N. H. DAVIS.

BEAM SHAPING PRESS.

APPLICATION FILED AUG. 6, 1906.

930,460.

Patented Aug. 10, 1909.

4 SHEETS—SHEET 1.

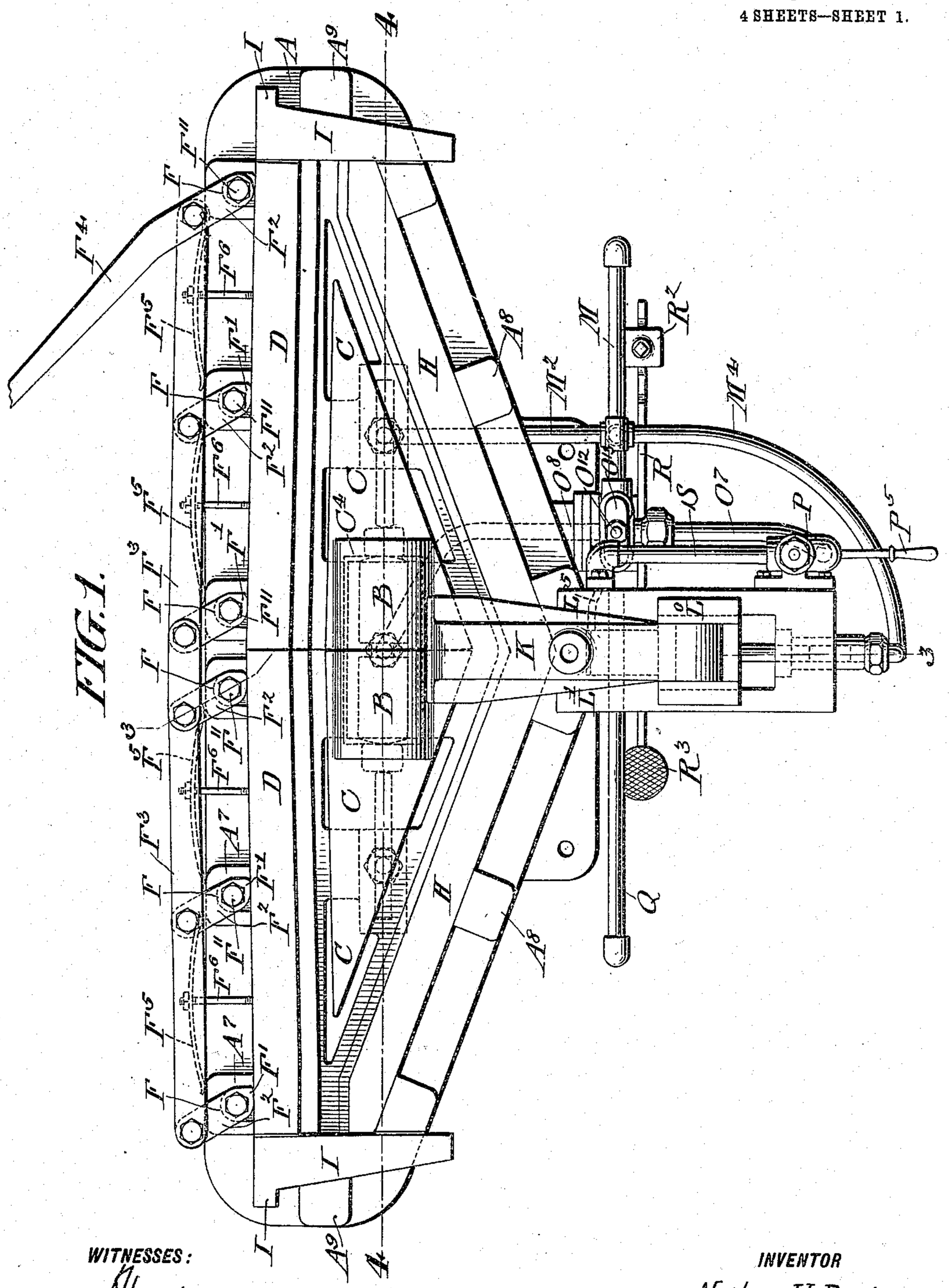

FIG. 1.

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4 SHEETS—SHEET 2.

FIG. 2.

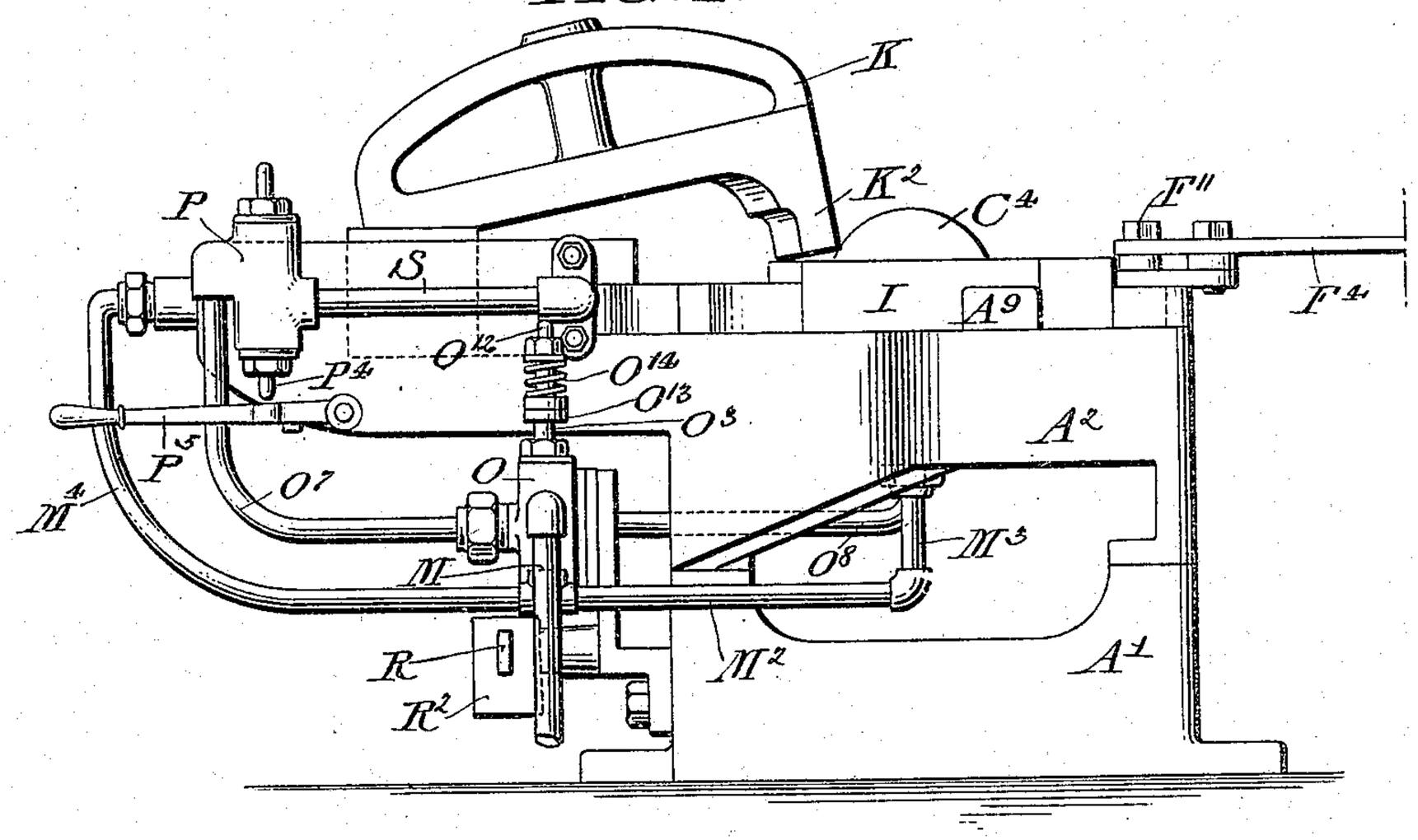
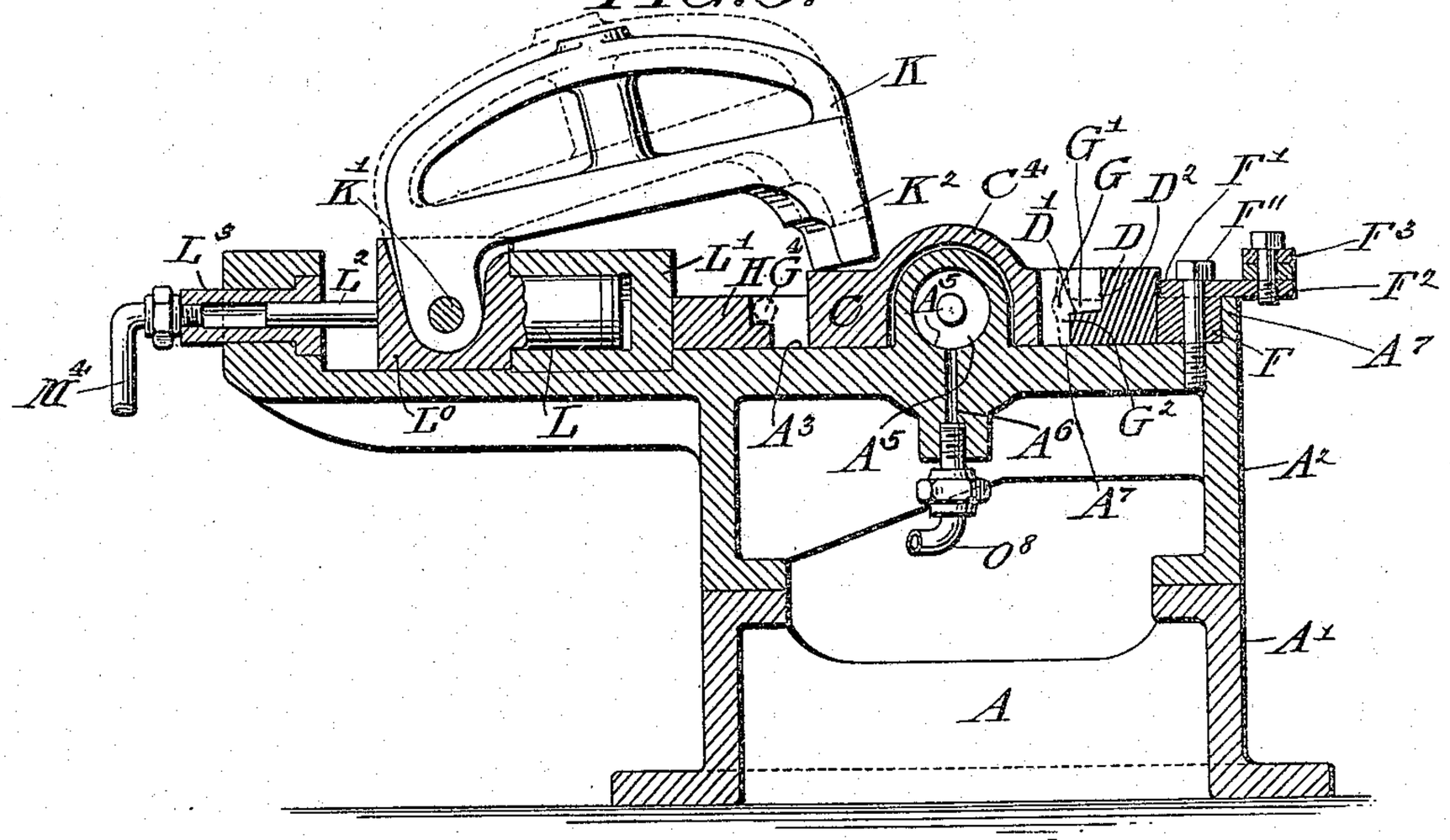


FIG. 3.



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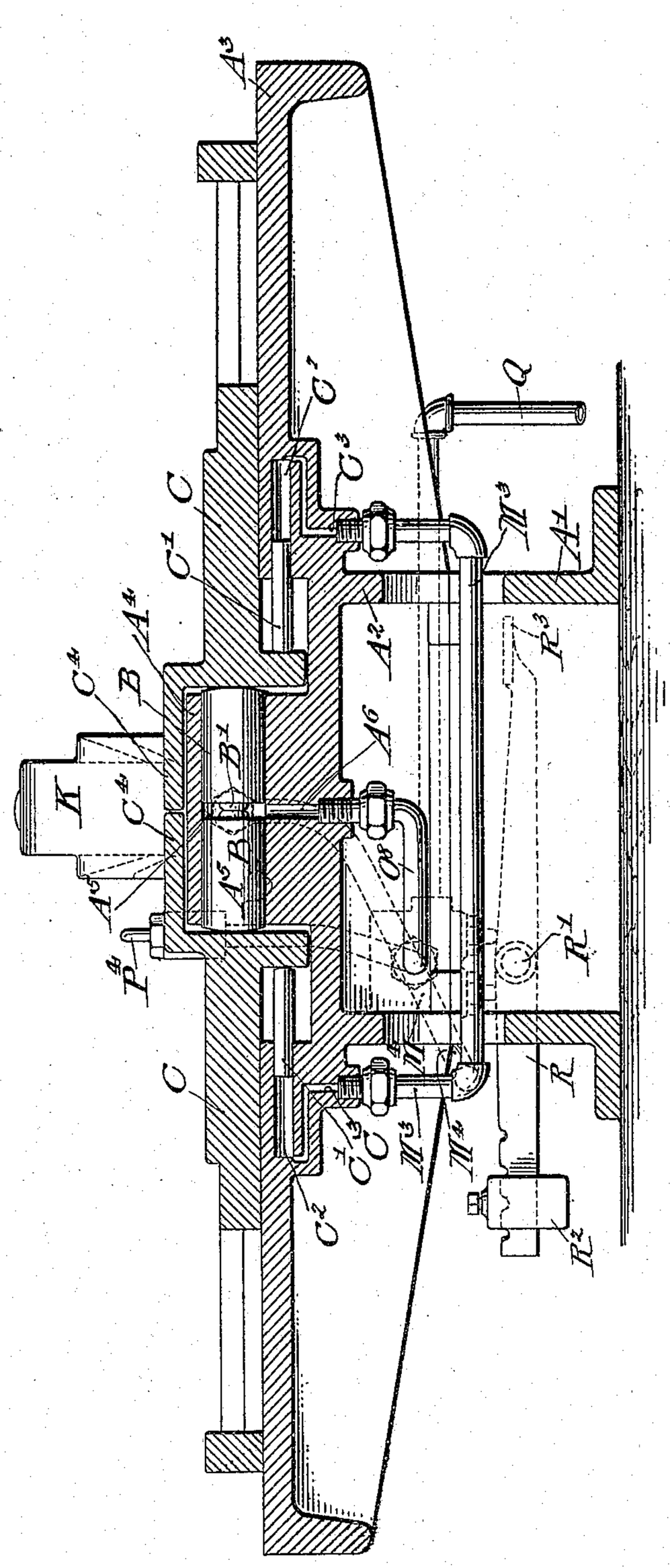
4 SHEETS—SHEET 3.

FIG. 4.



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4 SHEETS—SHEET 4.

FIG. 7.

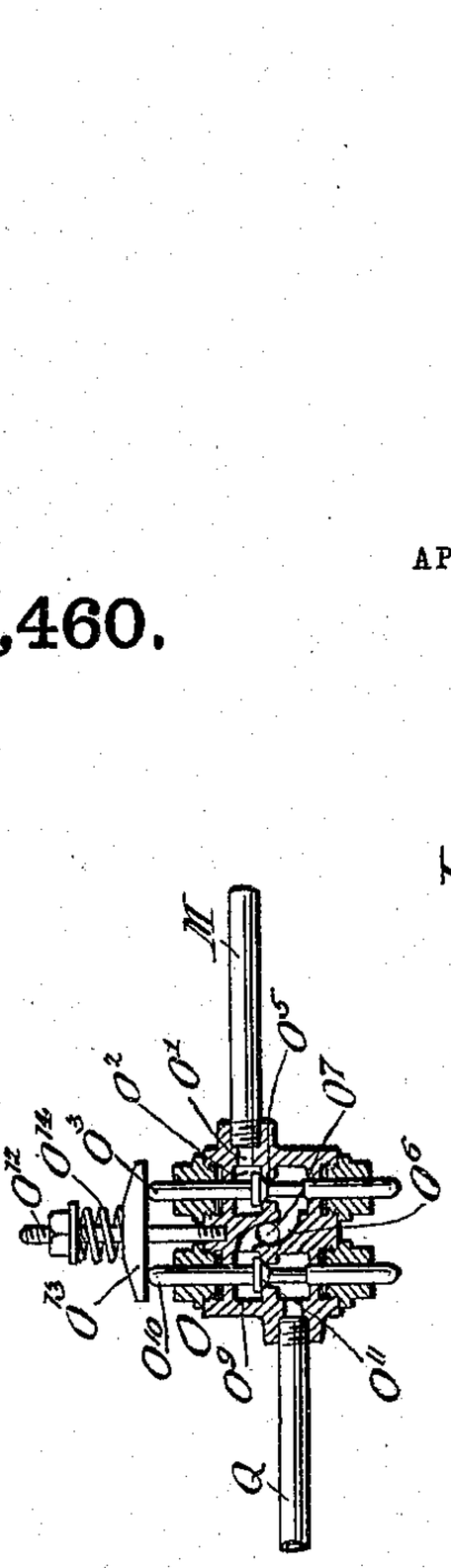


FIG. 5.

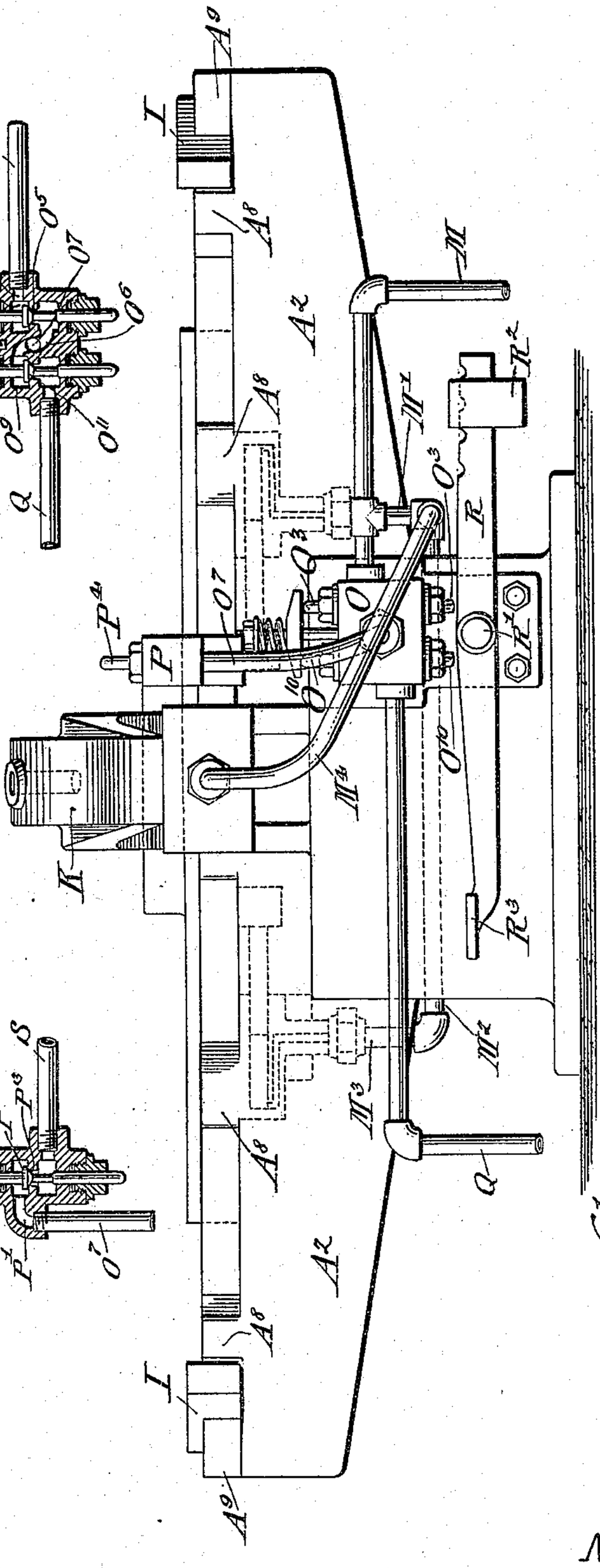
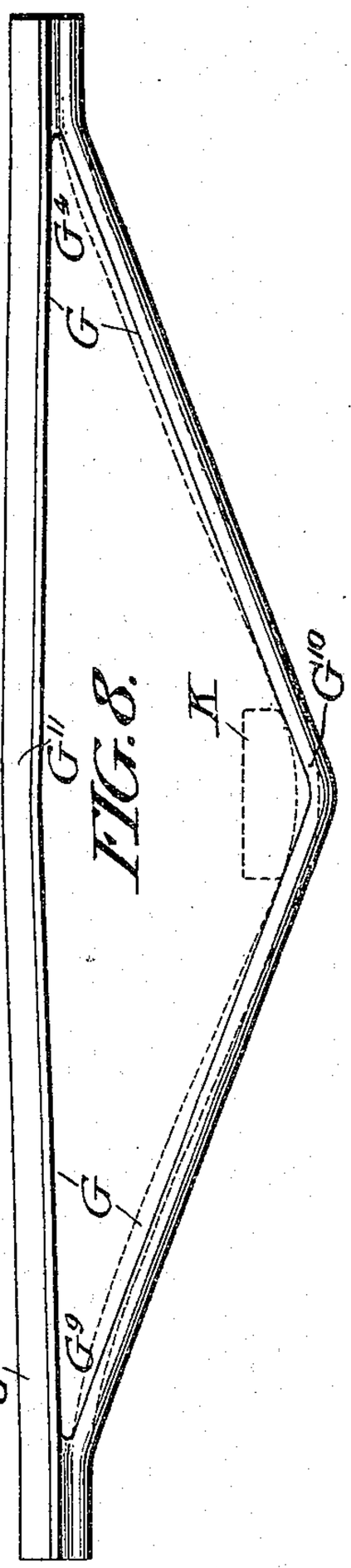


FIG. 6.

FIG. 8.



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BEAM-SHAPING PRESS.

No. 930,460. Specification of Letters Patent. Patented Aug. 10, 1909.

Application filed August 6, 1906. Serial No. 329,491.

To all whom it may concern:

Be it known that I, NATHAN H. DAVIS, a citizen of the United States of America, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Beam-Shaping Presses, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My present invention relates to metal shaping apparatus and particularly to apparatus for completing the shape of a brake beam or truss member which has previously been rough shaped by cutting and spreading apart portions of a rolled bar.

One object of my invention is the provision of means for rapidly and effectively straightening and alining the parts of such a beam and particularly the two halves of the bowed or arched tension member.

Another object of my invention is the provision of means for forming fillets at the points where the ends of the tension member are connected to the body of the beam.

A further object of my invention is the provision of means for properly shaping the portion of the tension member engaged by the strut ordinarily employed between the tension and compression members of the beam.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of my invention, however, and the advantages possessed by it, reference may be had to the accompanying drawings and descriptive matter in which I have illustrated and described one of the forms in which my invention may be embodied.

In the drawings, Figure 1 is a plan view of the apparatus. Fig. 2 is an end elevation of the apparatus shown in Fig. 1. Fig. 3 is an end elevation with parts in section on the line 3—3 of Fig. 1. Fig. 4 is an elevation in section on the line 4—4 of Fig. 1. Fig. 5 is a side elevation of the apparatus. Fig. 6 is a sectional elevation of one of the valves employed. Fig. 7 is a sectional elevation of another valve employed, and Fig. 8 is a plan view of the blank worked upon, the full lines showing the beam in its completed form and the dotted lines the blank prior to being operated upon by the apparatus disclosed.

In the drawings, A, represents the framework of the mechanism, which comprises a base member A' and an upper member A^2. The member A^2 has its upper surface machined to form a table or platform A^3. A cylindrical shell-like projection A^4 from the member A^2 extends above the surface of the table. The interior of the projection A^4 forms an open ended horizontally extending piston chamber or cylinder A^5 in which are located two oppositely moving similar pistons B. The outer end of each piston B bears against the base end of one of a pair of triangular or wedge formed spreaders or shaping devices C. Each shaping member C is engaged by a piston member C' smaller in cross section than the pistons B. Each piston C' extends into a piston chamber C^2 formed in the member A^2. When a fluid, such as water, under pressure, is admitted to the chamber A^5 through the passage A^6, each piston B tends to move out of the corresponding chamber end. This tends to separate the shaping members C, forcing each piston C', into the corresponding chamber C^2. Fluid under pressure admitted to the chamber C^2 through the ports C^3 tends to move the pistons C' in the opposite direction and when not opposed by the action of the pistons B, serves to move the shaping members into the positions shown in Fig. 4 and hold them there. The movements of the members C are guided by the hoods C^4 partially surrounding the projection A^4.

The shaping members C coöperate with stationary shaping or die members D which are movable toward and away from the members C by means of cams in the form of disks or cylinders F journaled in bosses A^7 and provided with cam portions F' and held in place by bolts F^{11}. Each cam member F is provided with an extending arm F^2. The arms F^2 are pivotally connected to an operating member F^3 and a lever F^4 pivotally mounted on one of the bolts F^{11}, extended for the purpose, and also pivotally connected to the operating member F^3 serves as a means by which all the cams may be simultaneously turned in their pivotal supports to move the die members D through the cam portions F' toward the shapers C. Springs F^5 bearing at their ends on the bosses A^7 and connected to the members D by bolts F^6 are employed for normally holding the parts in the position shown in Fig. 1. As shown, the parts D are cut away to form shoulders D' and D^2 against which rest the under side of the rib G' and

the outer side of the rib G^2 of the compression member of the blank G.

The table member A^2 is provided with lugs A^8 against which the stationary die parts or shaping members H abut. At each end of the table, a lug A^9 is provided having its inner side tapered reversely to the outer side of a thrust block I. The ends of the blank worked upon bear against the blocks which may be readily adjusted to accommodate blanks of different lengths by sliding them along the lugs A^9.

A shaping member K is pivotally connected by a pin K′ to the crosshead L^0 connected integrally or otherwise to a piston L, reciprocating in a piston chamber L′ which may be integral with the member A^2. The piston L is normally held in the position shown in Fig. 3 by means of a small piston L^2 which slides in a piston chamber L^3 and is acted upon by a fluid under pressure admitted to the outer end of said chamber. When fluid under pressure is admitted to the inner end of the chamber L′ through the port L^5 shown in Fig. 5, the piston L is moved in a direction to carry the member K away from the line of movement of the pistons B.

In operation, a blank of the form indicated by the dotted lines shown in Fig. 8 is inserted in the apparatus, the member K being then tilted into the dotted line position of Fig. 3 to admit such insertion. Preferably the blank inserted is heated to a forging temperature and, advantageously, the operation on the blank may be performed before the blank has lost the heat given it preparatory to the cutting and shaping operation by which it is brought from the form of a rolled bar into the form shown in dotted lines in Fig. 8. After the blank is inserted, the tension member G^4 is moved into the proper position relative to the adjacent sides of the member C through the operating member F^4 and parts moved by it. Fluid under pressure is then admitted through the port A^6 into the space in the chamber A^4 between the adjacent ends of the piston B. As shown, the pistons B are provided with projections B′ which prevent the bodies of the pistons from coming into contact. The fluid under pressure so admitted spreads the members C apart and shapes the tension and compression members G^4 and G^8 of the blank respectively, between the member C and the dies D and H. As shown, the outer ends of the members C are rounded slightly, so that fillets G^9 are formed at the lines of separation between the tension and compression members. As the members C are spread apart, the end K^2 of the member K, shown in cross-section in Fig. 8, drops between the members C upon the upper surface of which it has been resting, and the end of the projection K^2 then rests upon the table A^3. After this fluid is admitted to the chamber L′ through the port L^5 to move the member K bodily away from the pistons B and through the projection K^2 imparts to the bent portion G^{10} of the tension member of the blank, the shape shown in full lines in Fig. 8, thus fitting it to receive the strut which may extend from it to the portion G^{11} of the compression member of the truss.

The means for controlling and distributing the operating fluid comprise a pressure supply pipe M which leads to the port O′ of a valve casing O provided with a valve chamber O^2 into which extends a piston valve O^3 normally closing a port O^5 located between the port O′ and a valve passage O^6. A pipe O^7 leads from the valve passage O^6 to the port P′ of a valve P. A pipe O^8 leads from the passage O^6 to the port A^6. The valve casing O is also provided with a valve chamber O^9 similar to the valve chamber O^2 and provided with a valve piston O^{10} normally closing the port O^{11} leading from the valve passage O^6 to a waste pipe Q. A rod O^{12} secured to the valve casing O′ has mounted upon it a movable crosshead O^{13} which is normally held in a position to hold the valves O^3 and L^{10} in their closed position by means of a spring O^{14}. A lever R pivoted to the frame member A′ at R′ is normally turned from the position shown in Fig. 5 by the adjustable counterweight R^2 into the position in which the valve member O^{10} is lifted off its seat. When the member R is turned in the opposite direction by the application of a weight to the pedal extension R^3 of the lever the valve O^3 is moved off its seat. As shown, the valves are arranged so that pressure in the end of the chamber O^2 connected to the passage M or at the end of the chamber O^9 connected to the passage O^6 tends to hold the corresponding valve in the closed position.

The valve P comprises a valve chamber P^2 separated into two portions by a port P^3 normally closed by the piston valve member P^4. The pipe S leads from the lower end of the chamber P^2 to the port L^5. The valve member P^4 may be lifted off its seat in any suitable manner, as by means of a lever P^5 engaging the lower end of the valve member P^4 projecting through the valve casing. The valve P^4 is arranged so that the pressure in the pipe O^7 normally holds the valve in a position to close the port P^3. Pipes M′, M^2 and M^3 lead from the pipe M to the ports C^3. Similarly the pipe M^4 leads from the pipe M to the chamber L^3.

It will be observed that the chambers C^2 and L^3 are connected at all times to the pressure supply pipe so that the pistons L and P are normally held in the positions shown in Figs. 3 and 4 respectively. When the valve O^3 is moved to open communication through the port connecting the upper and lower parts of the valve chamber O^2, pistons B are

spread apart against the action of the pistons C′. Similarly when the valve member P^4 is lifted off its seat the piston L moves out of its chamber L′ against the action of the small piston L^2.

While the form of my invention disclosed has been found in practice to give excellent results it will be understood by those skilled in the art that changes may be made in the form of my invention without departing from its spirit, and I do not wish the claims hereinafter made to be limited to the particular embodiment disclosed more than is made necessary by the state of the art.

While the apparatus disclosed is primarily designed for operating on brake beam blanks, such as have been produced by operations and apparatus disclosed and claimed in my copending applications Ser. Nos. 329,490 and 329,492 filed of even date herewith, it will be readily apparent to those skilled in the art that my invention is in some of its aspects not limited to use on such blanks.

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

1. In a machine for finishing a rough shaped diamond truss having integral tension and compression members, a support having die surfaces for engaging the outer edges of the truss, a pair of oppositely directed wedge shaped internal shaping dies, and fluid pressure means for moving said dies away from each other and into engagement with the inner sides of the truss at the acute angles thereof, said means including two pistons, one engaging each of said internal dies.

2. In a machine for shaping a rough shaped diamond truss having integral tension and compression members, a support having die surfaces against which the outer edges of the truss engage, and having also guiding surfaces extending substantially parallel to the line connecting the acute angles of said die surfaces, a pair of oppositely directed wedge shaped internal shaping dies provided with surfaces engaging said guiding surfaces on said support and prevented from movement thereby except in a direction parallel to said line, and means for moving said dies away from each other and into engagement with the inner sides of the truss at the acute angles thereof.

3. In a machine for finishing a rough shaped diamond truss having integral tension and compression members and end portions beyond the junction of the tension and compression members, a support having die surfaces for engaging the outer edges of the tension and compression members, abutments carried by said support against which the end portions of the beam impinge, said abutments being adjustable to vary the distance between them, and a pair of oppositely directed wedge shaped internal shaping dies, and means for moving said dies away from each other and into engagement with the inner sides of the truss members at the acute angles thereof.

4. In a machine for finishing a rough shaped diamond truss, a support having die surfaces for engaging the outer edges of the truss, a pair of oppositely directed wedge shaped internal shaping dies and means for moving said dies away from each other and into engagement with the inner sides of the truss at the acute angles thereof, the wedge ends of said shaping dies being rounded to form fillets at the juncture of the tension and compression members.

5. In a machine for shaping a rough shaped diamond truss, a table supporting said truss, dies carried by the table for engaging the outer edges of said truss, a pair of internal wedge shaped shaping dies normally having their bases in contact, means for spreading said dies apart, a third internally acting die normally held out of engagement with the blank by its engagement with the wedge shaped dies, but dropping into position to engage said blank as the wedge shaped dies are spread apart, and means for thereafter moving said third die in a direction transverse to the line of movement of the wedge shaped die.

6. In combination, a pair of oppositely movable dies C, a transversely moving crosshead L^0, a die member K pivotally connected to the crosshead and provided with a portion K^2 normally resting on dies C and means for reciprocating the crosshead L.

7. In combination, a table provided with a boss A^4, oppositely moving shaping members C slidingly guided by said boss, die actuating pistons B, a reciprocating crosshead L^0, movable transversely to the line of movement of the member C, a die member K connected to said crosshead, means for separating the pistons B to separate the dies C, means for moving the dies C toward one another and means for reciprocating the crosshead.

8. In a machine for finishing a rough shaped diamond truss, die parts having their work engaging surfaces corresponding to the outer surfaces of the finished truss, and means for moving the outer surfaces of a rough shaped blank into engagement therewith, comprising a pair of wedge shaped dies and means for moving them into the acute internal angles of the truss and a transversely movable internal die for shaping the strut engaging portion of the tension member.

9. In a machine for shaping a rough shaped diamond truss beam having integral tension and compression members, a table or support provided with die surfaces against which the outer edges of the truss engage, a pair of oppositely directed wedge shaped internal

shaping dies mounted on said table and movable away from each other into the acute angles of the beam, and means for moving them apart, comprising an open ended cylinder mounted on the support, a pair of pistons, one projecting through each end of the cylinder, and means for supplying fluid under pressure to the interior of the cylinder between the inner ends of the pistons.

10. In a machine for shaping a rough shaped diamond truss beam having integral tension and compression members, a table or support provided with die surfaces against which the outer edges of the truss engage, a pair of oppositely directed wedge shaped internal shaping dies mounted on said table and movable away from each other into the acute angles of the beam, and means for moving them apart, comprising an open ended cylinder mounted on the support, a pair of pistons, one projecting through each end of the cylinder, and means for supplying fluid under pressure to the interior of the cylinder between the inner ends of the pistons, said dies being provided with guiding surfaces which engage the outer wall of said cylinder.

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Witnesses:
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