M. F. CARR.

PUNCHING PRESS.

APPLICATION FILED AUG. 4, 1917.

1,259,359.

Patented Mar. 12, 1918.

3 SHEETS—SHEET 1.

Fig. 1.

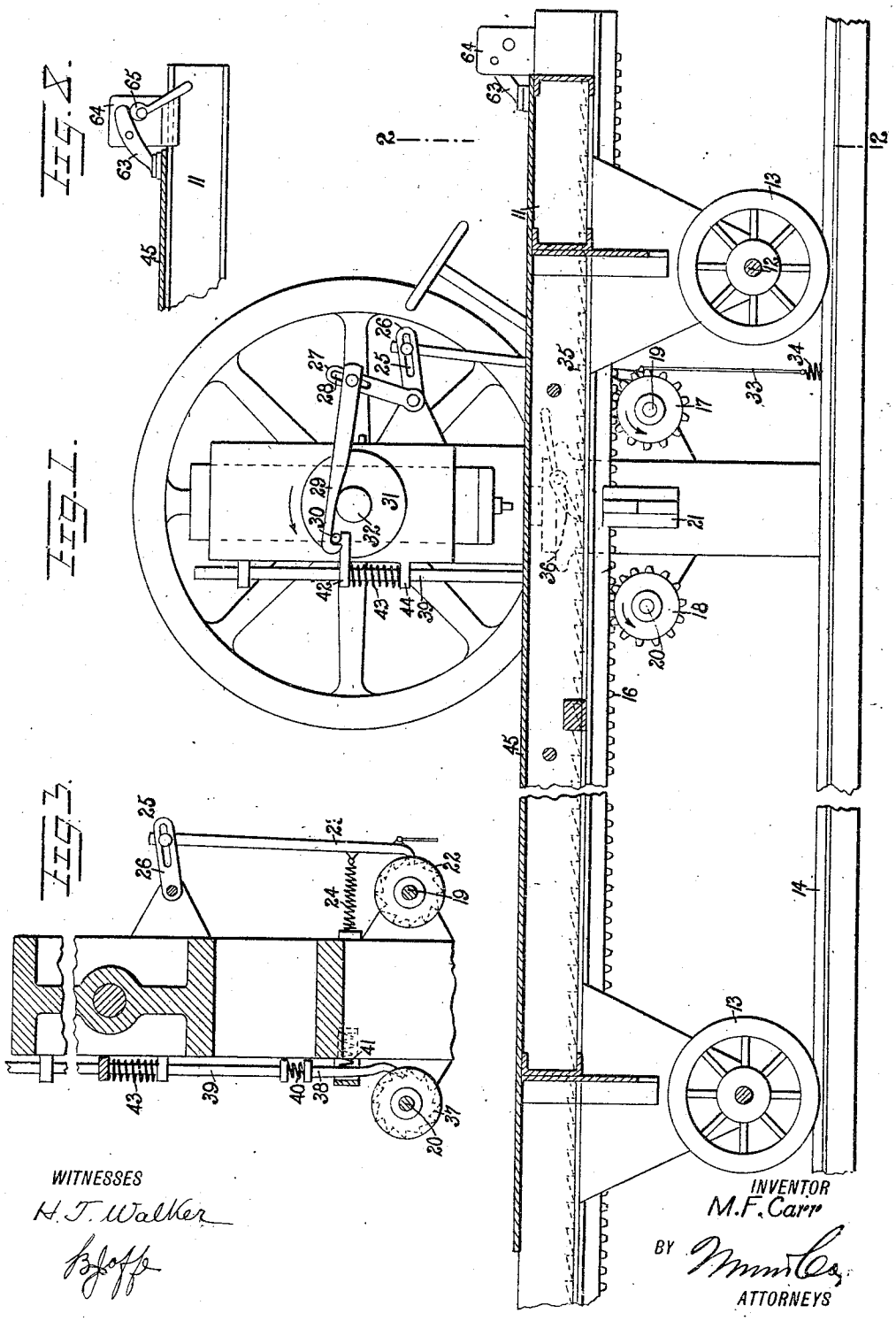


Fig. 2.

WITNESSES

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3 SHEETS—SHEET 2.

Fig. 2.

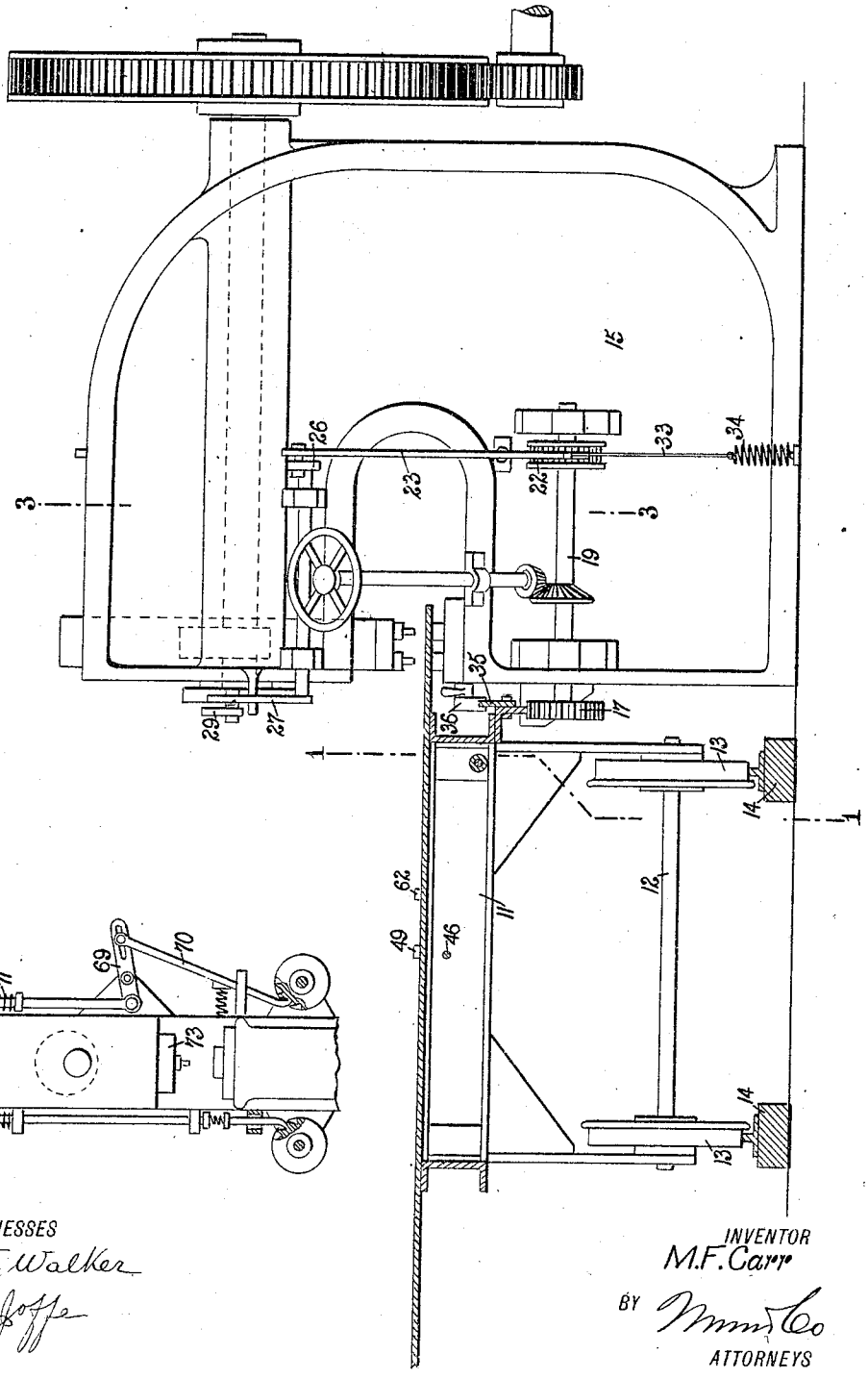


Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 4.

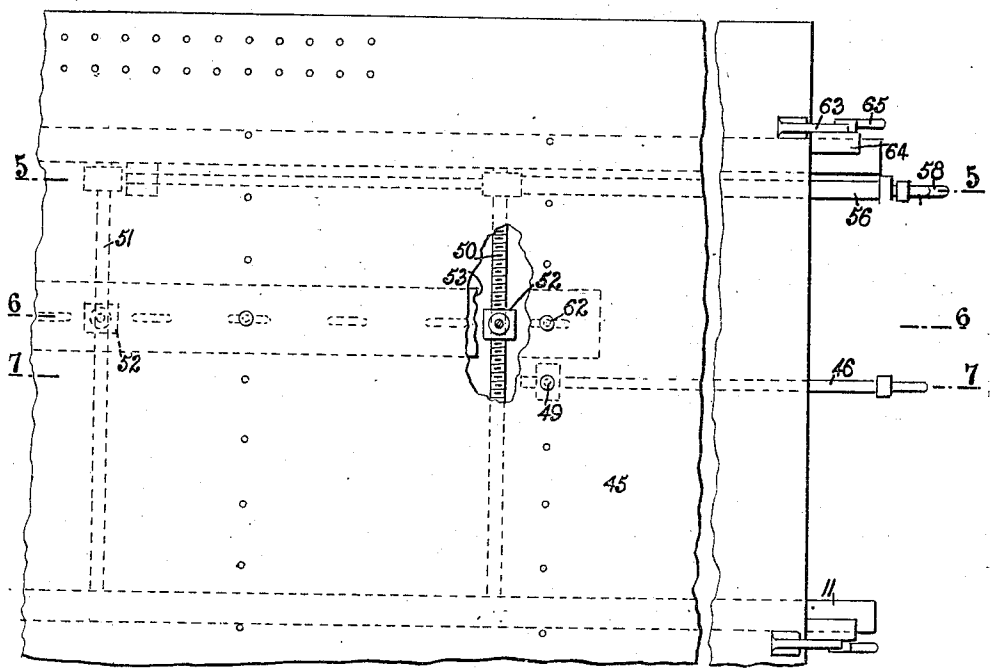


Fig. 5.

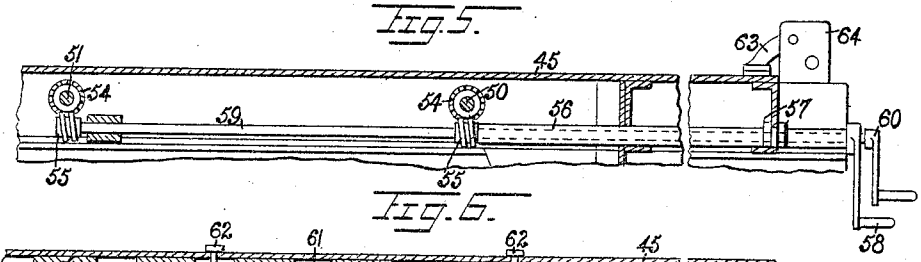


Fig. 6.

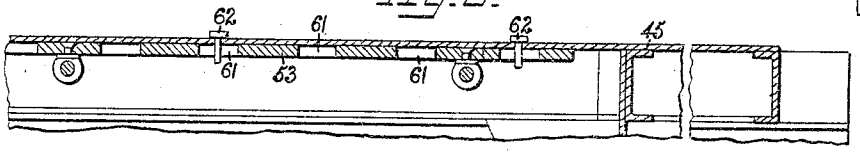
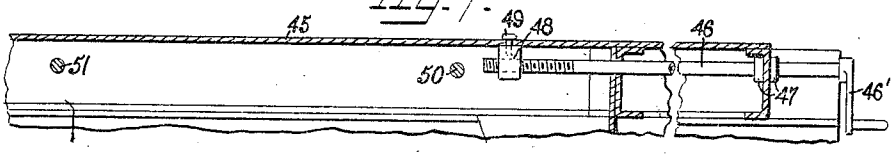


Fig. 7.

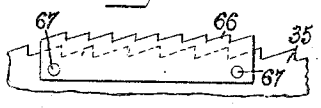


WITNESSES

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Fig. 10.



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UNITED STATES PATENT OFFICE.

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PUNCHING-PRESS.

1,259,359. Specification of Letters Patent. Patented Mar. 12, 1918.

Application filed August 4, 1917. Serial No. 184,429.

To all whom it may concern:

Be it known that I, MICHAEL F. CARR, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Punching-Press, of which the following is a full, clear, and exact description.

My invention relates to punching presses designed particularly for punching ship plates.

An object of the invention is to provide a simple, strong and efficient press whereby standard punching can be done expeditiously.

Another object of the invention is to provide a punching press of the character mentioned in which any departure from the standard punching can be easily and quickly accomplished.

With the above and other objects in view, the nature of which will more fully appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts as herein fully described, illustrated and claimed.

In the accompanying drawings, forming part of the application, similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a front elevation of a punching press the work-carrying table of which is shown in section in line 1—1 of Fig. 2;

Fig. 2 is a side elevation of the press, the work-carrying table being shown in section on line 2—2, Fig. 1;

Fig. 3 is a fragmentary section through the press on line 3—3 showing the feed mechanism for the work-carrying table;

Fig. 4 is a fragmentary top view of the work-carrying table, a portion of the work thereon being broken away to show the details of construction of the table;

Fig. 5 is a longitudinal section through the work-carrying table on line 5—5, Fig. 4;

Fig. 6 is a similar section on line 6—6, Fig. 4;

Fig. 7 is also a longitudinal section through the work-carrying table on line 7—7, Fig. 4;

Fig. 8 is a detail structure of the means for clamping the work on to the work-carrying table;

Fig. 9 is a modified structure of a feed mechanism for the work table; and

Fig. 10 is a side elevation of the auxiliary rack section whereby the feed of the work-carrying table is varied so as to vary the distance between the punched holes in the ship plate.

Referring to the drawings, the work-carrying table consists of a rectangular frame 11 made of suitable structural iron beams running longitudinally and transversely. The frame 11 is supported on suitable axles 12 which are provided with wheels 13 rolling on a track 14, which track is disposed in front of a punching-press frame 15. The frame 11 is provided with a rack 16 running longitudinally of the frame in proximity to the press. Gears 17 and 18 are in mesh with said rack 16, said gears being mounted on shafts 19 and 20 respectively with which they are constrained to revolve, the shafts bearing on the frame 15 of the press. The frame 15 also presents a bearing 21 for the rack to slide in when the work-carrying table is moving on its track 14.

The shaft 19 is provided with a ratchet 22 constrained to revolve with the shaft. A pawl 23 engages the ratchet 22. A spring 24 maintains the engagement of the pawl with the ratchet. The end of the pawl is adjustably mounted in a slot 25 of an arm 26, whereby the displacement of the pawl, and in consequence, of the ratchet, may be varied. The arm 26 is constrained to oscillate with an arm 27 which has also a slot 28 for adjusting therein one end of a drag rod 29, the other end of the rod forming a hook to be engaged by a pin 30 provided on a plate 31 which is constrained to revolve with the main shaft 32 of the press.

During the rotation of the plate 31 the pin 30 comes into engagement with the drag rod 29 and causes the rotation of the gear 17, thereby imparting a longitudinal movement to the work-carrying table. The pawl 23 is connected by a rod 33 to a spring 34, or a dashpot if so desired, which would move the pawl and therewith the drag rod to their initial position, the spring 24 al-

lowing the displacement of the pawl on the ratchet. A support 29′ is provided for the drag rod to maintain it in proper position for engagement.

Since the rack 16 is constant and the distance between the holes to be punched on the press varies, a one-way rack 35 is detachably secured to the rack 16, or to the work-carrying table if so desired. The teeth of the rack 35 vary in accordance with the desired distance between the holes to be punched. A pawl 36 is pivotally mounted on the frame of the press and engages the rack 35 under the action of gravity. Although the displacement of the table by the gear 17 may be adjusted so as to move the table through a tooth of the rack 35, the tendency of the table to roll ahead may come into play and, therefore, the gear 18 is used to roll the table back so as to bring a tooth of the rack 35 against the pawl 36 at the moment when the presser head moves to engage the work on the table.

This is obtained by a ratchet wheel 37 constrained to revolve with the shaft 20. A pawl 38 engaging the ratchet 37 is spaced from a slide rod 39 of a spring 40 which joins the pawl to the rod. The engagement of the pawl 38 with the ratchet is obtained by a spring 41. The slide rod 39 has a shoulder 42 which extends into the tooth of the pin 30. The rod carries a spring 43, one end of which abuts against the shoulder and the other against a spring 44 provided for the rod on the frame of the press. This spring brings the shoulder 42 of the rod to its initial position after it has been displaced by the pin 30. It will be noted that the springs 40 and 43 allow the pawl 38 to jump the tooth of the ratchet 37 when the gear 18 rotates under the displacement of the table by the gear 17. The shoulder 42 and the drag rod 29 are so related that the pin 30 engages the shoulder as it leaves the drag rod 29.

As the pin and presser head move downwardly the spring 40 is compressed. The further downward displacement of the pin and, therefore, of the shoulder 42, causes the rotation of the ratchet and, therefore, the rotation of the wheel 13 which moves the table backward until the tooth of the rack 35 and the pawl 36 are fully engaged. The further displacement of the pin will only cause the compression of the springs 40 and 43. The pin 30 leaves the shoulder 42 as the die, or dies, begins to engage the work 45 projecting from the table into the frame of the press. The moving of the table so as to bring the rack 35 and the pawl 36 into operative engagement is not resisted by the ratchet 22 and the pawl 23, for the said ratchet is so arranged that the spring 24 will allow it to yield when the gear 17 is rotated in the reverse direction.

To adjust the work longitudinally on the table I provide a threaded oscillating rod 46, which is prevented from longitudinal displacement in the table by suitable collars 47 provided on said rod. The threaded portion of the rod carries a nut 48 which has a flat surface and which is adapted to be engaged by the work. This nut 48 has a bore, opening into the flat portion, into which a pin 49 may be dropped through an aperture in the work 45 and whereby the work is secured to the nut 48. The flat surface of the nut is preferably on a level with the upper surface of the table. The rod 46 is provided with a crank 46′ for manipulating the same.

To shift the work on the table laterally and angularly, I provide a pair of screws 50 and 51 mounted in the frame 11 of the table and disposed transversely of same. Each of the screws carries a nut 52 each pivotally mounted in a plate 53 disposed below the work in the table. Each of the screws carries a worm wheel 54 each engaged by a corresponding worm 55. The worm 55 which operates the screw 50 is secured to a tubular shaft 56 which is prevented from longitudinal displacement in the frame by suitable collars 57. A crank 58 is provided at the end of the shaft for rotating the same, whereby the screw 50 may be revolved, and, therefore, the nut 52 engaged thereby move transversely of the table, and that end of the plate to which it is connected displaced therewith.

The other worm is revoluble with a shaft 59 which passes through the tubular shaft 56, and is also provided with a crank 60 of a smaller throw than the crank 58 to prevent interference, and by which the screw 51 may be operated and, therefore, the other end of the plate 53 moved. The plate 53 has a series of elongated slots 61 into which a pin 62 may be dropped through an aperture in the work 45. These pins 62 entrain work 45 with the plate 53 during the displacement of same by the screws 50 and 51. The work is locked to the frame 11 of the table by jaws 63 which are pivotally mounted on lugs 64 provided on the frame, said lugs also carrying an eccentric member 65 whereby the jaws 63 may be jammed against the work on the table.

When the running of the holes in the work requires a change, as, for example, when butts are joints of plates, and altering of frame spacing such as bulkheads and turning frames, it is necessary to change the rack. This would require the stopping of the press and a change in the feed. To obviate this I provide rack sections 66 which are applicable directly to the rack 35 and for which sections pins 67 are provided on the rack 35, suitable apertures being provided in the rack sections 66 to engage the pin 67. The apertures in the rack sections

66 are so formed that the teeth of the rack 66 are above the teeth of the rack 35 and, therefore, the pawl 36 will engage with the teeth of the rack section 66 while said section is passing under the pawl, the retracting mechanism taking care of the difference in the teeth of the rack 66 and that of the rack 35.

By providing rack sections the running of the holes in the sheets can be changed any time it is necessary without materially interfering with the working of the punching press or the adjustment of the work on the table.

In Fig. 9 a modified form of the feed mechanism is shown. In the said figure the drag rod 68 is connected directly to one end of a first-class lever 69, the other end of which is slotted to engage a pawl 70. The spring 71 for restoring the pawl to the initial position is mounted directly on the drag rod 68. The operation of the drag rod, as well as the retracting mechanism, is by a cross bar 72 which is connected to the projecting end of a presser head 73 of the press.

I claim:

1. In a punching press, a work-carrying table comprising a frame, means for feeding the frame operable by the movement of the press, a plate disposed longitudinally in the frame of the table and to which the work is adapted to be detachably secured, means for moving each end of the plate relative to the frame, and means for moving the work on the table and on the plate.

2. In a punching press, a work-carrying table, means for feeding the table operable by the movement of the press, a screw revoluble in the table, a nut movable on the screw and adapted to be secured to the work on the table whereby the work on the table may be displaced by the manipulation of said screw, a plate in the table and adapted to be secured to the work on the table, and means for moving said plate transversely of the movement of the nut on the screw.

3. In a punching press, a table, means for feeding the table operable by the movement of the press, means in the table for adjusting the work longitudinally of the table, a plate disposed longitudinally of the table and adapted to be secured to the work on the table, and means for moving each end of the plate transversely of the table for adjusting the work thereon.

4. In a punching press, a table, means for feeding the table by the movement of the press, a screw disposed longitudinally of the table and prevented from axial displacement relative to said table, a nut engaged by said screw and adapted to be secured to the work on the table and whereby the work may be adjusted longitudinally of the table by means of said screw, a plate in said table disposed longitudinally of same, a nut in proximity of each end of the table, a screw for each of the nuts disposed transversely of the table, and means for imparting rotary motion to each of the screws.

5. In a punching press, a table, a ratchet mechanism for advancing the table and a ratchet mechanism for retracting part of the advancing of the table, said second ratchet mechanism becoming operable after the first ratchet mechanism has been operated and before the press punches the work.

6. In a punching press, a table, a rack, a gear meshing with the rack, a ratchet mechanism for revolving the gear operable by the movement of the press, a second gear in mesh with the rack, and a second ratchet mechanism for operating the second gear also operable by the press but after the first mechanism has been operated and before the press punches the work, said second ratchet mechanism being adapted to retract the table and having means permitting the forward movement of the table by the first ratchet mechanism.

7. In a punching press, a table, means for feeding the table forward, means including a spring for retracting a part of the forward feed, a rack carried by the table, and a pawl on the press for engaging the rack and whereby the retracting movement of the table is controlled.

8. In a punching press, a table, a rack carried by the table, a pawl on the press engaging the rack, means operable by the press for feeding the table so that the movement of the rack displaces the pawl, and means including a spring adapted to move the table in an opposite direction to bring a tooth of the rack against the pawl.

9. In a punching press, a table, a rack carried by the table, a pawl on the press for engaging the rack, a pawl and ratchet mechanism for feeding the table forward, a pawl and ratchet mechanism for retracting the forward movement of the table so as to bring a tooth of the rack against the pawl, and a compression spring connecting the last-mentioned ratchet mechanism to the operating means of the press.

10. In a punching press, a table, a rack carried by the table, a pawl carried by the press for engaging the rack, a pawl and ratchet mechanism for feeding the table forward, a presser head, means connecting the presser head to the pawl and ratchet mechanism, a second ratchet mechanism for retracting a part of the forward movement of the table whereby a tooth of the rack is brought against the pawl, a slide operable by the presser head, and a spring connecting said slide to the ratchet mechanism, both of said ratchet mechanisms having yielding members permitting the rotation of said ratchet mechanisms in a reverse direction.

11. In a punching press, a table, a rack

on the table, a pawl on the press for engaging the rack, and rack sections securable to the rack so that the teeth of said rack sections are above the teeth of the rack, whereby the pawl will engage the teeth of the rack sections in lieu of the teeth of the rack when said rack sections engage with the pawl and whereby the change of table feed is obtained.

12. In a punching press, a table, means for feeding the table, means in the table for adjusting the work longitudinally of the table, a plate disposed longitudinally of the table and having means whereby it may be secured to the work on the table, said means permitting a displacement of the plate relative to the work, and means for moving the plate transversely of the table.

13. In a punching press, a table, means for feeding the table, a screw revoluble in the table, a nut engaging the screw and having means whereby it may be secured to work on the table, said screw serving for the adjustment of the work longitudinally of the table, a plate disposed longitudinally of the table and having elongated slots running longitudinally whereby the plate may be connected to the work on the table, a pair of screws running transversely of the plate, a nut for each screw pivotally mounted in the plate, said nut being in proximity to the ends of the plate, a worm wheel for each of the screws, a tubular shaft having a worm in mesh with one of the worm wheels, a second shaft passing through the tubular shaft having a worm in mesh with the other worm wheel, and means for operating said two last-mentioned shafts whereby the ends of the plate may be moved transversely of the table for the purpose of adjusting the work on the table.

14. In a punching press, a table, a rack carried by the table, pins projecting laterally from the rack, a rack section having apertures for engaging said pins so that the teeth of the rack section are disposed above the teeth of the rack, and a pawl on the press for gravitationally engaging the rack or the rack section substantially as and for the purpose set forth.

15. In a punching press, a table, a rack carried by the table, a pawl for engaging the rack, and a rack section adapted to be secured to the rack so as to present its teeth above the teeth of the rack, whereby said teeth of said rack section may be engaged by the pawl without engaging the teeth of the rack.

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