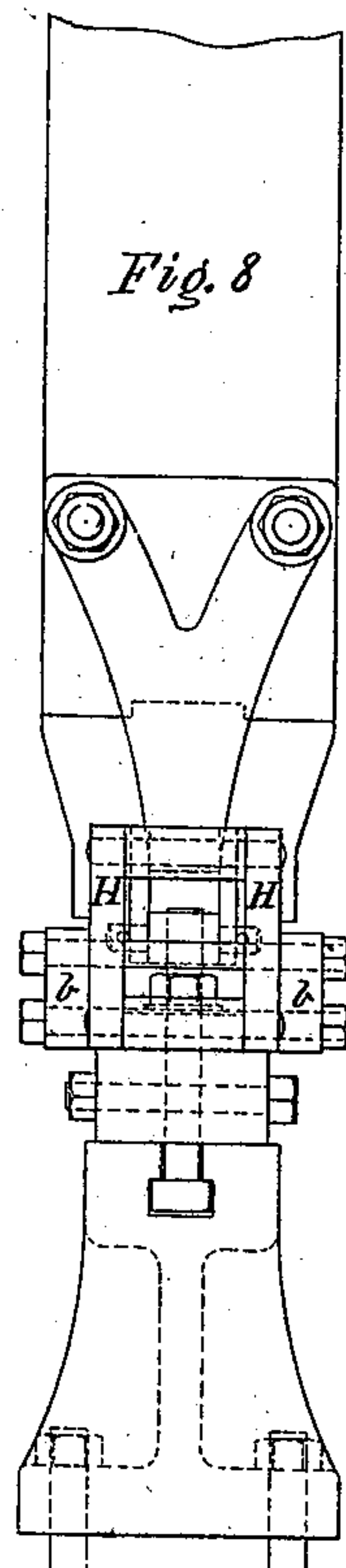
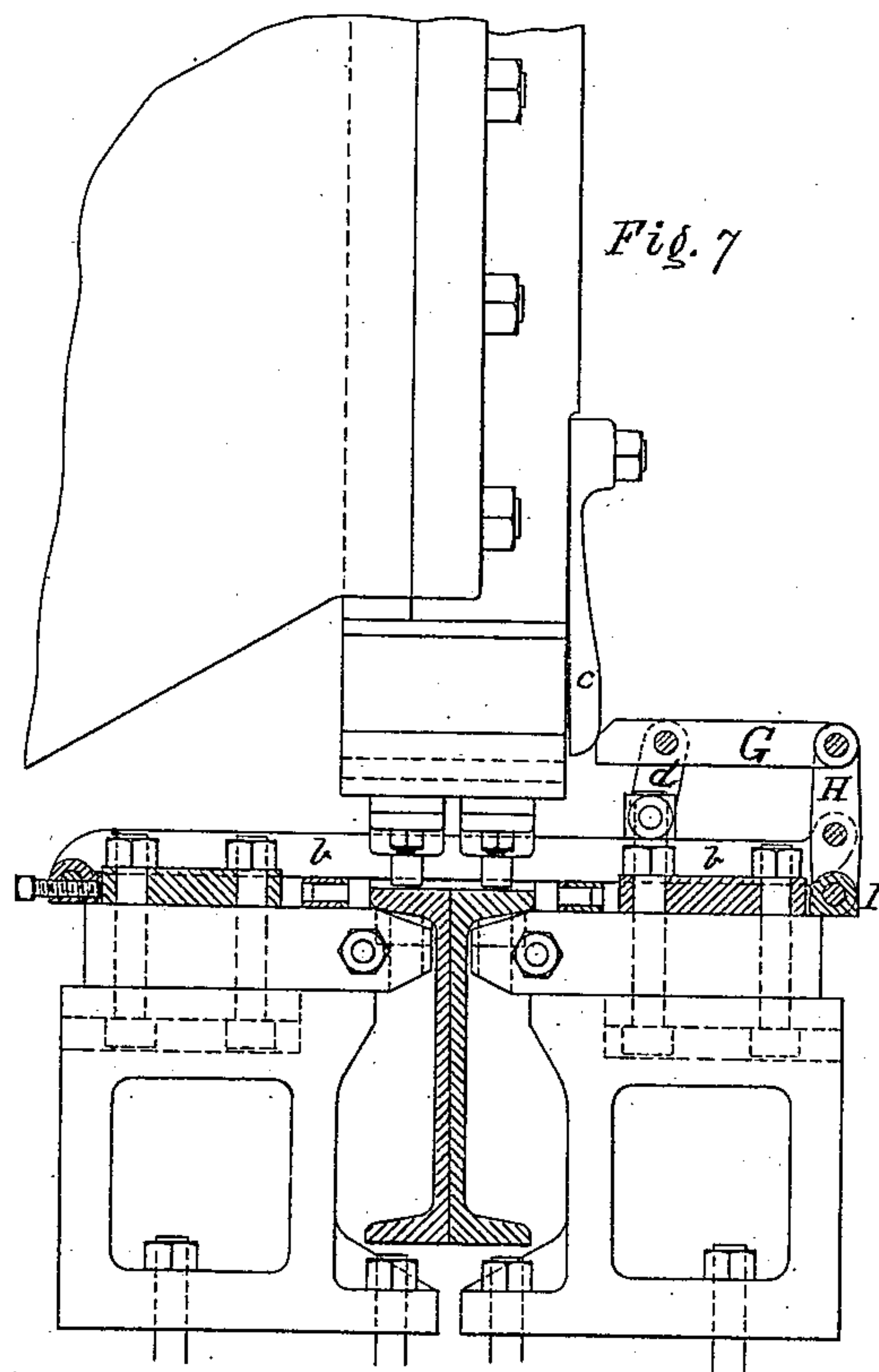
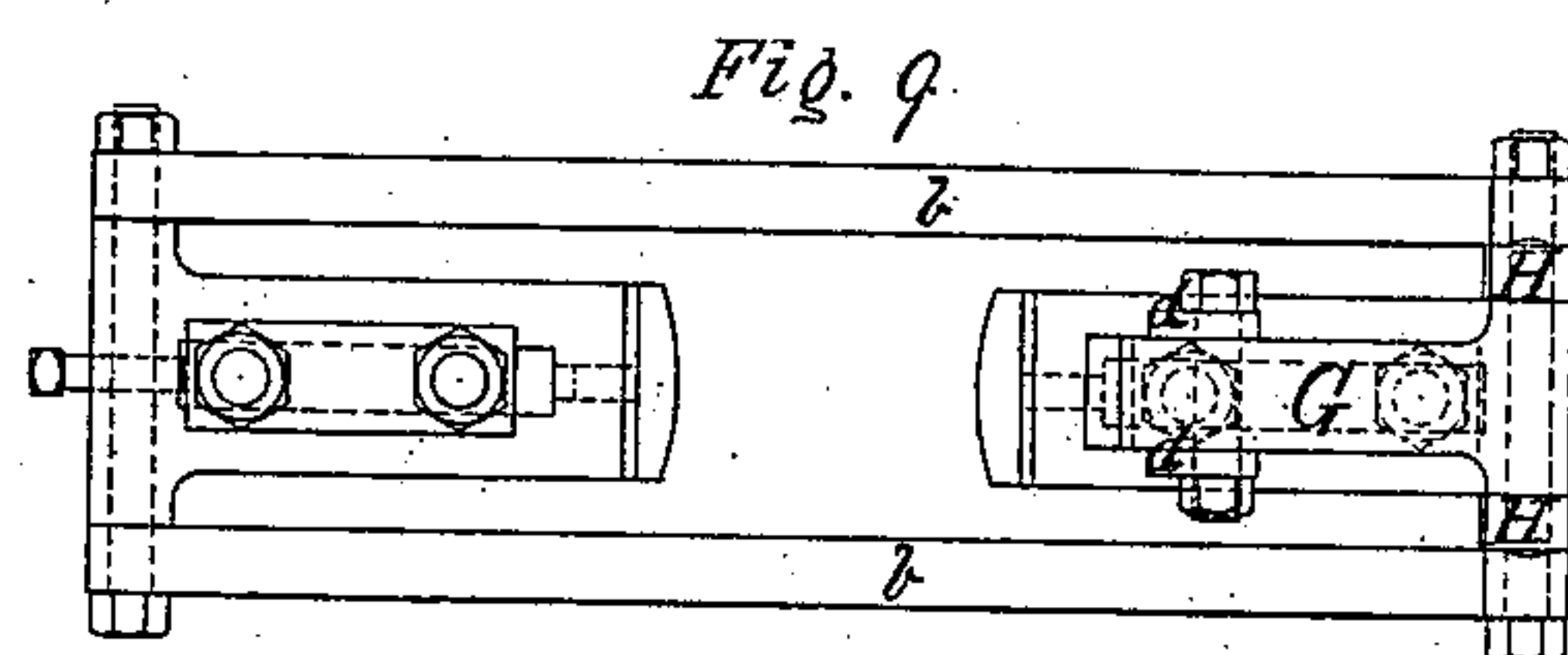
Witnesses;
E. Davidson,
J. H. Mynadler.

Inventor;
George H. Sellers,
By his attorneys—
Baldwin, Hopkins & Peyton.

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

GEORGE H. SELLERS, OF WILMINGTON, DELAWARE.

MACHINE FOR PUNCHING ANGLE-BARS AND CHANNEL-BARS.

SPECIFICATION forming part of Letters Patent No. 230,968, dated August 10, 1880.

Application filed September 17, 1878.

To all whom it may concern :

Be it known that I, GEORGE H. SELLERS, of the city of Wilmington, New Castle county, in the State of Delaware, have invented certain new and useful Improvements in the Process of Punching Wrought-Iron Angles and Channel-Bars, and in apparatus for the conduct of such process, of which improvements the following is a specification.

In the preparation of the materials for structures of wrought-iron, the angles and channels which compose parts of the same require punching to receive the rivets which unite these with other parts; and previous to my invention these particular-shaped bars were punched one hole in one bar at a time, and as the holes in such shapes can never be in the center of the bar—that is, so as to have as much metal on one side of the hole as on the other—that side having the least metal would stretch with the punching, thereby bending the bar, so that it required to be straightened after the punching was completed.

It is the object of my improvement to punch these bars without bending them during the punching; and to this end my invention consists in placing two bars back to back and clamping them together as they pass through the machine during the punching operation, so that the bars will support each other and the bending force caused by the stretch which will occur in one outer edge will be counteracted by that in the other; and it further consists in providing an automatic gripping device which will gripe the two channel-bars together just before the punch strikes, hold them while the punch is passing through, and release them just after the punch is withdrawn; and it further consists in providing guides which maintain the bars in proper relation to the punches laterally and combining the gripping device therewith, so that the gripping shall not affect this lateral adjustment.

In the accompanying drawings, which form part of this specification, Figure 1 represents a side elevation of a punching-machine, partly in section, to show the support for the die-block as arranged for punching channel-bars. Fig. 2 represents a front elevation of the same, the two channel-bars in end section. Fig. 3 represents an enlarged front elevation of the

supports for the die-blocks in position, with the die-blocks, channel-bars, and automatic gripping devices partly in section. Fig. 4 represents a plan of the die-blocks shown in Fig. 3. Fig. 5 represents a plan of the gripping devices shown in Fig. 3. Fig. 6 represents an end elevation of the supports for the die-block shown in Fig. 3. Fig. 7 represents a side elevation of the die-blocks and their supports arranged for punching channel-bars, with both gripping-jaws operated from one side. Fig. 8 represents a front elevation of the parts shown in Fig. 7. Fig. 9 represents a plan of the gripping devices shown in Fig. 7. Fig. 10 represents a front elevation of the punches and die-blocks arranged for punching angles, with the automatic gripping devices in position. Fig. 11 represents a plan of the parts shown in Fig. 10.

In an application filed September 24, 1877, for a patent for improvements in punching and shearing machines, invented by William Sellers and Coleman Sellers, of Philadelphia, Pennsylvania, will be found shown and described the punching-machine represented in Figs. 1 and 2 of the accompanying drawings, aside from the gripping devices, which, in Fig. 2, I show applied to such a machine. This gripping device, in the form represented in Figs. 2 to 6, inclusive, comprises two gripper-plates, A A, fitted to slide upon the top of the die-blocks B B, and having rectangular openings through the center, as shown by the dotted lines in Fig. 5. These openings receive correspondingly-shaped clamps C C, which fit laterally in the openings, but are short enough to permit a longitudinal motion of the plates A A at right angles to the work sufficient to gripe and release the work to be operated upon by the punches. These clamps are thicker than the plates A A, and above the plates are enlarged so as to project over the plates, and, without obstructing their movement, prevent them from rising, and they are held in position on top of the die-block by the same bolts which secure the die-blocks to the holders D D, which, in turn, are secured to the die-beam E. The inner ends of the plates A A are provided with removable gripping-jaws *a a*, held in position by pins which project from the jaws into the plates, and which permit pack-

ing-pieces to be inserted between the jaws and plates, to regulate the distance of these jaws apart without affecting the position of the griper-plates A A with reference to each other. Upon the face of the punch-beam I bolt the compressing-block holders F F, which project from the punch-beam beyond the griper-plates, as shown in Fig. 5. The faces of F F toward each other are provided with slots, in which the bolts *b b* slide freely, by means of which the compressing-blocks *c* and *c'* are secured in any desired vertical position upon the block-holders F F. These blocks *c* and *c'* have their lower ends rounded to enter upon the beveled ends of the griper-plates A A, as shown in Figs. 2 and 3, which will be pressed toward each other as the compressing-blocks *c* and *c'* descend. This forward movement of the griper-plates will continue until the blocks *c* and *c'* have passed the bevel upon the ends of the griper-plates, when the continued descent of the blocks *c c'* will produce no farther movement in the griper-plates; but the parallel surfaces above the ends of the blocks *c* and *c'* will retain the griper-plates in position until the blocks are withdrawn.

To make allowance for the irregularities in the width of the flanges in the same size of channel-bars I make the block *c'* as a very stiff spring, and to prevent the bars from rising as the punches are withdrawn I provide projections *v* from the inner side of the die-block supports, under which the lower flanges of the channels pass in their progress through the machine, which projections will act as strippers if the weight of the bars themselves is not sufficient for this purpose.

In operating the machine upon channel-bars, two such bars are placed back to back, the under sides of their beveled flanges resting upon the corresponding beveled surfaces of the dies, as shown in Figs. 2 and 3. At intervals along their length the bars are clamped together by screw-clamps, or any of the well-known devices for a like purpose. The distance between the inner ends of the die-blocks B B must be adjusted to the thickness of the webs of the two channels, so that when adjusted these die-blocks will constitute guides to give lateral direction to the channels in their passage through the machine, and the gripping-jaws *a a* must then be adjusted by packing or by adjusting the position of the compressing-block holders F F, so that when the compressing-blocks *c c'* have pressed the gripping-jaws forward the full extent of their movement the work to be operated upon will be powerfully compressed between these jaws.

The vertical position of the blocks *c c'* is so adjusted upon the block-holders F F that the blocks *c c'* will have compressed the gripping-jaws upon the work just before the punches strike, so that no movement of the two channel-bars toward or from each other can take place while the punches are entering, passing through, or withdrawing from these bars; but upon the withdrawal of the punches the grip-

ing-jaws will be released, and the work can then be moved forward a space equal to the distance required for the next punching action.

The importance of this compression will be manifest when it is considered that the beveled surfaces of the channels rest upon correspondingly-beveled dies, so that the pressure of the punches would slide the two bars toward each other if there were room for such a movement, and if such a movement occurred after the punches struck the result would inevitably be the breaking or the bending of the punches.

In Figs. 6, 7, and 8 I have shown an arrangement in which the grippers gripe the two bars upon their opposite sides simultaneously, as hereinbefore described; but in this arrangement both grippers are operated by one compressing-block, as I contemplate using such modification upon an ordinary punching-machine in which the punches are held upon the under side of a bar in place of the punching-beam previously described. In this modification the arrangement of the gripping-jaws, the griper-plates, and the attachment of these plates to the die-blocks is the same as already described; but the one compressing-block, *c*, through the bar G, acts upon the upper ends of two vertical levers, H H, the lower ends of which are jointed upon the outer end of one griper-plate at I, and connected to the outer end of the other griper-plate by two links, *b b*, which are attached to the lever above the lower joint, so that the movement of this lever will cause the griper-plates to approach and recede from each other.

The bar G is supported at the end next the compressing-block by two links, *d d*, attached by pin-joints to a nut which is adjustable vertically upon a prolongation of the bolt which holds the die-block upon its support.

The adjustment of the compressing-block is, as before described, so that the block will pass the beveled end of the bar G just before the punches strike. The movement of this bar outward will draw the two griper-plates together and compress the jaws upon the two channel-bars, as before, so that no movement of these bars toward or from each other while the punches are entering, passing through, or withdrawing from the bars can take place.

In punching angles the two bars rest upon their flat surfaces in passing through the machine, the punch entering upon the beveled side, which requires a modification of the gripping devices, such as shown in Figs. 10 and 11, so that the grippers may act as strippers as well as grippers.

In the passage of both channel-bars and angles through the machine the under side of both must rest upon rollers which carry their weight on either side of the punches, and the height of the surface upon which the punches act will vary greatly between these two shapes.

With channels special supports to raise the dies must be employed, but with angles the die-blocks are bolted directly upon the die-beam; and that the griper-plates may act as

strippers I arrange them to operate upon the vertical legs of the angles, just above the horizontal leg and upon both sides of the punches. This disposition, moreover, distributes the compressive strain more uniformly than would be the case if this strain were brought upon the edges of the horizontal legs.

The compressing-blocks *c* and *c'* project below the punch-beam and afford sufficient elasticity to compensate for the differences that exist in angles nominally of the same size, and the griper-plates being divided so as to pass the punches, the compression will take place exactly opposite the punches, as in the arrangement for channels.

In operating upon angles two bars are placed back to back, the flat under sides resting upon the dies. At intervals along their lengths the vertical legs are clamped together; but these clamps may be of more simple construction than those described for angle-bars. I have found a simple forging having a tapered slit which nearly fits the taper of the two vertical legs, and driven down by an ordinary hammer, quite sufficient and more readily attached and detached than the screw-clamp or other similar devices required for channel-bars.

The griping-plates and the compressing-blocks are adjusted, as before described, so that the bars will be gripped just before the punches strike, and so held that no movement of the bars toward or from each other can take place while the punches are entering, passing through, or withdrawing from the bars.

By the above method of griping and punching it will be seen that both bars, whether channel or angle, may be punched simultaneously, and that if the punches are arranged as described in the before-mentioned application of Wm. Sellers and Coleman Sellers the bars may be punched alternately, with the same advantage, from my improved method of griping.

It will be seen that while in all cases two bars are to be placed back to back, yet when there are two angle-bars the griping, while

advantageous, is not so essential as with channel-bars, because the angle-bars, having flat surfaces resting upon flat dies, have no tendency to slide under the pressure of the punches; but the channel-bars have such tendency, which, with the effect thereof, has been previously set forth. In punching angle-bars, notwithstanding the absence of this tendency to slide, the griping insures greater lateral accuracy in the punching by keeping the backs of these bars in contact during the operation of the punches.

Having thus described the nature and object of my improvements, what I claim herein as new, and desire to secure by Letters Patent, is—

1. As an improvement in the art of punching wrought-iron angles and channel-bars, the hereinbefore-described method of preventing their distortion during such operation by placing two such bars back to back, clamping and griping, or clamping them together, and punching them in one pass through the machine at opposite or alternate points, substantially as set forth.

2. The combination, with the punches and dies, of two griping-jaws which move toward a common center and between which the work moves, and which gripe, hold, and release the bars as the punches pass into, through, and out of the metal, substantially as and for the purposes described.

3. In combination with the griping-jaws which move toward a common center, adjustable guides which maintain the bars in proper relation to the punches laterally during the movements of the work, substantially as described.

4. The automatic griping-jaws moving toward a common center and compressing the two bars upon their opposite sides simultaneously, substantially as described.

GEO. H. SELLERS.

Witnesses:

W. HAROLD SMITH,
THOMAS R. LALLY.