No. 893,427. PATENTED JULY 14, 1908.

G. L. BENNETT.

CENTER AND FEED GUIDE FOR PUNCHES.

APPLICATION FILED JAN. 3, 1906.

2 SHEETS—SHEET 1.

Fig. 1

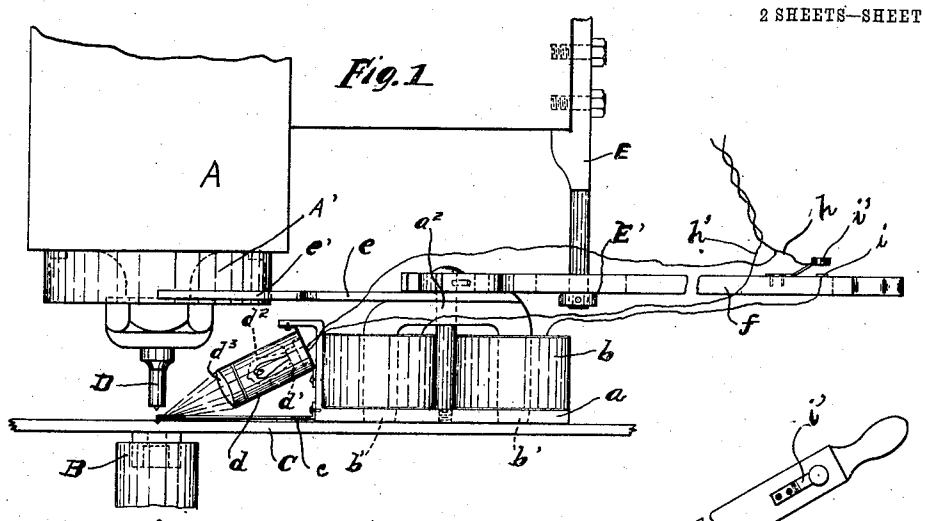


Fig. 2

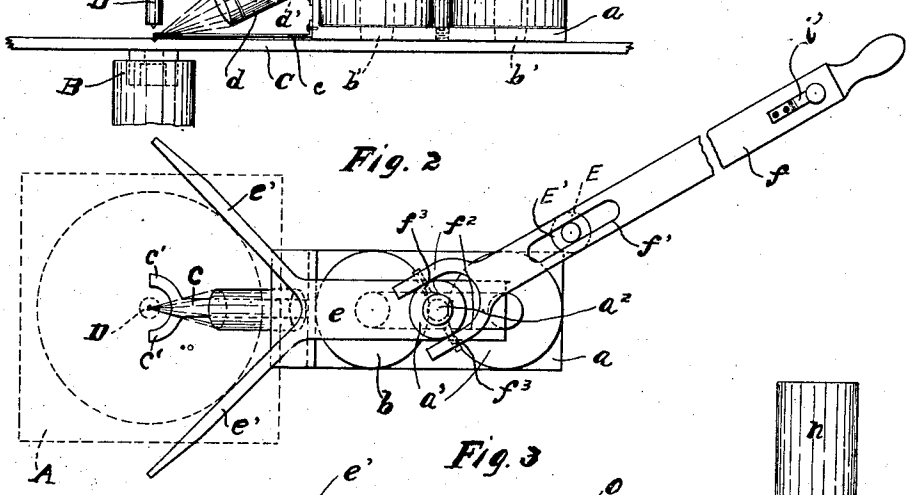


Fig. 3

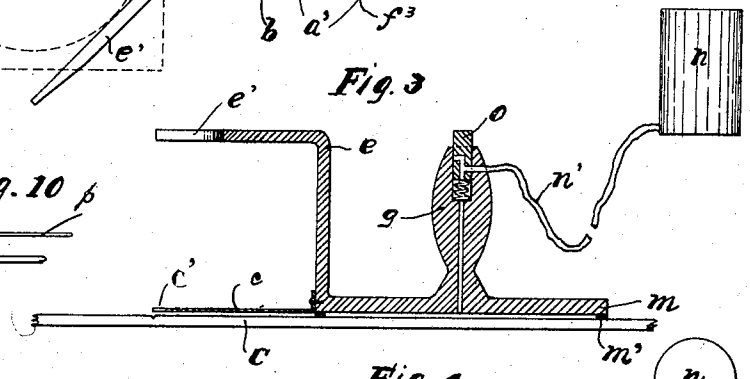


Fig. 10

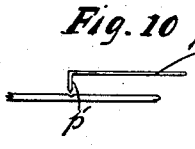


Fig. 4

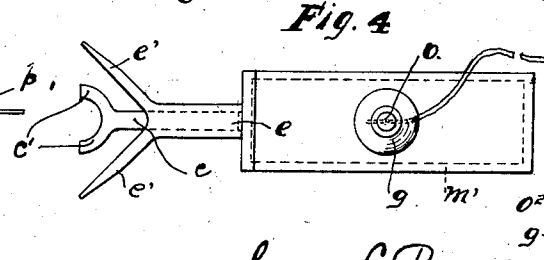


Fig. 11

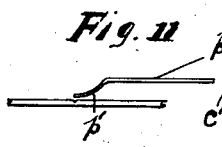
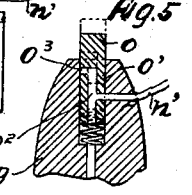


Fig. 5



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2 SHEETS—SHEET 2.

Fig. 6

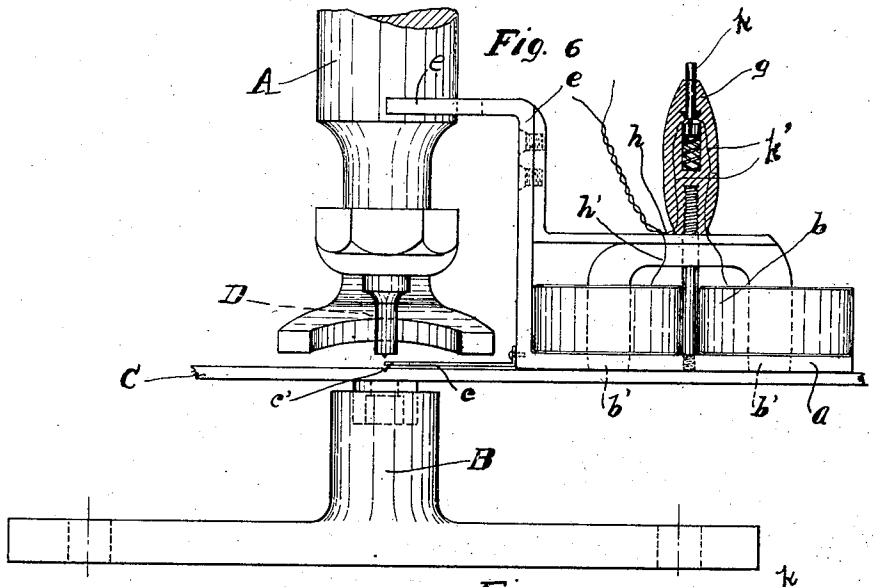


Fig. 9

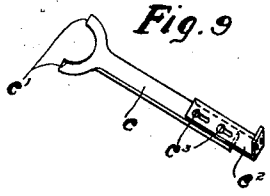


Fig. 7

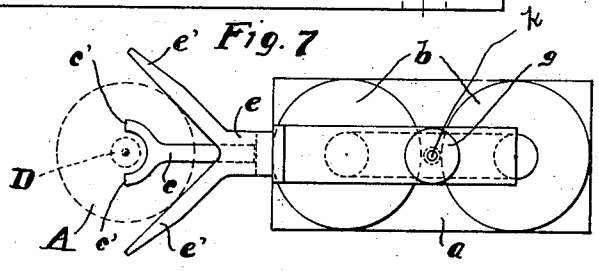
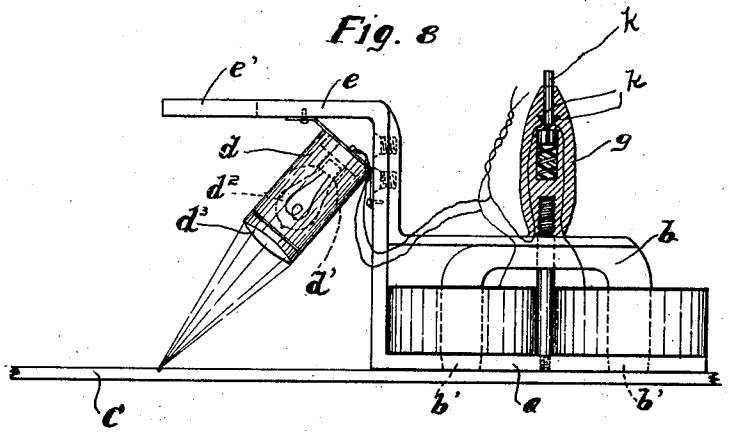


Fig. 8



WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE L. BENNETT, OF TRENTON, NEW JERSEY.

CENTER AND FEED GUIDE FOR PUNCHES.

No. 893,427. Specification of Letters Patent. Patented July 14, 1908.

Application filed January 3, 1906. Serial No. 294,383.

To all whom it may concern:

Be it known that I, GEORGE L. BENNETT, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Center and Feed Guides for Punches, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to center and feed guides for punches, and more particularly to a type of such as may be used for bringing a series of predetermined centers on a bar, sheet or plate accurately beneath the punch, successively.

The main object of the invention is to provide a center and feed guide for punches whereby any center may be accurately and quickly determined and the guide temporarily attached to the bar sheet or plate in a manner to permit the latter to be rapidly fed directly beneath the ram and its punch, at the same time establishing accurately such a relative position of the center on the bar, sheet or plate and the punch as to cause an axial alinement of said punch with said center.

A further object is to provide a guide of this character wherein means are provided for quickly and accurately establishing the proper relative position of the entire guide to a center, or finding the center.

A still further object is to provide a guide which may be quickly attached to and released from a bar, sheet or plate being punched, in order that it may be positioned relative to the next succeeding center while the ram is descending, or operating, thus permitting a rapid feed of the bar, sheet or plate.

A still further object is to provide a guide having a centering attachment whereby the mere bringing of the attachment into engagement with the ram or an abutment fixed relative thereto, for this purpose, will accurately accomplish the centering of a predetermined point on the bar, sheet or plate, with the punch.

A still further object is to provide a "finder" whereby the relation of the centering attachment to a center may be visually determined with precision.

A still further object is to provide a guide of this character wherein the controlling means, by means of which it is temporarily attached to and released from, the plate, will be so positioned as to be conveniently actuated by an operator without materially affecting the rapidity of handling.

A still further object is to provide a guide which may be conveniently used in connection with heavy work.

A still further object is to provide a guide wherein the various parts may be so assembled as to properly position the finder relative to the guide attachment. And a still further object is to provide a guide which is capable of use with various styles and sizes of punches without requiring material adjustment or re-adjustment of parts.

The invention consists primarily in providing a center and feed guide for a punch comprising a base, means whereby said base may be temporarily attached to a bar, sheet or plate, means whereby the position of said base relative to a center may be determined, and means adapted to accurately establish a definite position of said last mentioned means relative to a punch whereby said center will be alined with a punch; and in such other novel features of construction and combination of parts as are hereinafter set forth and described and more particularly pointed out in the claims hereto appended.

Referring to the drawings: Figure 1 is a side elevation of a center and feed guide embodying the preferred form of my invention; Fig. 2 is a plan view thereof; Fig. 3 is a sectional elevation of a modified form of the invention wherein the base is attached to a bar, sheet or plate, through the agency of a vacuum or partial vacuum; Fig. 4 is a plan view of the modification shown in Fig. 3; Fig. 5 is a detail view of the controller used in connection with the modification shown in Figs. 3 and 4; Fig. 6 is a side elevation of a still further modification adapted for use with lighter work than the form shown in Figs. 1 and 2; Fig. 7 is a plan view of the modification shown in Fig. 6; Fig. 8 is a side elevation of the modification shown in Figs. 6 and 7 with a modified form of finder; Fig. 9 is a detail view of the preferred form of finder, and Figs. 10 and 11 are detail views of modified forms of finders.

Like letters refer to like parts throughout the several views.

In the drawings, A indicates the ram of a punch; B, the die, and C a metal bar, sheet or plate to be punched. The punch proper is indicated at D.

It is customary in work of this character to lay out plates and mark the various centers to be punched, and in the following description, it is assumed that the plate is so marked with various centers, it being immaterial as to the regularity in the spacing of these centers.

In the embodiment of my invention shown in the drawings, *a* indicates a base, upon which, in the forms of the invention shown in Figs. 1 and 2, 6 and 7, and 8, is mounted an electro magnet *b* the ends *b'* of the core of which preferably project through said base so as to come into contact with the plate C.

Projecting forwardly of the base *a* is a center finder, the preferred form of which, see Fig. 9, comprises a stem *c* having divergently curved arms *c'* in close proximity to the bottom of said base, to permit the location of the center mark with relation to the center line of said stem, and the diametrically opposite ends of the arms *c'*, and the passage of the punch D therebetween without engagement therewith and injury thereto. To facilitate the assembling of the attachment, and its adjustment and re-adjustment, I preferably make this stem in two parts, one of which as c^2 is slotted to accommodate set screws c^3 carried by the other, forming a slip joint, and thus permit the regulation of the extent of projection of said finder. I preferably also provide an auxiliary or supplemental finder comprising a cylindrical casing *d* having a reflector *d'* and an incandescent lamp d^2 contained in and protected thereby, and a lens d^3 focusing the rays from said lamp at a point forwardly of said base, said casing being set at such an angle as to locate this point properly. If desired, this lamp may be used entirely independently of said main finder, as shown in Fig. 8, although I prefer to equip a guide with both so as to adapt it to both small and large work.

Carried by the base *a* and projected forwardly thereof is a centering attachment and feed guide *e* comprising a stem formed integrally with, or attached to said base *a* or the magnet *b*, having divergent arms *e' e'* adapted to engage the ram A of a punch, when said ram is cylindrical, or a cylindrical collar or abutment as A' carried thereby when it is angular or of a dimension unsuitable to coöperate with said guide attachment. The contact faces of these arms *e'* must be so positioned as to aline the center line of the stem thereof with a radius, or with a line passing through the center of the ram A. To insure accuracy, I preferably have these arms diverge at an angle of 90 degrees, although this is immaterial so long as a sufficient space is provided between them to insure their engagement with the abutment, or that of either of them, whether said abutment be the ram A or a substitute part. The apex of the angle between these arms being on the center line of the finder arms *c'*, or alined with the axis or focus point of the lens d^3, they will center said finder laterally of the punch and limit the quantity of feed when forced against the ram A or other abutment, and in assembling or re-adjusting, thereafter the finder may be adjusted until its arms *c'* or the focus point of the rays of the lamp, are on a line bi-secting said center line at a point directly beneath the center of the punch D. This arrangement of finder and centering attachment is common to all forms of my invention shown.

In the form of my invention shown in Figs. 1 and 2, I provide a lever handle *f* pivotally connected to a pendent arm E carried by the head of the punch, and to the base *a*, by means of which the guide and the plate with it, may be raised and fed with relation to the ram. To give greater latitude in the handling of the guide and plate, I provide the handle *f* with an elongated slot *f''* by means of which it is mounted on the arm E, the collar E' on said arm supporting the lever handle *f*, thus permitting it to rock laterally and vertically, and slide backwards and forwards. To compensate for these movements of said lever handle, I fork the end thereof at f^2 which forked end I attach to a rotary collar a^3 on a stem a^2 carried by the base *a*, by means of pivots f^3, the axes of which are substantially perpendicular to the axis of the collar a^3, forming a universal joint between the said lever and the base *a*.

In the modifications shown in Figs. 3 and 4, and 6 to 8 inclusive, to provide controlling means for the attachment and release of the base *a*, I lead one terminal wire *h* of the source of electrical supply to a point of the handle *f* or *g* convenient to the hand of the operator, and at that point provide any suitable make and break mechanism, or electrical switch, as a contact plate *i* and spring tongue *i'*, Figs. 1 and 2, or opposed spring contacts *k k* and a depressible spring pressed contact plunger *k'*, Figs. 6 to 8 inclusive, the other terminal *h'* being connected directly with the magnet winding. I provide this normally open circuit, preferably, as it is more economical and tends to facilitate the use of the feed guide, but this is a mere matter of mechanical detail and may be varied to meet the demands of special operators or uses. The wires *h h'* are flexible and connected to any convenient source of energy in any desired manner, thus permitting unrestricted movement of the attachment.

The electrical fittings of the lamp *d'* will not be described in detail, the same being well known in the arts.

In the modification shown in Figs. 3 and 4, the means for attaching or releasing the base *a* to or from the plate C comprises a vacuum chamber formed on the bottom of said plate

by means of a box plate m, the downwardly projected edges of which are faced with a strip of leather, rubber or other suitable packing material m'. The stem a^2 in this form of the invention is tubular and projects into and communicates with said chamber, the upper part thereof being in communication with a vacuum tank or pump as n by means of a flexible tube n' and a chamber in the handle g. Mounted in the said chamber is a three way, spring pressed plunger valve o, the ways o', o^2 and o^3 of which respectively are adapted to be caused to register with the inlet of the vacuum tube n', to communicate with the bore of the stem a^2, and to communicate with the atmosphere to admit air under normal pressure to said chamber. The valve o is a fairly tight fit, to avoid leakage, and the ways o' and o^3 are so disposed relative to each other that when one is operative, the other is inoperative by being closed by the handle g.

In Figs. 10 and 11, I have shown modifications of the center finder comprising respectively a straight stem or shank p and a downwardly projected index finger p' adapted to be fixed upon the center mark. These two forms differ merely in that in one form the index finger projects at right angles to the shank and in the other, it projects downwardly and forwardly at an angle therefrom.

In punching work on bars, sheets and plates, ordinarily, the plates, etc., are first laid out and the centers of the various holes to be punched marked before the plate is ready for the punch. The workman then feeds the plate, etc., towards the punch proper, locating the center mark as nearly as possible directly beneath the punch, relying entirely upon his skill and a visual comparison of the punch and the center mark positions, to determine when he has the plate, etc., properly positioned. The absence of guides and stops necessitates considerable adjustment of the plate, and this with the care required in feeding the plate, etc., results in a material increase in the cost of the operation and a corresponding decrease in the capacity of a punch; and this is particularly true when the centers are irregularly spaced.

With the herein described center and feed guide, the center mark may be quickly and precisely determined, and the plate, etc., fed rapidly up to the punch without exercising any particular degree of care or skill, automatically and accurately positioning the center mark directly under the punch and in axial alinement therewith; and this operation may be repeated rapidly to feed the plate, etc., to the next center mark irrespective of the distance between these marks. The operation of my center feed and guide to accomplish this result aforesaid, is substantially as follows: In the preferred form of the invention, the lever handle f is used to bodily raise the base a and its various appurtenances, and swing it toward the first center mark on the plate C, to be punched, the universal connection between said lever and the stem a^2 permitting a substantially direct movement of the base. The finder c in this manner is brought to position with the center mark alined with the ends of the arms c' and the center line of the shank c thereof, and substantially alined with the ends of the arms e', this being the exact center of the semi-circle formed by said arms. As the plate is necessarily some distance from the operator, the auxiliary finder or lamp d', aids materially in locating this center mark precisely, the rays therefrom being so focused as to fall directly upon the mark when the entire attachment is properly positioned. This light also dispels any shadows which might be cast by any part of the apparatus tending to obscure the center mark. It is to be observed, however, that when the plate is not handled at a distance, as great as that referred to above, the light may be dispensed with, see Figs. 3 and 4, 6 and 7, or if desired, it may be used alone. I prefer to combine these two forms of finder, however, to give more or less universality to the attachment. In the remaining forms of my invention shown, the handle g is used to raise and place the guide with relation to the plate C. While positioning the attachment by means of the finder, the circuit is necessarily open. When, however, the attachment is positioned, the base a is dropped upon the plate, and the circuit at once closed by the make and break mechanism secured to the handle lever f, or handle g, energizing the magnet b and attaching the guide to the plate C, the protruding ends b' of said magnet insuring a good contact. This manner of attachment of the base a temporarily to the plate C is identical in all forms of the invention shown, excepting that illustrated in Figs. 3 to 5 inclusive, in which form, this is accomplished by depressing the plunger valve o until the way o' therein registers with the inlet of the tube n', thereby creating a more or less imperfect vacuum in the box m. This results in the base a setting firmly on the plate C. It is to be observed that when the plunger valve o is depressed, the way o^3 thereof is closed by the handle g.

The base a having thus been attached to the plate, the guide and with it the plate C is brought up to the punch D until the arms e' e' of the guide attachment e contact with the ram A or the cylindrical collar A' thereon. In Figs. 1 and 2, the lever f is swung vertically and laterally on the collar E' and the support E to raise the base a and with it the plate C sufficiently to permit the feed, and if the arc described by said lever handle in coming to place is on too short a radius, said

lever may be moved directly toward the punch to an extent limited by the length of the slot f'. In the remaining forms of the invention, the handle g is utilized to give this feeding movement. As the arms e' contact with the ram A or collar A', the angle between said arms is accurately alined with relation to the center of said ram or collar, and the center line of the finder c, being coincident with a line bi-secting said angle, will also be so alined with relation to said punch D. If these arms e' form two sides of a rectangle, or of a right angled triangle, the length of which are the same as the diameter of the said ram or collar, and it is preferable to make them so, a straight line connecting the ends of said arms, or the third side of the triangle, will intersect the center of the ram and its contained punch, and be coincident with the ends of the arms c', thus insuring a perfect centering of the center mark with the punch.

The position of the center mark being coincident with the point of intersection of the center line of the finder, which is alined with a line bisecting the angle between the arms e', and a straight line extending from arm e' to arm e' diametrically of the ram A or collar A', and at right angles to said center line, this position will be the exact center of a circle of any radius inscribed from this center, and hence of the punch D. Hence, it is apparent that so long as the center line of the finder bisects the angle between the arms e' e' or is accurately alined with the center line of said guide attachment, and said finder is so positioned as to cause the index end or focus point thereof to be substantially directly axially below the center of the ram A or collar A', or the contained punch D, irrespective of the exact contour of the arms e', said arms will, when they are both properly in engagement with said ram or collar, center said center mark with the axis of the punch.

The guide may be brought to this position very rapidly, it being merely necessary to force the arms e' to place, they aiding in the further adjustment by a sliding contact with the ram or collar.

The plate having been fed to position, the punch is tripped and according to the nature of the work, the guide is either allowed to remain attached to the work to prevent any shifting of the plate, or the magnet circuit is instantly opened, or the valve plunger o permitted to spring up to admit air under atmospheric pressure to the box m, to release the base a and permit the whole device to be shifted to the next center, and located with relation thereto preparatory to the next feeding operation. The rapidity with which this shifting can be effected is such as to practically have the operator prepared to feed the plate forward by the time it is stripped from the punch, and to have the plate positioned for the next stroke of the ram by the time the punch has returned to normal.

It will be observed that the guide not only permits of a rapid feeding operation, with the resultant increase in the capacity of both the machine and the operator, but that the automatic centering of the center mark with the punch insures uniform accuracy and precision.

The form of the invention embodying a magnet as the attaching means is preferred because of its reliability and the convenience of making electrical connections in a shop, but in connection with light work or that not susceptible to magnetic influence, the vacuum chamber may be employed.

I believe it to be broadly new to provide a center feed and guide for punches which may be temporarily attached to and fed forward with a plate to position the plate relative to the punch, and then released and brought back and attached relative to a succeeding point to be punched, so as to insure a rapid accurate feed of the plate, and I intend to claim such broadly. It is not my intention, therefore to limit the invention to the precise details of construction shown in the drawings, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent is:

1. In a center and feed guide for punches, a base, means whereby said base may be temporarily attached to a bar, sheet or plate, means whereby the position of said base relative to a center may be determined, and a centering member adapted to abut against a punch member and to accurately establish a definite relation of said centering member relatively to a punch, whereby said center will be alined with such punch.

2. In a center and feed guide for punches, a base, means whereby said base may be temporarily attached to a bar, sheet or plate, means whereby the position of said base relative to a center may be determined, and a forwardly projected guide attachment having divergent arms adapted to engage an abutment fixed relative to the punch whereby said center will be alined with such punch.

3. In a center and feed guide for punches, a base, means whereby said base may be temporarily attached to a bar, sheet or plate, means whereby the position of said base relative to a center may be determined, and a forwardly projected guide attachment having arms diverging at an angle, a line bisecting said angle coinciding with the center line of said attachment, said arms being adapted to engage an abutment fixed relative to the punch whereby said center will be alined with such punch.

4. In a center and feed guide for punches, a base, means whereby said base may be temporarily attached to a bar, sheet or plate, a center finder projected forwardly of said base whereby the position of said base relative to a center may be determined, and a centering member projected forwardly of said base adapted to abut against a punch member and to accurately establish a definite relation of said centering member relatively to a punch whereby said center will be alined with such punch.

5. In a center and feed guide for punches, a base, means whereby said base may be temporarily attached to a bar, sheet or plate, a center finder comprising a stem or shank having divergently curved arms projected forwardly of said base whereby the position of said base relative to a center may be determined, and means adapted to accurately establish a definite relation of said last mentioned means relatively to a punch whereby said center will be alined with such punch.

6. In a center and feed guide for punches, a base, means whereby said base may be temporarily attached to a bar, sheet or plate, a center finder comprising a bi-part stem or shank having divergently curved arms projected forwardly of said base, and means whereby said parts may be adjusted relative to each other, whereby the position of said base relative to a center may be determined, and means adapted to accurately establish a definite relation of said last mentioned means relatively to a punch whereby said center will be alined with such punch.

7. In a center and feed guide for punches, a base, an electro magnet carried thereby, electrical connections between said magnet and a source of electrical supply, and a make and break mechanism, whereby said base may be temporarily attached to a bar, sheet or plate, means whereby the position of said base relative to a center may be determined, and a centering member adapted to abut against a punch member and to accurately establish a definite relation of said centering member relatively to a punch, whereby said center will be alined with such punch.

8. In a center and feed guide for punches, a base, an electro magnet carried thereby, electrical connections between said magnet and a source of electrical supply, a handle carried by said base and a make and break mechanism on said handle whereby said base may be temporarily attached to a bar, sheet or plate, means whereby the position of said base relative to a center may be determined, and a centering member adapted to abut against a punch member and to accurately establish a definite relation of said centering member relatively to a punch, whereby said center will be alined with such punch.

9. In a center and feed guide for punches, a base, means whereby said base may be temporarily attached to a bar, sheet or plate, means whereby the position of said base relative to a center may be determined, means adapted to accurately establish a definite relation of said last mentioned means relatively to a punch, whereby said center will be alined with such punch, a lever handle adapted to be fulcrumed on the frame of the punch and pivotal connections between said lever and said base.

10. In a center and feed guide for punches, a base, means whereby said base may be temporarily attached to a bar, sheet or plate, means whereby the position of said base relative to a center may be determined, means adapted to accurately establish a definite relation of said last mentioned means relatively to a punch, whereby said center will be alined with such punch, a lever handle having an elongated slot therein whereby it may be fulcrumed on the frame of the machine, and pivotal connections between said lever and said base.

11. In a center and feed guide for punches, a base, means whereby said base may be temporarily attached to a bar, sheet or plate, means whereby the position of said base relative to a center may be determined, means adapted to accurately establish a definite relation of said last mentioned means relatively to a punch, whereby said center will be alined with such punch, a lever handle having an elongated slot therein whereby it may be fulcrumed to the frame of the machine, a stem carried by said base, a rotatable collar thereon, and pivotal connections perpendicular to the axis of said collar, between said collar and said lever.

12. In a center and feed guide for punches, a base, an electro magnet carried thereby, electrical connections between said magnet and a source of electrical supply, and a make and break mechanism whereby said base may be temporarily attached to a bar, sheet or plate, a center finder projected forwardly of said base and an electric lamp projecting its rays upon said finder, whereby the position of said base relative to a center may be determined, and means adapted to accurately establish a definite relation of said finder relatively to a punch whereby said center will be alined with such punch.

13. In a center and feed guide for punches, a base, an electro magnet carried thereby, electrical connections between said magnet and a source of electrical supply and a make and break mechanism whereby said base may be temporarily attached to a bar, sheet or plate, a center finder projected forwardly of said base, a casing carried by said base, an electric lamp and reflector contained within and protected by said casing, suitable connections for said lamp, a lens mounted in said casing focusing the rays of said lamp with relation to said finder, whereby the position

of said base relative to a center may be determined, and means adapted to accurately establish a definite relation of said finder relatively to a punch whereby said center will be alined with such punch.

14. In a center and feed guide for punches, a base, an electro magnet carried thereby, electrical connections between said magnet and a source of electrical supply, and a make and break mechanism whereby said base may be temporarily attached to a bar, sheet or plate, a center finder projected forwardly of said base and an electric lamp projecting its rays upon said finder, whereby the position of said base relative to a center may be determined, means adapted to establish a definite relation of said finder relatively to a punch whereby such center will be alined with such punch, a lever handle having an elongated slot therein whereby it may be fulcrumed on the frame of the machine, and pivotal connections between said lever and said base.

15. In a center and feed guide for punches, a base, an electro magnet carried thereby, electrical connections between said magnet and a source of electrical supply, and a make and break mechanism whereby said base may be temporarily attached to a bar, sheet or plate, a center finder projected forwardly of said base whereby the position of said base relative to a center may be determined, and a forwardly projected guide attachment having arms diverging at an angle, a line bisecting said angle coinciding with the center line of said attachment and of said finder, said arms being adapted to engage an abutment fixed relative to the punch whereby said center will be alined with such punch.

In witness whereof, I have hereunto affixed my signature, this 26th day of December, 1905, in the presence of two witnesses.

GEORGE L. BENNETT.

Witnesses:

F. T. WENTWORTH,

WM. H. BLAIN.