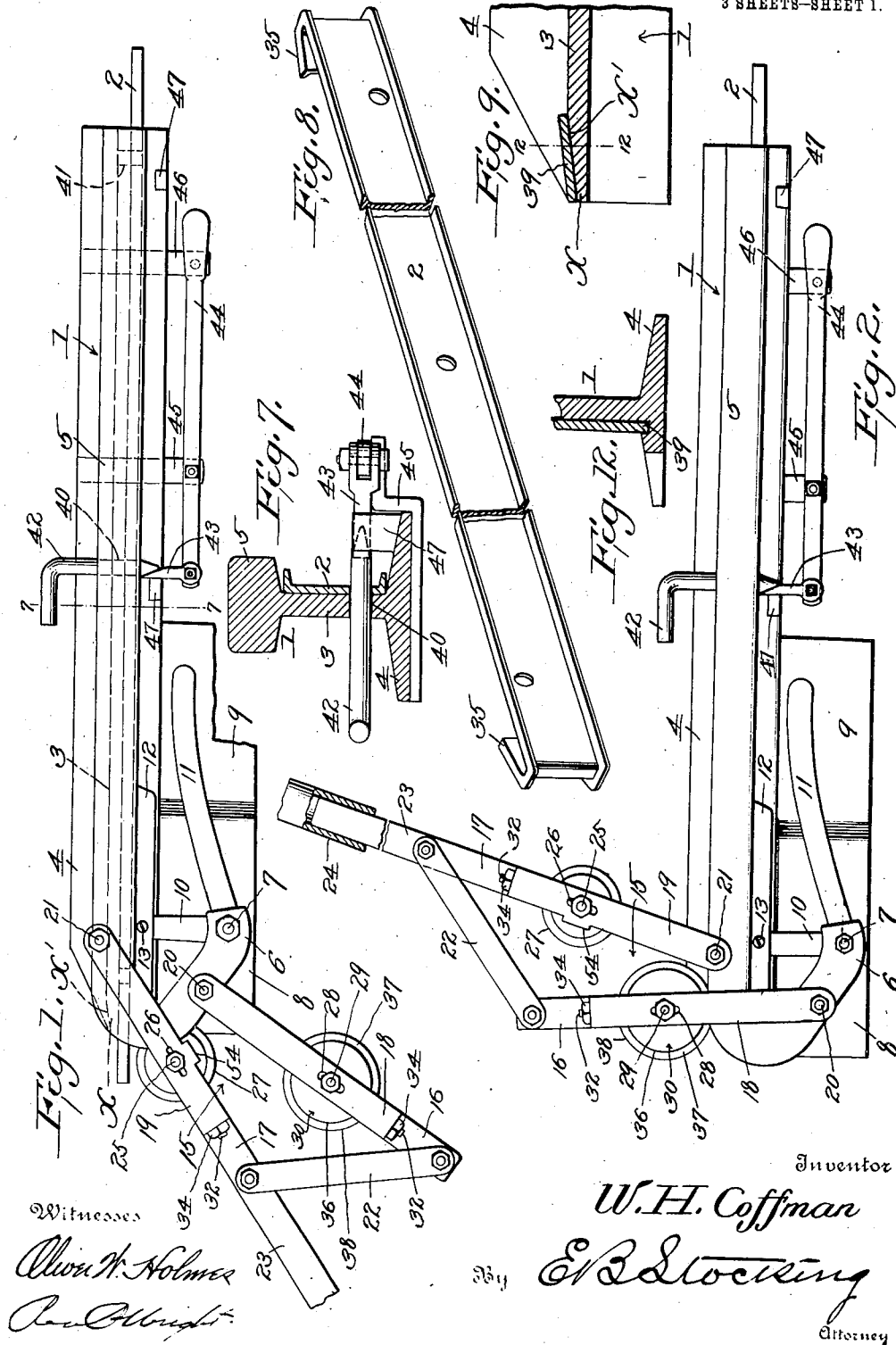


W. H. COFFMAN.
BENDING MACHINE.
APPLICATION FILED JAN. 15, 1912.

1,054,675.

Patented Mar. 4, 1913.

3 SHEETS—SHEET 1.



Witnesses
Oliver H. Holmes
Paul C. Wright

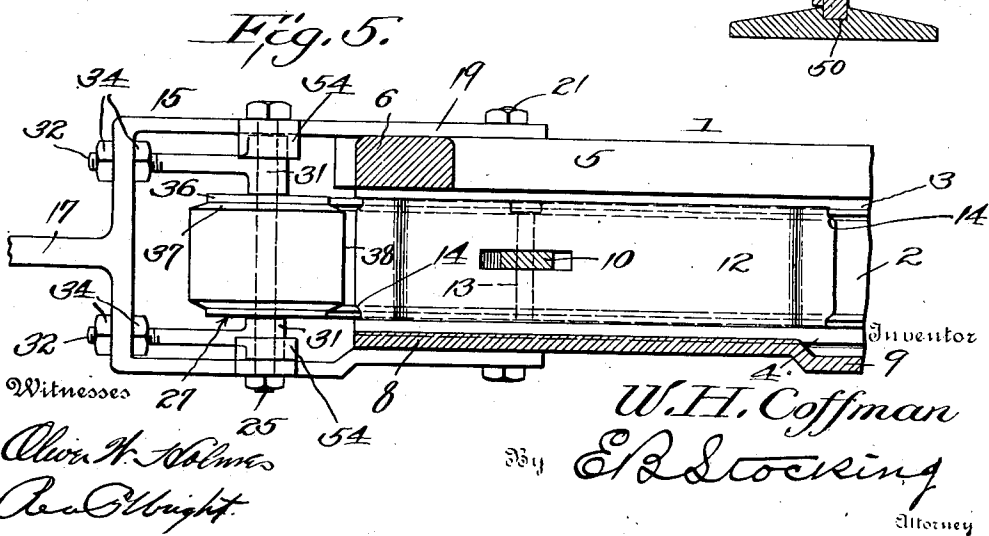
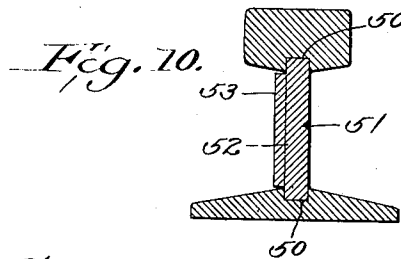
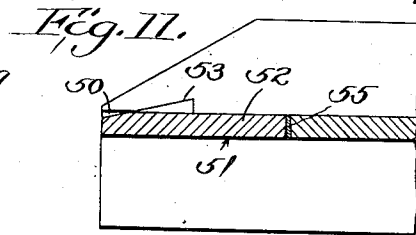
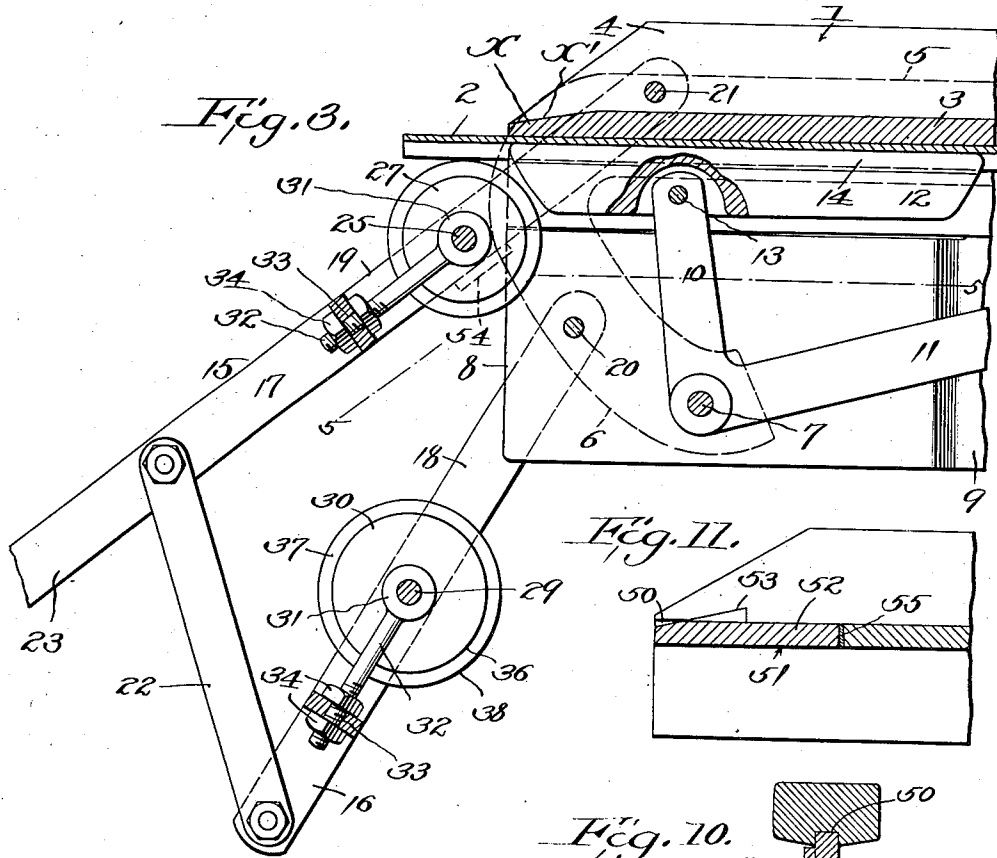
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3 SHEETS—SHEET 2.

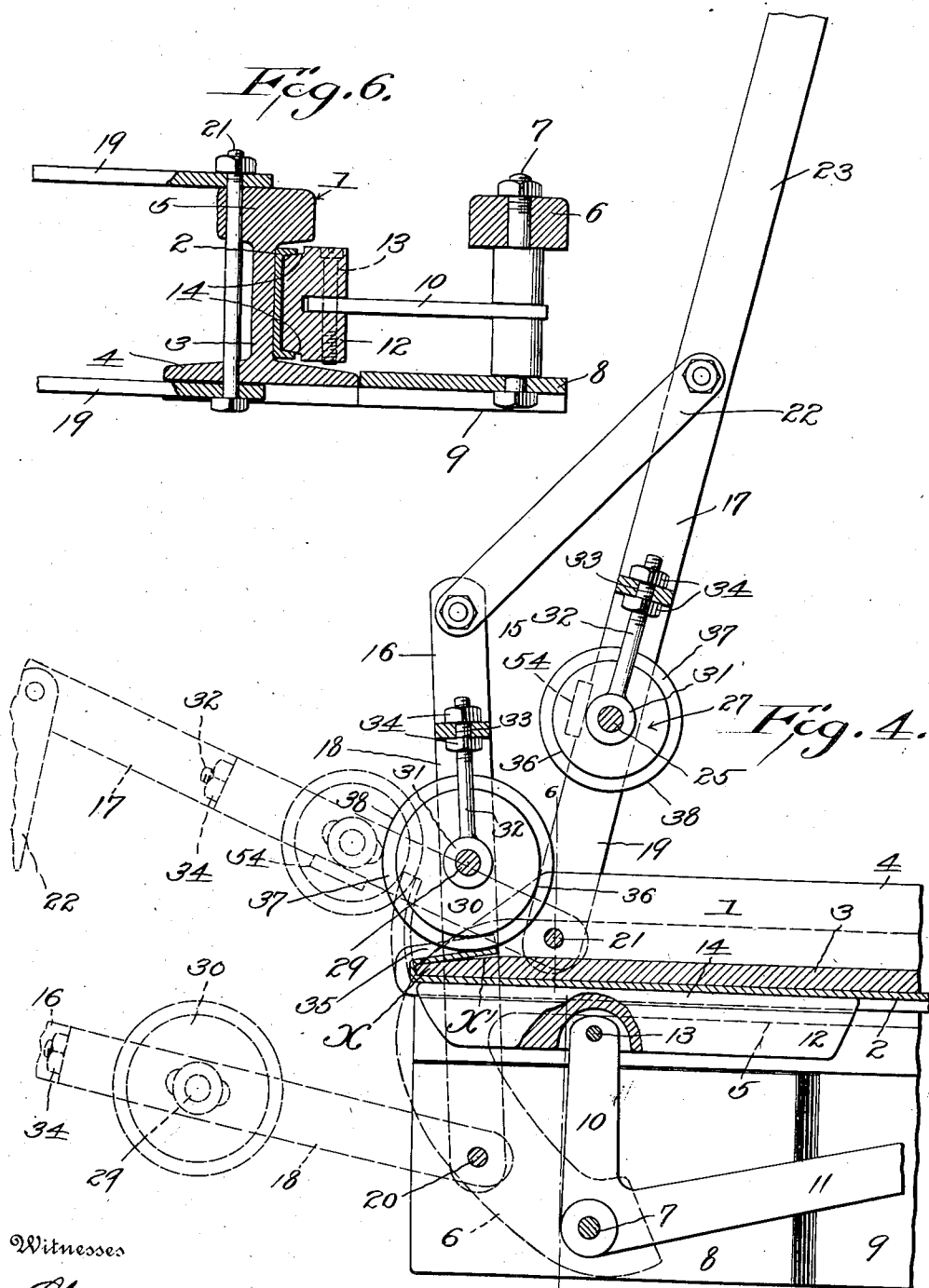


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3 SHEETS—SHEET 3.



Witnesses

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364

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UNITED STATES PATENT OFFICE.

WILLIAM H. COFFMAN, OF BLUEFIELD, WEST VIRGINIA.

BENDING-MACHINE.

1,054,675.

Specification of Letters Patent.

Patented Mar. 4, 1913.

Application filed January 15, 1912. Serial No. 671,209.

To all whom it may concern:

Be it known that I, WILLIAM H. COFFMAN, a citizen of the United States, residing at Bluefield, county of Mercer, State of West Virginia, have invented certain new and useful Improvements in Bending-Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to certain new and useful improvements in bending machines and more particularly to a machine for bending railroad ties, the object being to provide a machine capable of completing the bending operation by a single movement of the parts.

Another object of the invention is to provide a novel and improved construction of frame mounted relative to the base of an anvil and carrying a plurality of bending devices disposed to traverse different paths of travel relative to said base and to consecutively bend material thereon by a single movement of the frame.

A further object of the invention is to provide a novel construction of base or anvil for the material to be bent and a cooperating clamp to hold the material in contact with said base.

A still further object is to provide novel means for positioning the bar on the base or anvil in order to obtain the desired size of hook at the ends of the bar.

Another object is to provide means for adjusting the bending rollers in order to compensate for bars of different thicknesses.

A further object is to provide a detachable face block for the beak of the anvil in order to increase the thickness of the same whereby hooks of different angles can be formed on the machine.

The invention presents a simple, efficient and economical construction of bending machine in which separate operations are avoided and the entire bending of a hook at the end of the tie is performed by a single movement of the frame which greatly reduces the time required and the cost of production for forming structures such as herein shown.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawings—Figure 1 is a top plan view of the machine showing the bar in po-

sition therein to be bent; Fig. 2 is a similar view showing the bar bent to form a hook; Fig. 3 is an enlarged top plan view of one end of the machine partly in section; Fig. 4 is an enlarged top plan view of the parts shown in Fig. 3 showing the bending devices in a different position; Fig. 5 is a section taken on line 5—5 of Fig. 3; Fig. 6 is a section taken on line 6—6 of Fig. 4; Fig. 7 is a section taken on line 7—7 of Fig. 1; Fig. 8 is a perspective view of the bar bent to form a tie; Fig. 9 is a detail longitudinal section of the anvil; Fig. 10 is a detail transverse section through a modified form of anvil; Fig. 11 is a detail longitudinal section through the same; and Fig. 12 is a detail vertical section through the anvil showing the face block in position.

Like numerals of reference refer to like parts in the several figures of the drawings.

In the drawings, 1 indicates the base or anvil of the machine which may be of any desired construction but is preferably formed of a T-shaped rail in which case the material 2, herein shown a channel bar, to be bent rests against the web 3 and is held against lateral displacement by the base flange 4 and the head portion 5. In the form of anvil shown, the base flange and web are cut away at one end to form a beak X having a beveled face X' and the head 5 is bent laterally to form a bracket 6 in the end of which a pivoting bolt 7 is mounted which has its lower end extended through the off-set portion 8 of a base plate 9 upon which the base or anvil is mounted. The base plate is provided with a series of openings through which bolts or screws pass for securing the same upon a work bench in order to obtain a rigid anvil which will be held in such position that the bending device cooperating therewith, which will be later described, can be readily operated.

Mounted on the bolt 7 is the angled end 10 of a clamping lever 11, the end 10 thereof extending into a recess formed in a clamping block 12 and through which a bolt 13 passes for pivotally connecting the lever and block together in order that the block may be forced into contact with the material or channel bar 2 so as to force it against the base at 1 as shown or drawn out of engagement therewith in order to release the material so that the same can be quickly removed. The clamping block herein shown is especially constructed for clamping chan-

nel bars and is provided with rabbeted edges 14 which co-act with the flanges of the bar in order to obtain as large a clamping surface as possible so as to prevent the bar from moving in any way when being operated upon. The clamping block has a longitudinal movement as well as a transverse movement in order to bring the forward end into engagement with the material at the point of the beak of the anvil so as to prevent the material from yielding at the point of bend and in this position, the block is held from any transverse movement.

The bending device may be carried by any preferred form of construction of frame 15 for instance comprising the levers 16 and 17 having forked ends 18 and 19, the former being pivotally mounted upon a bolt 20 passing through the bracket 6 and the offset portion 8 of the base plate, and the latter pivoted upon a bolt 21 passing through the head and base flange of the base 1. These levers are of different lengths and pivoted to swing in different arcs so that when connected together by a link 22, they will in their movement in one direction approach each other as shown in Fig. 2. One of the arms may be extended as shown at 23 to form an operating handle 24 and each lever is provided with a suitable bending device, for instance a roller. The arms of the fork 19 of the lever 17 are provided with longitudinal slots 26 in which is slidably mounted a bolt 25 on which a roller 27 is revolvably mounted. The arms 18 of the lever 16 are similarly slotted as shown at 28 in which a bolt 29 is slidably mounted carrying a roller 30 of a greater diameter than the roller 27.

Mounted on the bolts 25 and 29 to each side of the rollers 27 and 30 are spaced sleeves 31 for centering the rollers in the forks of the levers and said sleeves are provided with threaded stems 32 extending through openings 33 formed in the heads of the forks of the levers 16 and 17 on which are mounted adjusting nuts 34 on each side of the heads for shifting the journals of the rollers 27 and 30 in order to compensate for different thicknesses of material being operated upon. It will be noticed that the distance of the roller 30 from the pivot 20 of the lever 16 is greater than the distance of the roller 27 from the pivot 21 of the lever 17.

The bar or material 2 is bent to form a hook or overturned portion 35 at one or both ends as shown and the application of the invention herein shown is for the purpose of forming hooks on the end of the ties which are adapted to embrace the base flange of the rail in order to obtain true alinement without any danger of the rail spreading in any way. The rollers 27 and 30 herein shown are also especially constructed for

bending channel bars and are provided with hub portions 36, and beveled side portions 37 which terminate at the treads 38 which are substantially of the same width as the channel of the bar being operated upon and when the rollers are forced into engagement with the material or channel bar, the treads engage the base between the flanges and at the same time, the beveled portions and hubs engage the inside face and edges of the flanges of the channel bar in order to obtain a pressure upon all portions of the bar at the same time which prevents the bar from twisting at the point of bend.

The web and base flanges of the anvil adjacent the beveled face of the beak are grooved to form a guide way for a detachable face block 39 in order that the angle of the hook formed on the end of the bar may be changed to fit different sizes and designs of rails. When the block is in position, it is necessary to adjust the rollers 27 and 30 on the levers in order to compensate for the increased thickness of the beak of the anvil.

In order to provide means for gaging the length of hook to be formed on the ends of the bar or to provide means for obtaining the same size of hook at each end, I provide the web 3 of the anvil with positioning openings 40 and 41, the opening 40 being formed midway of the anvil and the opening 41 being formed adjacent the end of the anvil at the opposite end to that of the beak, which are adapted to register with openings punched in the bar previous to being inserted in the machine.

In making ties requiring a central anchor, an opening is punched in the center of the bar in which case the center opening of the anvil is used for positioning the bar and when this is not required, the opening at the end for securing the rail fastening member is used in which case the openings at the ends of the bar are preferably punched to the opposite sides of the longitudinal center of the bar so that when the bar is turned end for end, the openings therein will register with the openings in the end of the anvil. The bar is held in position by a tapering positioning pin 42 which is forced through the registering openings in the anvil and bar and held from any slight movement by a wedging member 43 pivotally carried by a lever 44 mounted, as the case may be, on either of the brackets 45 or 46 extending from the anvil according to the position of the opening of the anvil being used. This wedging member co-acts with the positioning pin 42 and with one of the stops 47 formed on the base flange of the anvil and by means of which the wedging action is released by withdrawing the wedging member in order to allow the pin to be removed quickly so that the bar can be removed.

In the operation of the invention, the bar

or any material to be bent is positioned on the base by the pin and wedging member and clamped into contact with the base or anvil by the clamping block with the members of the frame positioned as shown in Fig. 1 and a portion of the material or bar extended beyond the beak of the anvil. The frame levers are then swung toward the material and the forward roller engages the extended end and bends it at substantially right angles to its former position as shown by dotted lines in Fig. 4. The continued movement of the levers causes the second roller to approach the first and to engage the previously bent portion of the material and force it toward the beveled face of the beak of the anvil forming the hooked or overturned end as shown in Fig. 4 at which time the rollers are immediately adjacent each other. It will be observed that the bending is performed by a single movement of the frame in one direction during which operation the bending devices traverse different paths of travel which intersect each other. After the bending operation is completed, the frame is returned to its initial position and the clamping block released so that the bar can be quickly removed from the base and reversed in order to bend the opposite end in a similar manner.

In the form of anvil shown in Figs. 10 and 11, the web of the anvil at the beak portion is cut out and the head and base are grooved as shown at 50 in which is forced a detachable beak 51 which has a shank portion 52 and a beveled face 53 and by this construction beaks of different sizes can be inserted into the anvil and when the beak, as shown in the preferred form of machine, wears to such an extent that the machine becomes useless or it is necessary to change the points of the pivots of the levers, the same can be cut away and one of the detachable beaks inserted and by this construction, the life of the machine is greatly increased. An anvil provided with one of these detachable beaks can be used for bending various other angles and as shown in Fig. 11 the beak can be forced outwardly as the same wears by placing a wedge or a filler strip 55 between the shank portion 52 thereof and the web of the anvil.

In order to prevent the arms of the forked end 19 of the lever 17 from being bent and to provide means for reinforcing the journal bolt 25 of the roller, I provide the same with flanges or lugs 54 which extend down alongside of the sleeves 31 as clearly shown in dotted lines in Fig. 4 whereby the bearings are held against lateral strain when the bending roller is in operation.

What I claim is—

1. In a bending machine, the combination with an anvil, means for positioning and clamping the material to be bent on

said anvil, and a movable frame carrying bending devices to traverse intersecting paths of travel relative to said anvil.

2. In a bending machine, the combination with an anvil, of a movable pin for positioning the material to be bent upon said anvil, a stop arranged on said anvil, a movable member, and a movable wedging member carried by said movable member co-acting with said stop and pin.

3. In a bending machine, the combination with an anvil, of a detachable pin for positioning the material to be bent on said anvil, a stop arranged on said anvil, and a movable wedging member co-acting with said stop and pin.

4. In a bending machine, a support, a movable frame, and a plurality of bending devices carried by said frame and disposed to traverse intersecting paths of travel relative to said support and to consecutively bend material thereon by a single movement of said frame.

5. In a bending machine, a support, a movable frame, a plurality of adjustably mounted bending devices carried by said frame and disposed to traverse intersecting paths of travel relative to said support.

6. In a bending machine, a support, a movable frame, and a plurality of bending devices carried by said frame and disposed to traverse intersecting paths of travel relative to said support.

7. In a bending machine, a support, a pivoted frame comprising independent pivoted levers connected together by a link, and a plurality of bending devices carried by said frame and disposed to traverse intersecting paths of travel relative to said support and to independently engage the material to be bent.

8. In a bending machine, a support, a pivoted frame, and independently pivoted rollers carried by said frame and disposed to traverse intersecting paths of travel relative to said support.

9. In a bending machine, a support, a pivoted frame, independently pivoted rollers movably mounted in said frame and disposed to traverse intersecting paths of travel relative to said support, and means for adjusting said rollers in said frame for changing the intersecting path of travel of said rollers.

10. In a bending machine, a support, a frame comprising levers independently pivoted thereon, a link connecting said levers, and independently adjustably mounted bending devices carried by said levers and disposed to traverse intersecting paths of travel relative to said support.

11. In a bending machine, an anvil, a slidably mounted beak carried by said anvil, means for holding said beak against movement in one direction, and a frame carrying

bending devices disposed to traverse said beak.

12. In a bending machine, a support, a frame comprising levers independently pivoted thereon, a rotary bending device adjustably mounted upon each of said levers, and disposed to traverse intersecting paths of travel relative to said support, a link connecting said levers to effect simultaneous movement thereof, and a clamp mounted upon said support to engage the material thereon.

13. In a bending machine, a support, comprising an anvil having a slidably mounted beak, means for positioning the material to be bent upon said beak, means for clamping the material in adjusted position upon said beak, and a frame comprising independently pivoted levers carrying bending devices disposed to traverse intersecting paths of travel relative to said support.

14. In a bending machine, a support, a frame comprising independently pivoted levers, bending devices carried by said levers, and a link connecting said levers to cause said bending devices to travel in intersecting paths of travel relative to said support.

15. In a bending machine, a support, a frame comprising separate levers independently pivoted thereon, means connecting said levers, and bending rollers pivoted upon said levers each at a different distance from the pivot of its lever.

16. In a bending machine, a support, a frame comprising independently pivoted levers, means connecting said levers to produce a movement thereon toward each other in the travel of the frame in one direction, and separate bending devices carried by each of said levers.

17. In a bending machine, a support, a frame comprising independent levers each pivoted at a different distance from the end of said support, bending devices carried by said levers to traverse the end of said support, and means connecting said levers to effect simultaneous movement thereof.

18. In a bending machine, a support provided with a laterally extending bracket, a lever pivoted upon said bracket provided with a bending roller, a lever pivoted upon said support and provided with a bending roller, and a link connecting said levers.

19. In a bending machine, a support provided with a laterally extending bracket, an angled clamping lever mounted upon said bracket, a clamping block pivotally carried by the end of said lever for clamping the material to be bent against said support, a lever pivoted upon said bracket and provided with a bending roller, a lever pivoted upon said support and provided with a bending roller, and a link connecting said levers to effect a simultaneous movement

thereof to independently engage the material to be bent.

20. In a bending machine, a support provided with a laterally extending bracket, means for clamping the material against said support, a lever pivoted upon said bracket and provided with a bending roller, a lever pivoted upon said support and provided with a bending roller, and a link connecting said levers to effect a simultaneous movement thereof.

21. In a bending machine, a support provided with a laterally extending bracket, a lever pivoted upon said bracket and provided with a bending roller, a lever pivoted upon said support and provided with a bending roller, a link connecting said levers to effect a simultaneous movement thereof, said levers being adapted to traverse the end of said support, a clamping lever pivoted upon said bracket, and a clamping plate carried by said lever for engaging the material to be bent at the end of said support.

22. In a bending machine, an anvil having an adjustably mounted beak, means for clamping material against said beak, a frame comprising independently pivoted levers, bending devices independently adjustably mounted upon said levers to independently engage the material to be bent upon said anvil.

23. In a bending machine, a support, means for initially positioning the material to be bent upon said support, means for clamping said material upon said support, and a frame comprising independently pivoted levers carrying rotary bending devices disposed to traverse intersecting paths of travel relative to said support.

24. In a bending machine, a support, a clamping lever mounted thereon, a clamping block carried by said lever and movable relative to one face of said support, and parallel flanges carried by said support at opposite sides of said clamping block.

25. In a bending machine, a support comprising an anvil having a laterally extending bracket, a lever pivotally mounted in said bracket carrying a clamping block for engaging the material to be bent upon said anvil at the point of bend, and a pivoted frame carried by said support and bracket provided with bending devices disposed to traverse intersecting paths of travel relative to said anvil.

26. In a bending machine, an anvil having a beak provided with a beveled face, a face block mounted in guide ways over the face of said beak, a frame pivotally mounted upon said anvil, and bending rollers adjustably mounted in said frame.

27. In a bending machine, the combination with an anvil having a beak provided with a beveled face, of means for position-

ing the material on said anvil in respect to said beak, means for clamping said material in position thereon, a frame comprising independent levers, bending rollers carried by said levers, and a link connecting said levers for effecting a simultaneous movement thereof.

28. In a bending machine, a support comprising an anvil, of means for positioning a bar on said anvil, a clamping member movable longitudinally and transversely to one face of said anvil, said clamping member having a clamping face corresponding in shape to the material being operated on, a frame comprising independently pivoted levers, a link connecting said levers, and

bending rollers revolubly mounted in said frames having faces corresponding in shape to the material being operated upon.

29. In a bending machine, an anvil, a slidably mounted beak carried thereby, a wedging member arranged between said beak and anvil, means for clamping material against said beak, and a frame carrying bending devices adapted to traverse said beak.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. COFFMAN.

Witnesses:

REO P. WRIGHT,
HENRY P. ALDEN.