E. M. COBB.

MULTIPLE PUNCHING MACHINE.

APPLICATION FILED FEB. 5, 1915.

1,243,656.

Patented Oct. 16, 1917.

3 SHEETS—SHEET 1.

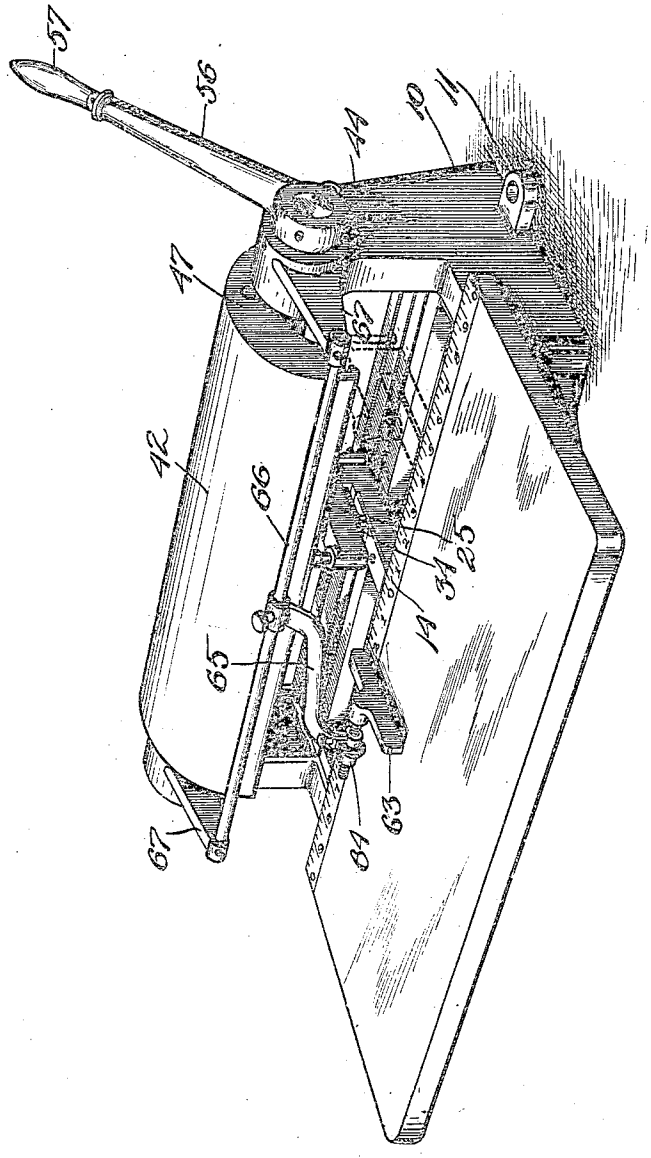


Fig. 1.

Witnesses:

Louise A. Jordan.

Marguerite M. D'Arcy

Inventor.

Elmer M. Cobb,

by Clyde L. Rogers

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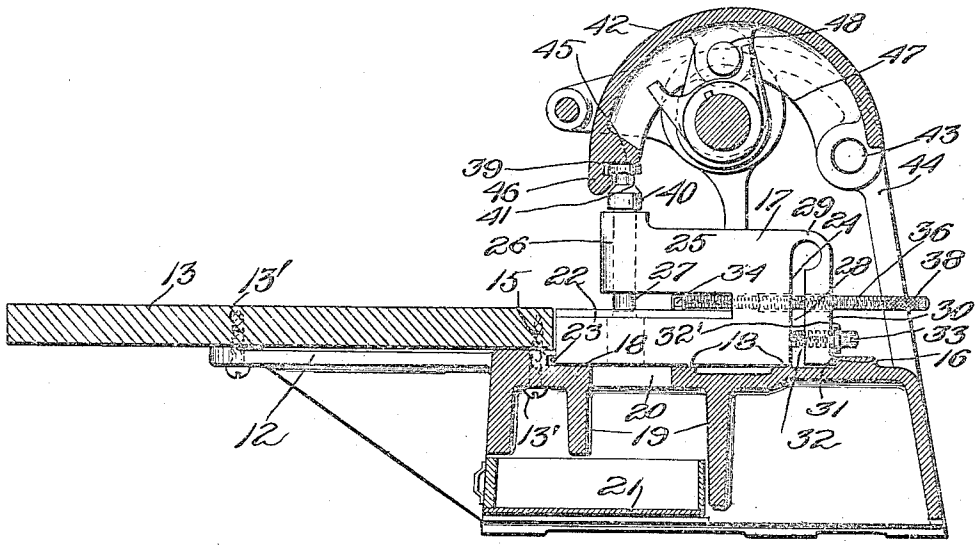


Fig. 2

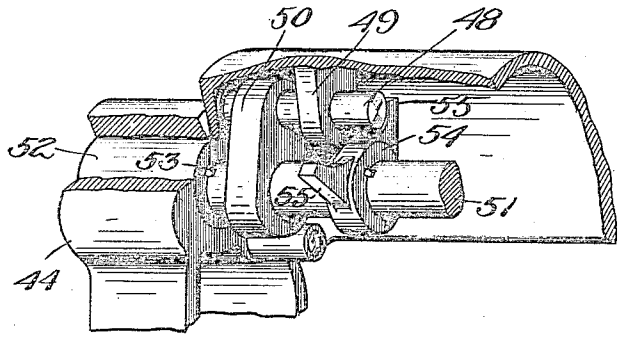


Fig. 3

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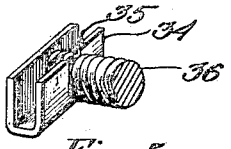


Fig. 5

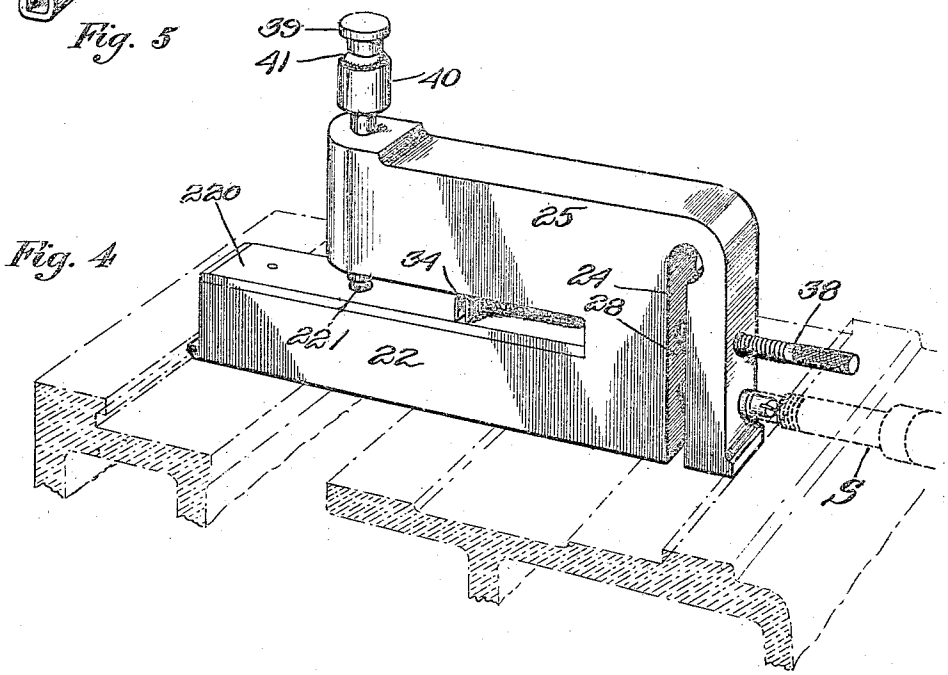


Fig. 4

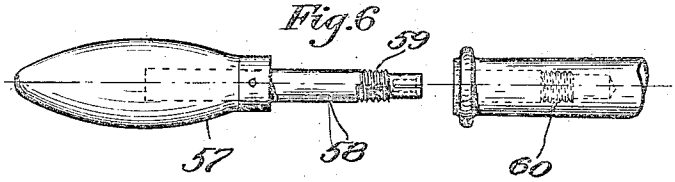


Fig. 6

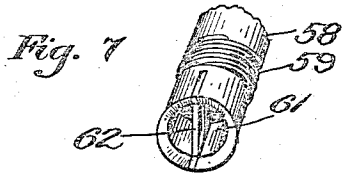


Fig. 7

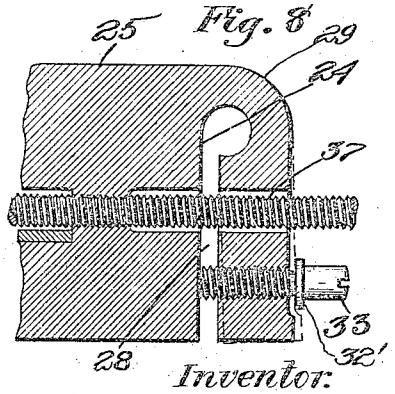


Fig. 8

Witnesses:

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UNITED STATES PATENT OFFICE.

ELMER M. COBB, OF SOUTH PORTLAND, MAINE, ASSIGNOR TO SOUTHWORTH MACHINE COMPANY, OF PORTLAND, MAINE, A CORPORATION OF MAINE.

MULTIPLE PUNCHING-MACHINE.

1,243,656. Specification of Letters Patent. Patented Oct. 16, 1917.

Application filed February 5, 1915. Serial No. 6,281.

To all whom it may concern:

Be it known that I, ELMER M. COBB, a citizen of the United States, and resident of South Portland, county of Cumberland, State of Maine, have invented an Improvement in Multiple Punching-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts in each of the several views.

This invention relates to punching machines and particularly to a type of machine well adapted for manual operation, and adapted to operate either one or a selective plurality of variably spaced punches simultaneously and by the same operating mechanism. One important object of the invention is to provide a machine wherein punch heads bearing any desired type of punch may be quickly and easily adjusted and clamped in operative position in the machine, the organization being such as to permit a selective plurality of punch heads to be adjusted in coöperative relation in the machine, and spaced variably apart according to the requirements of the work in hand. A further object is to provide an organization adapted to hold the punches rigidly and strongly in coöperative relation to the work, and with an operating mechanism adapted to impart a powerful stroke that is evenly applied to the several punches, where several are used, with a relatively small application of power. A further object is to provide an operating mechanism adapted to impart a powerful stroke evenly applied to the several punches with a rigid unyielding pressure impulse on each punch from the source of power application. The foregoing and other objects and features of the invention will be better understood from the following detailed description taken in connection with the accompanying drawings and will be thereafter pointed out in the appended claims.

Referring to the drawings:

Figure 1 is a perspective view showing a preferred embodiment of my improved machine;

Fig. 2 is a transverse vertical section thereof;

Fig. 3 is a view in perspective showing parts of the operating mechanism, covering parts being broken away;

Fig. 4 is an enlarged perspective showing one of the punch heads with a fragment of the bed to which it is secured, in outline;

Fig. 5 is a fragmentary perspective showing the work gage in detail;

Fig. 6 is an elevation showing the detachable operating handle;

Fig. 7 is a fragmentary perspective of the end of said handle detached; and

Fig. 8 is a sectional detail showing the means for clamping a punch head to the bed.

A suitable bed or base support 10 which may have perforated ears 11 for securing it in place, has forwardly projecting brackets 12 supporting a work table 13 secured thereto by screws 13′, the rear edge of which may be suitably graduated as indicated at 14. Just back of this table the bed is formed with an undercut ledge 15 extending through most of the length thereof, and near its back with a parallel ledge 16, these ledges constituting coöperating portions of a slide way on which the punch heads are adjustable, one of these heads being indicated at 17 and typifying any desired number within the capacity of the machine. The base between the ledges 15, 16 is formed with bearing portions 18 of substantial extent on which the punch heads are supported, these being stiffened by downwardly extending vertical ribs 19 with an intermediate space 20 through which the punchings may fall into a receiving receptacle 21. Each punch head is formed with a base portion 22 of block form adapted to rest on the bearing portions 18 and equipped with a toe 23 adapted to engage with the undercut ledge 15. At the rear of this base portion an upright portion 24 integral therewith has a forward extension 25 spaced from the base 22 and provided with a vertical passage 26 through which is slidably fitted the punch 27. The upright portion 24 of the punch head at its rear is recessed vertically from its bottom to near its top as seen at 28, this recess being of some little width all the way up but considerably enlarged near the top to form a yielding neck 29 with a thicker slab portion 30 depending therefrom. This

depending portion 30 is formed at its bottom with a bearing face 31 adapted to engage with the ledge 16. The punch head so constituted is formed to slide easily along its slide ways so as to bring it to any desired position for operation; for clamping it in a selective adjusted position a screw bolt 32 is threaded through depending portion 30 and equipped with a kerf head 33 whereby it may be engaged to turn it up so that its forward end will impinge on the face of the main upright portion 24 at the side of the recess 28. As the screw 32 is turned up after this impingement the extension 30 will be sprung outward causing the face 31 to bear against the ledge 16 and this reacting against the ledge 15 at the forward portion of the head will clamp the head securely in place with a capability of being instantly released for other adjustments by turning back said screw 32. The screw 32 is formed with a stop flange 32′ back of the screw threads thereon, this being for the purpose of engaging the extension 30 to prevent the screw from being turned in far enough to spring out said extension to a point that might cause breakage of the neck 29. Means is provided to serve as a gage for the material to be punched as it is inserted between the base portion 22 and the overhanging portion 25 of the punch head and for this purpose a gage member 34 is fitted to slide in the space between these parts. This gage member may be formed as best seen in Fig. 5 of a U-shaped stamping with a recess 35 at one side thereof to receive a reduced neck at the end of an adjusting screw rod 36 which is threaded through the back of the punch head and extends through an enlarged passage 37 therefor in the depending spring portion 30. This screw rod may be provided with any suitable means shown as a knurled head 38 whereby it may be readily turned for adjustment.

For coaction with the punch 27 the base portion 22 may be provided with a hardened die plate 220 having a hole 221 therethrough of a size to permit the punchings to be forced therethrough by the punch 27. The punch or punches 27 are shown as equipped with an enlarged head 39 with a hub 40 spaced therefrom and presenting an outer conical face 41. For operatively engaging the punch or punches a lever arm 42 is journaled at 43 to uprights 44 extending from the rear portion of the base 10. The width of the arm 42 extends substantially the full distance between the uprights 44 and along the entire extent of its forward edge it is formed with a presser face 45 adapted to engage the tops of the punches, and with a hook portion 46 formed to engage the reduced neck portion between the end 39 and the hub 40. The cross section of this punch engaging forward edge of the arm 42 is uniform throughout its extent and hence the punch remains in operative engagement therewith as the head 17 is adjusted along the bed. The arm 42 is preferably of a curved, substantially semi-cylindrical form in cross section with the fulcrum 43 at one side thereof, and the punch engaging face 45 approximately diametrically opposite. Intermediate these sides and housed within the concavity of the arm so as to be protected and concealed thereby in use is the operating mechanism for swinging said arm to impart punching movements. The arm 42 is also formed at its ends with inwardly extending shroud flanges 47 which serve the three-fold function of stiffening said arm, of affording means for applying power thereto, and of further housing and inclosing the operating mechanism. At each end of the arm 42 and substantially central of the concavity thereof are mounted pins 48 engaged at one end through the shroud flanges 47 and at their other ends through ears 49 depending within said arm. These pins are operatively engaged by links 50 whose other ends are mounted on a stout shaft 51 extending the length of the machine and journaled in the uprights 44. As a means for imparting a requisite throw to the links 50 and hence to the punches, the shaft 51 has fixed at its ends where it is journaled in the uprights 44, eccentrics 52, these eccentrics being held rigid with the shaft as by means of suitable keys 53 and journaled to turn in bearings in said uprights. Means may be provided whereby the throw of the shaft 51 in each direction may be positively limited so that it may not pass the uppermost and lowermost limits of throw as effected by the eccentrics 52. For this purpose I may provide a yoke stop member 54 fixed to shaft 51 and with projections 55 spaced apart so as to engage an extension of pin 48 at the proper point. The shaft 51 has keyed or otherwise fixed thereto at one end an operating arm 56 with a handle 57 at the end thereof. The handle 57 is preferably removably fitted to the arm 56 having for this purpose a reduced extension 58 equipped with screw threads 59 adapted to fit into a socket in the end of said arm equipped with operative screw threads 60. The end of this detachable handle 57 is recessed as seen at 61 and provided with a transverse blade 62. The purpose of this is to permit said handle to be readily removed and used as a screw driver for engaging the kerf end 33 of the screw 32 as seen at S when said screw is to be operated, the recess 61 and blade 62 being of suitable dimension for this purpose. A gage piece 63 is fitted to slide along the table 13 and for this purpose it is held with a screw and nut adjustment 64 at the end of an arm 65 slidably fitted to a rod 66 held

by arms 67 projecting forwardly from the uprights 44 and rigid therewith. Thus by adjustment of this gage with reference to the scale 14 the work may be accurately positioned with reference to the punch, it being understood that the punch head will be likewise adjusted along its ways with reference to said scale which may conveniently be graduated each way from a central zero point as shown. This gage device therefore in conjunction with the adjustable back gage 34 permits the holes to be punched accurately in any part of the material desired.

This provision for ready and accurate adjustment of the punch head or heads and the material relative to each other I consider to be one distinguishing characteristic of the invention. A further important characteristic is the construction of the punch operating arm 42 which in its arcuate form as set forth presents a rigid unyielding presser face that is absolutely even along the entire extent thereof, while the form of said arm as noted serves as a housing and container for the operating mechanism. It is to be noted that the operating means comprising the shaft 51 with its eccentric sleeve 52 is adapted to impart a powerful punching pressure with a minimum of power application, which punching pressure gradually and evenly increases to a maximum by reason of the particular setting of the eccentric as shown as the punching operation is being completed. I also consider the construction of the punch heads 17 with the described provision for clamping adjustment thereof to be a valuable and important feature of invention, and the use of this is not to be understood as limited to coöperation with the other specific features set forth. I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

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

1. Punching apparatus, comprising a bed, a punch operating lever arm fulcrumed thereto, said arm presenting a punch engaging face of substantial width extending along the length of said bed, and a punch head with a punch fitted therein adjustably fitted to said bed to be engaged by said face at adjustable selective points therealong to operate on work at different points along the length of said bed and at variably spaced distances apart.

2. Punching apparatus, comprising a bed, a relatively wide punch operating arm fulcrumed thereto, said arm having at one end thereof a punch engaging face of substantial extent along the length of said bed, and a punch head adjustably fitted to ways of said bed having a punch slidably fitted therein adapted to be engaged by said punch engaging face throughout the range of adjustment of said punch head along the bed to operate on work at different points along the length of said bed and at variably spaced distances apart.

3. Punching apparatus, comprising a bed, a punch operating arm curved in cross section, fulcrumed at one end to said bed and formed with a punch engaging face at its other end, operating mechanism housed within the hollow of said arm and operatively engaged therewith, and a punch mounted to be engaged by said punch engaging face of said arm.

4. Punching apparatus, comprising a bed, a relatively wide punch operating arm curved to approximately a semi-circle in cross section, fulcrumed at one end to said bed and formed with a punch engaging face of substantial extent at its other end, operating mechanism housed within the hollow of said arm and operatively engaged therewith, and a punch mounted to be engaged by said punch engaging face of said arm, and adjustable on said bed.

5. Punching apparatus, comprising a bed, a relatively wide punch operating arm fulcrumed at one end to said bed and formed with a punch engaging face of substantial extent at its other end, said arm being curved in cross section with stiffening flanges at its sides, operating mechanism housed within the hollow of said arm and engaged therewith, and a punch head slidably fitted to ways of said bed underneath said arm and bearing a punch to be engaged by said arm throughout the range of adjustment of said head.

6. Punching apparatus, comprising a bed, a relatively wide punch operating arm fulcrumed thereto at one end and having a punch engaging face of substantial extent at its other end, said arm being of substantial curvature in cross section and presenting its concave side toward said bed, operating mechanism housed within the hollow of said arm and connected thereto, and a punch head carrying a punch to be engaged by said arm, said punch head being slidably fitted to ways of said bed and being covered by said arm throughout its range of adjustment.

7. Punching apparatus, comprising a bed, a punch operating arm fulcrumed thereto and presenting a punch engaging face, operating mechanism consisting in a manually operable shaft having eccentrics fixed at its end portions, said eccentrics being journaled in bearings of said bed, link connections from said shaft to said arm, and a punch mounted on said bed to be engaged by said arm.

8. Punching apparatus, comprising a bed,

a punch operating arm fulcrumed thereto and presenting a punch engaging face, operating mechanism consisting in a manually operable shaft having eccentrics fixed at its end portions, said eccentrics being journaled in bearings of said bed, link connections from said shaft to said arm, means for limiting the movement of said shaft in each direction at the limits of throw of said eccentrics, and a punch mounted on said bed to be engaged by said arm.

9. Punching apparatus, comprising a bed equipped with punch operating mechanism and a punch head having a punch slidably fitted thereto to be engaged by said mechanism, said bed being formed with a slide way for said punch head with ledges at opposite sides thereof, and said punch head having provision for internal expansion to be pressed into clamping engagement with said ledges in selective adjustments along said way.

10. Punching apparatus, comprising a bed equipped with punch operating mechanism and a punch head having a punch slidably fitted thereto to be engaged by said mechanism, said bed being formed with a slide way for said punch head with ledges at opposite sides thereof, and said punch head having a portion slitted with respect to the body thereof for spring action with a screw bolt mounted to press said slit portion outward whereby said punch head is clamped to said ledges in selective adjusted positions.

11. Punching apparatus, comprising a bed, a relatively wide punch operating arm fulcrumed thereto toward the rear thereof with a punch engaging face at its front end, a punch head bearing a punch slidably fitted to said bed underneath said arm to be operatively engaged thereby at different points, a table mounted at the front portion of said bed with a scale along the rear edge thereof, and a gage adjustably mounted to be moved over said table, said gage and said punch head being coöperatively adjustable to determine the punching position on the material.

12. Punching apparatus, comprising a bed, a punch head slidably fitted to ways thereof, said punch head consisting in a block having a portion formed to spring for engaging said ways, and a clamping screw for causing said portion to spring, said screw having a stop flange arranged to prevent excessive springing of said portion, a punch slidably fitted in said punch head, and means for operating the same.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ELMER M. COBB.

Witnesses:

GEORGE H. WEEKS,

CLIFFORD WILSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."