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METAL STRIP BENDING MECHANISM.

APPLICATION FILED DEC. 9, 1914.

1,154,970.

Patented Sept. 28, 1915.

2 SHEETS—SHEET 1.

Fig. 1

Fig. 2

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2 SHEETS—SHEET 2.

Fig. 3

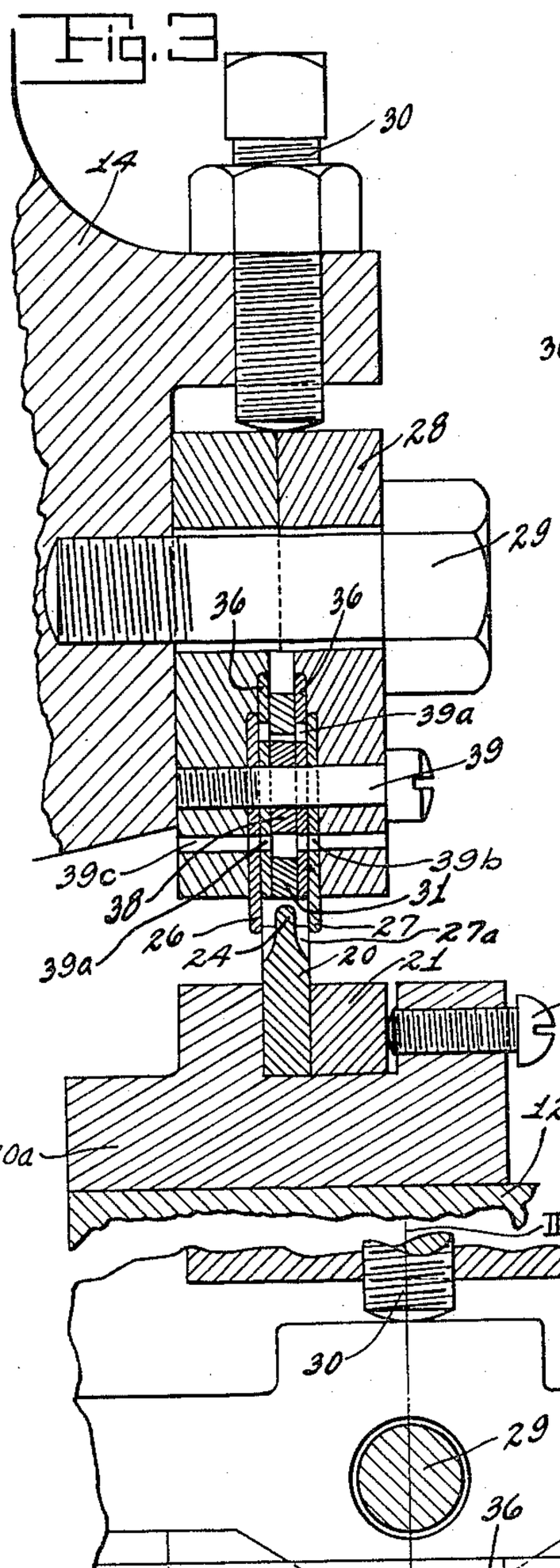

Fig. 6

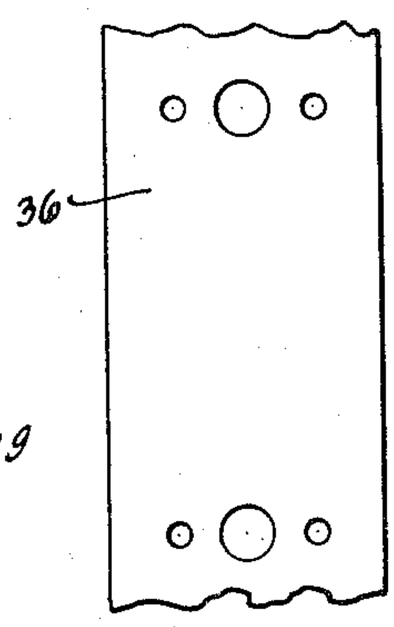

Fig. 7

Fig. 8

Fig. 4

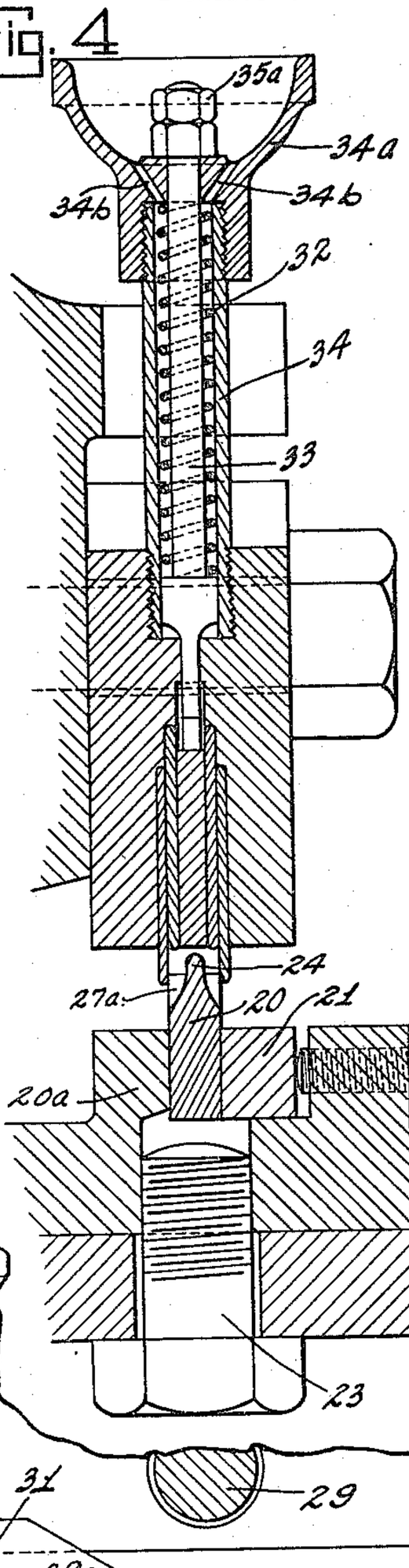

Fig. 5

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METAL-STRIP-BENDING MECHANISM.

1,154,970. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed December 9, 1914. Serial No. 876,295.

To all whom it may concern:

Be it known that I, CHARLES BURNHAM, a citizen of the United States, and a resident of Los Angeles, county of Los Angeles, and State of California, have invented certain new and useful Improvements in Metal-Strip-Bending Mechanism, of which the following is a full, clear, and exact description.

This invention relates more particularly to the means for bending a metal strip lengthwise for use as a binding for berry or fruit baskets, and is a continuation in part of my application, Serial No. 734,155, filed November 29, 1912.

One of the principal objects of the invention is to provide simple and efficient means whereby a narrow strip of metal may be positively held and guided while being bent lengthwise thereof to form the strip substantially U-shaped or V-shaped in cross-section to adapt the strip to be used as a binding in the manufacture of baskets or boxes.

Other objects of the invention are to provide simple means whereby a quick adjustment may be obtained for the punch member of the press or bending mechanism to adapt the punch to be quickly dropped or lowered in case of a tangled metal strip or in case of an accumulation of dirt; to provide simple means for positively guiding and holding a die member to adapt the latter to serve as an ejecting means for the strip after being folded; to provide a punch member which engages the strip at certain points instead of throughout the entire length thereof; and to provide means which will take care of irregularities and curved portions of the strip.

Another object of the invention is to provide die members which are in the form of plates and which are so constructed that in case of wear those plates used on one side may be shifted to the other side or turned end-for-end to present new wearing surfaces, thereby dispensing with expensive machine parts and at the same time forming effective means for guiding and straightening a metal binding during the forming operation.

A further object of the invention is to provide simple and efficient means for adjusting the different parts and for yieldingly holding the die ejecting member in position.

With these and other objects in view, the invention will be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification, and will then be pointed out in the claims at the end of the description.

In the drawings, Figure 1 is a front elevation of one embodiment of the invention showing the same applied to a part of a machine frame. Fig. 2 is a side or end elevation showing a fragmentary portion of the frame. Fig. 3 is an enlarged vertical section taken on the line III—III of Fig. 5. Fig. 4 is an enlarged vertical section taken on the line IV—IV of Fig. 5. Fig. 5 is an enlarged fragmentary front view, partly in section and partly broken away, showing the several plates or members forming a part of the die member. Fig. 6 is a fragmentary detail view of a part of one of the die plates. Fig. 7 is an enlarged transverse section of a strip before it is bent lengthwise; and Fig. 8 is an enlarged transverse section after the strip has been bent.

While the invention is ordinarily applied to a particular form of machine, it will be understood that many of the features may be used in connection with various forms of machines or alone, and that some of the parts may be dispensed with or other features substituted therefor without departing from the spirit of the invention.

In the general operation of a box-making machine to which this invention is particularly applicable, a narrow metallic strip is fed from a reel or otherwise suitably supported convenient to the machine, and this strip by suitable mechanism is fed to what may be termed forming mechanism, that is the metal is bent or formed lengthwise thereof so as to be substantially V-shaped or U-shaped in cross-section in order to fit over the open edge of the box form. This strip is fed inward and tilted and after being tilted so that it will assume a proper position relative to the edges of the box and the anvil or former about which it is bent according to the shape of the box, the strip is then cut off the proper length. The strip is then fed forward on one side of a substantially rectangular anvil having a shape corresponding to the shape of the open end of the box and until the said strip meets the anvil, when the jaws into which the strip has been previously fed by engagement with the former or anvil will bend both ends of

the strip on opposite sides thereof making the same substantially U-shaped. A second pair of jaws engages the free ends of the binding strip and forces the same on the remaining side of the anvil and causes one end of the strip to overlap the other. The shooks of which the box body is made are placed in two magazines located adjacent to one end of the machine, and these shooks are automatically fed upward in position to be removed therefrom. A reciprocatory and rotary pneumatic device is provided for this purpose and this device is automatically controlled so that the shooks will be picked up first from one magazine and then from the other so that the shooks as thus picked up will lie crosswise and at substantially right angles to each other. The pneumatic device discharges the crossed shooks into a rotary carrier or turret. A movement is given to the carrier and this places the crossed shooks in the path of box-forming mechanism, and at the proper time this mechanism operates to form the shooks into box form and carries the box from above the carrier and forces the upper edge thereof into the binding strip. The binding strip is then pinched on to the shooks thus holding the box shooks permanently together in box form. Means is provided for stripping the box and causing the completed box to be deposited into the carrier, and the carrier as it feeds new shooks crosswise to the die mechanism conveys the completed box into position to be discharged. The completed box is forced out of the carrier into a chute and properly stacked and may be removed in any desired way. Another form of machine to which the invention is applicable is one in which two or more strips are used as a binding for each box or basket, or as already stated, the invention may be used simply as a folder for the strips.

The binding metal is usually of tin or galvanized metal and is in the form of a narrow strip 10, and said metal strip may be supported as a roll or reel or otherwise fed or placed in the press or folding mechanism 11, feed rolls being usually employed for this purpose.

A head 12 is held to reciprocate in guides 13 located on the machine frame 14. The lower end of the head 12 is connected to adjustable rods 15, the lower ends of the latter being pivotally held to arms 16. These arms 16 have a pivotal or swinging upward movement and are operated by cams 17, a spring 18 having one end thereof held to the head and its other end threaded and engaged by a wing nut 19 to vary the tension thereof being provided to force the head downwardly. The head 12 at its upper end is provided with a bar-like member or blade 20, which is held to the head between the part or holder 20^a and the block or bar 21 by screws 22 or otherwise, there being bolts 23 for securing the part or holder 20^a to the upper part of the head. The member 20 has a substantially U-shaped or V-shaped rib 24 along the upper edge thereof, and this rib is cut away to provide spaced contact portions 25 which are adapted to engage the lower surface of the narrow strip of binding metal. The binding metal is adapted to rest and be guided along the rib 24 between the fixed plates 26 and 27, the member 20 being provided with spaced notches or gaps at 27^a below the rib 24 to permit the escape of dirt or the like, while the parts between the notches serve to guide the member 20 between the plates 26 and 27 when in its lowest position. These plates are held to a head 28 which may comprise two opposed members securely held by bolts 29 to the machine frame 14. The head 28 may be normally forced downward for adjustment by the screws 30 and securely held to the frame by the bolts 29. A movable bar or plate-like member 31 is opposed to the rib 24 of the reciprocatory member 20, and this movable member 31 is yieldingly forced downward by springs 32. The springs 32 are arranged around bolts 33 located within the sleeves or casings 34, the upper ends of which are provided with cup-shaped caps 34^a, the latter being provided with openings 34^b through which kerosene or other material or distillate is adapted to pass from said cap to clean out the press as the zinc scales off to a certain extent, and being very thin, works up about the moving part 31. The bolts 33 have their lower ends T-shaped, at 35, to fit in correspondingly shaped slots in the upper edge of the member 31, as best shown in Fig. 5, and their upper ends are provided with nuts 35^a for adjusting purposes and which limit the downward movement of the member 31. There are as many bolts 33 and springs 32 as desired and these are spaced apart so that the member 31 may be yieldingly forced downward to rest upon the metal strip to be folded. The rib 24 of the member 20 is adapted to move between two fixed strips or plates 36 which are held in the head or member 28 on opposite sides of the center member or bar 31. This member 31 is provided with openings 37 which are adapted to receive collars or buttons 38 carried by the screws 39 and which serve to space the plates apart. The openings 37 are larger than the collars and serve to permit a limited movement to the member 31, and the plates on opposite sides of the member 31 are arranged in pairs with the lower edge of one pair above the other to provide a channel for the strip. The plates 36 have two sets of openings 39^a, the plates 26 and 27 a single set of openings 39^b, and the members of the head 28 have alined openings 39^c. The openings are adapted to register as

shown in Fig. 3 to permit the space in the openings 37 under the buttons 38 to be cleaned of zinc dust or other waste, the plates 36 being provided with two sets of holes so that when reversed one set of holes is always in alinement with the lower part of the opening 37.

It will be evident that when the binding metal to be folded lengthwise is fed or placed between the member 31 and the rib 24 of the member 20, the said member 31 is normally forced downward by the springs 32 so that the lower edge thereof will be substantially flush with the lower edge of the plates 36. As the head 12 is moved or forced upwardly, the member 31 will be carried therewith and the strip being confined between the inner surfaces of the plates 26 and 27, will also be forced upwardly carrying therewith the member 31 against the action of the springs 32. This action will fold or bend the strip substantially U-shaped or V-shaped lengthwise thereof, and will prevent the strip from slipping sidewise on the rib 24 thus forming an even sided U-shaped section. When the head 12 is lowered again by the action of the spring 18, the member 31 will be forced downward by the action of the springs 32 and this will strip or eject the folded strip from between the members or plates 36 and plates 26 and 27. It will be further evident that by this construction a proper alinement will be secured and maintained for the strip while being folded, and that the metal plates 26 and 27 as they wear may be removed and have their positions shifted to present a new side as a wearing and alining surface for the binding metal.

The two plates 26 and 27 and the two plates 36 may be of spring blade steel and made of the ordinary ribbon spring steel with a few holes through the same for the screws 39. This spring blade steel is quite strong and hard and does away with a great deal of expensive machine work. The larger members and the collars or buttons 38 hold these thin plates in accurate alinement. After the edges of these plates wear down too much, the right hand one can be used on the left hand side and the left hand one on the right hand side, and the mechanism is again ready for use, or the plates 36 by reason of the position of the holes may be inverted or shifted end-for-end as desired. The member 20 is an important feature and holds the ribbon or strip of binding metal from creasing and causes the surface to properly balance and centralizes the metal strip, and further the construction shown prevents the strip sliding more readily to one side of the die than to the other and thereby making an imperfect U-shaped or V-shaped binding. As the narrow strip of metal is irregular and often curved, the plates serve as an effective means for straightening the strip and other irregularities.

If it is desired to move the head 12 and its reciprocatory member 20 quickly in case of a tangled strip or accumulation of dust independent of the rods 15 and their adjusting turnbuckles, the head may have a rod or shaft 40 to which the rods 15 are connected. This rod has a handle 41 for rocking the same and has eccentric portions 42 located between lugs or brackets 43 on the head 12. The eccentric portions are located in openings in the rods 15 and when rotated by the handle 41 will quickly shift the head 12 according to the direction of movement of the shaft 40, there being set screws 44 provided to hold the shaft 40 normally against movement.

In some cases it may be of advantage to divide the center or ejecting bar into two parts for relieving the bar from extra strain when the metal binding has a tendency to be ejected more easily out of the die in one place than in another. In this construction, the centering bar is cut or divided substantially centrally at one of the T-shaped slots so that the T-shaped end of the central spring-pressed rod will serve to support or hold the adjacent ends of both sections.

From the foregoing, it will be evident that simple and efficient means is provided whereby a metal strip may be effectually held and while so held positively guided and straightened if necessary and formed substantially U-shaped or V-shaped in cross-section; that simple means is provided for ejecting the folded strip; that simple and efficient means is provided whereby the various parts may be readily adjustable and at the same time accessible for repairs and for other purposes; and that simple and efficient means is provided whereby much expensive machine work is dispensed with an simple means provided whereby certain parts of the die mechanism may be shifted from one location to another in case of wear.

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

1. The combination of a reciprocatory head having a plate-like member provided with a rib, a plurality of thin stationary and reversible blade-like members forming an alining and centering means for a metal strip, and a yieldingly held intermediate member coöperating with the reciprocatory member to fold the strip lengthwise and to eject the folded strip from between the centering members.

2. The combination of a reciprocatory head having a plate-like member provided with a rib, a plurality of fixed thin blade-like reversible members forming an alining and centering means for a metal strip, said

reversible members being arranged in pairs with the edges of one pair being beyond the other pair, and a yieldingly held bar-like member coöperating with the reciprocatory member to fold the strip lengthwise and to eject the folded strip from between the centering members.

3. The combination of a reciprocatory head having a plate-like member provided with a rib, four blade-like members arranged in pairs and having the lower edges of one pair above the others and forming an alining and centering means for a metal strip, and a yieldingly held bar-like member located centrally of the plate-like members and coöperating with the reciprocatory member to fold the strip lengthwise and to eject the folded strip from between the centering members.

4. The combination of a movable head having a member provided with a rib lengthwise thereof, a plurality of stationary and reversible members forming an alining and centering means for a metal strip, and a yieldingly held intermediate member cooperating with the movable member and two of the fixed members to fold the strip lengthwise and to eject the folded strip from between the centering members.

5. The combination of a movable head having a member provided with a rib lengthwise thereof, means for adjustably holding said member and head, four fixed members forming an alining and centering means for a metal strip, said members being arranged in pairs with the edges of one pair being beyond the edges of the other pair and forming relatively different widths of channels, and a yieldingly held member coöperating with the movable member and two of the fixed members to fold the strip lengthwise and to eject the folded strip from between the fixed members.

6. The combination of a movable head having a member provided with a rib lengthwise thereof, a plurality of plate-like stationary and reversible members arranged in pairs and forming an alining and centering means for a narrow metal strip, and means including a pair of the plate-like fixed members coöperating with the movable member to fold the strip lengthwise.

7. The combination of a movable head having a member provided with a rib lengthwise thereof, means for giving the head a quick adjustment independent of the means for moving said head, a plurality of fixed members forming an alining and centering means for a metal strip, and a yieldingly held bar-like member having a straight lower edge coöperating with the movable member to fold the strip lengthwise and to eject the folded strip from between the centering member.

8. The combination of a reciprocatory member, a plurality of stationary and reversible blade-like members forming an alining and centering means for a narrow metal strip, a second member coöperating with the reciprocatory member and certain of the blade-like members to fold the strip lengthwise and to eject the folded strip from between the centering members, and springs for yieldingly forcing the second member toward the reciprocatory member.

9. The combination of a reciprocatory member, an adjustable fixed head, a plurality of fixed plates forming a channel lengthwise thereof and alining and centering means for a metal strip, bolts passing through the plates and head, collars on the bolts for spacing the plates, a second member located centrally between the plates and coöperating with the reciprocatory member to fold the strip lengthwise and to eject the folded strip from between said plates, and springs for yieldingly forcing the second member toward the reciprocatory member.

10. The combination of a reciprocatory member, a plurality of fixed plates adapted to be shifted in case of wear, and forming an alining and centering means for a metal strip, bolts passing through the plates, collars on said bolts for spacing the plates, and a second member coöperating with the reciprocatory member and certain of the plates to fold the strip lengthwise.

11. The combination of a reciprocatory member, four thin bar-like plates arranged in pairs and forming an alining and centering means for a narrow metal strip, means for adjustably holding said plates, a second member located centrally of the pairs of plates and coöperating with the reciprocatory member to fold the strip lengthwise and to eject the folded strip from between the centering members, and springs for yieldingly forcing the second member toward the reciprocatory member.

12. The combination of a member cut away to provide spaced parts, stationary and reversible thin metallic plates forming spaces of relatively different widths between said plates, a second member having a relative movement with respect to the first-mentioned member, rods having a slot-and-head connection with the second member, and springs tending to force the second member downward.

13. The combination of a member cut away to provide spaced parts, thin reversible metallic plates forming a space between the same, a second member having a relative movement with respect to the first-mentioned member, rods having a slot-and-head connection with the second member, springs tending to force the second member downward, a casing around the springs, a distillate containing cup-shaped cap for the casing, and nuts on the rods for limiting

the movement of the second member in one direction.

14. The combination of a member cut away to provide spaced parts, four thin metallic plates arranged in pairs and forming a space between the same, a second member located centrally of the pairs of plates and having a relative movement with respect to the first-mentioned member, rods connected to the second member, and springs arranged around the rods tending to force the second member downward.

15. The combination of a reciprocatory member cut away to provide spaced parts, thin metallic plates arranged in pairs with the lower edges of one pair located above the other and forming a channel between the same, a centrally located second member having a relative movement with respect to the reciprocatory member, rods having a slot-and-head connection with the second member, and means tending to force the second member toward the reciprocatory member.

16. The combination of a reciprocatory plate-like member having a rib cut away to provide spaced parts, thin metallic plates forming a channel between the same, a second member having a relative movement with respect to the rib member and provided with T-shaped slots along the same, rods having heads to fit the slots of the second member, and springs tending to force the second member toward the reciprocatory member.

17. The combination of a reciprocatory plate-like member having a rib cut away to provide spaced parts, thin metallic fixed plates forming a channel between the same, a second member having a relative movement with respect to the reciprocatory member and provided with T-shaped slots along the same, rods having heads to fit the slots of the second member, springs tending to force the second member downward, sleeves arranged around the springs, and nuts on the rods.

18. The combination of a reciprocatory plate-like member having a rib cut away to provide spaced parts, a block having a recess for the reciprocatory member, a clamping bar, screws for holding the clamping bar, screws for adjusting said reciprocatory member, and a second member having a relative movement with respect to the reciprocatory member.

19. The combination of a movable head having a member provided with a rib lengthwise thereof, and a plurality of stationary and reversible members coöperating with the movable head and forming channels of relatively different widths to serve as centering means for a narrow metal strip and bending means for the strip when coöperating with said movable member.

20. The combination of a vertically reciprocatory member provided with a rib lengthwise thereof, a plurality of stationary and reversible members arranged in pairs and forming channels of relatively different widths to serve as centering means for a narrow metal strip and lengthwise bending means for the strip when coöperating with said movable member, and a movable yieldingly held central member serving to eject the bent strip.

21. The combination of a vertically movable member provided with a rib lengthwise thereof, and four fixed members arranged in pairs with the edges of one pair located above the other, the outer pair serving as centering means for a narrow metal strip and the inner pair coöperating with the movable member to bend the strip lengthwise.

22. The combination of a movable member provided with a rib lengthwise thereof, four fixed plate-like members arranged in pairs with the edges of one pair located above the other, the outer pair serving as centering means for a narrow metal strip and the inner pair coöperating with the movable member to bend the strip substantially U-shaped lengthwise thereof.

23. The combination of a vertically movable member provided with a rib lengthwise thereof, four fixed members arranged in pairs in parallel relation with the edges of one pair located above the other, the outer pair serving as centering means for a narrow metal strip and the inner pair coöperating with the movable member to bend the strip substantially U-shaped lengthwise thereof, and a yieldingly held bar-like center member adapted to coöperate with the vertically movable member and to eject the bent strip.

This specification signed and witnessed this 23d day of November A. D. 1914.

CHARLES BURNHAM.

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