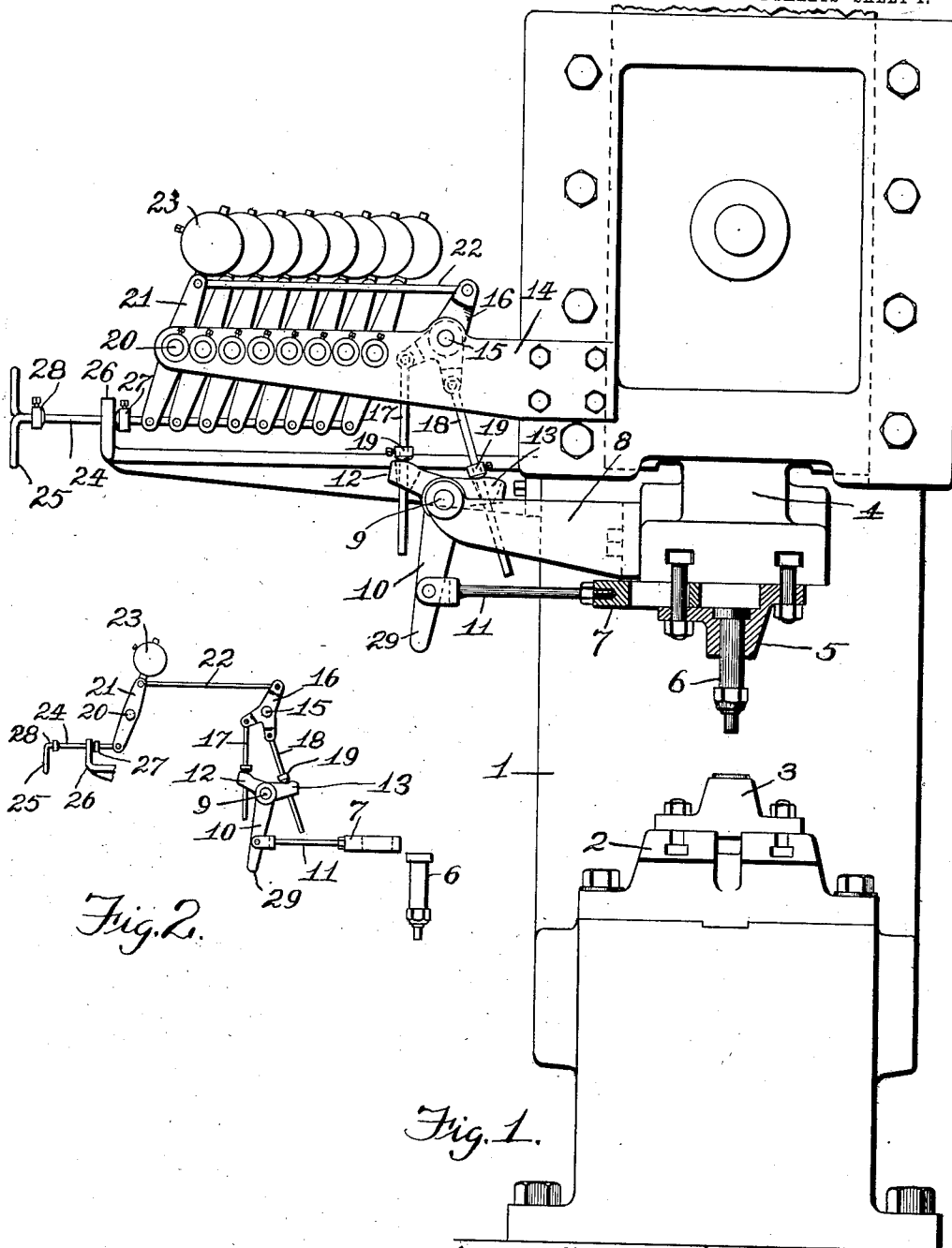


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PUNCH GAG MECHANISM.
APPLICATION FILED APR. 17, 1909.

931,781.

Patented Aug. 24, 1909.

2 SHEETS—SHEET 1.

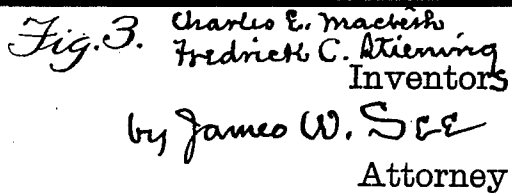


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APPLICATION FILED APR. 17, 1909.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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PUNCH GAG MECHANISM.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, CHARLES E. MACBETH and FREDRICK C. STIENING, citizens of the United States, residing at Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Punch Gag Mechanism, of which the following is a specification.

This invention relates to mechanism for facilitating the control of the gag mechanism of multiple punching machines,

In ordinary multiple punching machines provided with mechanism, the individual gags are adjusted when the ram and punches are in upward position and before they have proceeded far in their active stroke. In our present invention the gags may be adjusted for a given stroke during the preceding active or down stroke and also during a portion of the up stroke preceding the active down stroke, and by active stroke is meant the stroke which does the punching controlled by a given particular adjustment of the gag.

The invention will be readily understood from the following description taken in connection with the accompanying drawings in which:—

Figure 1 is a front elevation of a multiple punching machine provided with gag mechanism exemplifying our invention, one of the punch-holders and gags appearing in vertical section: Fig. 2 a front elevation of the motion-work of the gag mechanism of a single punch, upon a smaller scale than that of the other figures of the drawings: and Fig. 3 a side elevation of the gag mechanism.

In the drawings:—1 indicates the frame of an ordinary multiple punching machine: 2, the die-block: 3, the dies: 4, the ram: 5, the punch-holders: 6, the punches, capable of sliding idly upward in the punch-holders: and 7, the gags, being blocks mounted to slide horizontally in the punch-holders over the tops of the punches.

The arrangement is thus far substantially as usual. If one of the gags is in outward position, as seen in Figs. 1 and 2 then, when the ram descends, the punch, instead of doing its punching work will have a relative rising motion in the punch-holder and rest idly on top of the work. If, while the punch is in downward position in the punch-

holder the gag be moved inwardly over the punch, then when the ram descends the punch will be forced down into its regular punching work. If all the gags are in outer position then none of the punches will do work, and if all of the gags are in inward position then all of the punches will do work, and the selection of the punches for the doing of work at a given down stroke of the ram is controlled by the selective adjustment of the gags prior to the active down stroke and after the preceding up stroke.

As a multiple punching machine may contain quite a number of punches, eight being shown in the illustration, the adjustment of the gags may consume considerable time and thus impose delays upon the working of the machine. By our improvement we may make the gag adjustment at any time except during a portion of the up stroke of the ram; in other words, while punches with their gags properly adjusted are making an active down stroke we may adjust the gag mechanism for the succeeding down stroke.

As the individual mechanisms pertaining to the several gags are alike, we will describe them in the singular. Proceeding with the drawings:—8, indicates bearing-brackets projecting outwardly from the ram and rising and falling with it: 9, a pivot-shaft carried by these brackets, parallel with the line of punches: 10, a three-armed lever mounted loosely on this shaft, one for and in line with each individual gag: 11, a rod connecting each of the individual gags with the downwardly projecting arm of its appropriate three-armed lever, so that the oscillation of the three-armed lever will put the gag to the active or to the idle position: 12, the outwardly projecting arm of the three-armed lever: 13, the inwardly projecting arm of the three-armed lever: 14, a pair of bearing-brackets projecting outwardly from the frame of the machine, in the same direction as brackets 8: 15, a pivot-shaft mounted in brackets 14, parallel with pivot-shaft 9: 16, a three-armed lever mounted on shaft 15, one lever for and vertically over each of three-armed levers 10: 17, an arm having its upper end pivoted to one of the lower arms of lever 16, its body pro-

jecting loosely down through an aperture in the outer arm of three-armed lever 10: 18, a similar rod pertaining to the inner arms of levers 10 and 16: 19, collars on these rods, in position to engage downwardly on the horizontal arm of three-armed lever 10: 20, a horizontal series of shafts journaled in brackets 14, parallel with each other and with shaft 15, there being one of these shafts for each of the gags: 21, a vertical lever pivoted on each of shafts 20, one of these levers being in line with each of the three-armed levers 16: 22, a rod connecting each of the levers 21 with its appropriate three-armed lever 16: 23, a weight secured to the upper end of each of levers 21, in position to pass to the right and to the left of the vertical neutral point in the oscillation of the lever: 24, a rod having its inner end connected with the lower end of one of the levers 21, there being one of these rods for each of the levers 21: 25, a handle on each of the rods 24, the drawing showing the handles projecting alternately upward and downward to facilitate access by the hand: 26, a rigidly supported stop-bar through which all of the rods 24 slide: 27, a collar fast on each of the rods 24 and adapted to come into contact with the inner face of stop-bar 26 and limit the outward motion of the rod: 28, a similar collar on each rod to limit the inward motion of the rod: and 29, a downward prolongation of each three-armed lever 10 to form a handle for operating the gags independent of the automatic mechanism.

Turning to Fig. 2, illustrating the mechanism pertaining to one of the individual punches, rod 24 has been adjusted to outer position, thus putting collar 19 of rod 18 to lowermost position. As the ram carries shaft 9 and lever 10 upwardly, arm 13 comes in contact with the collar on rod 18, the result being that the gag is pulled outward to idle position if it was not already in that position. If, when the ram started its up stroke, the gag was in inward active position over the punch, it would be drawn outward to idle position when arm 13 was oscillated by coming into contact with the collar on rod 18. If, now, instead of rod 24 having been adjusted to outer position, it had been adjusted to inner position, then the gag, instead of being controlled by the collar on rod 18 would be controlled by the collar on rod 17 and would be moved inward to active position over the punch as the ram made its up stroke. The individual rods 24 are to be selectively adjusted to desired position according to whether given punches are to do work or are to descend idly. Rods 24 may be adjusted full stroke by means of their handles, or they may be moved by hand till weights 23 pass the neutral point, the weights then completing the adjustment of the rods.

Returning to Fig. 2, the gag and punch and lever 10 are at the top of the stroke, and when these parts descend the punch will be idle, owing to the outward position of the gag. As the parts descend, the handle pertaining to this individual mechanism may, if desired, be pushed inward. The punch will be idle during the downward stroke, but during the up stroke the arm 12 will engage the now lowered collar on rod 17 and the gag will be automatically moved inwardly over the punch so that on the next down stroke of the punch it will become active and do work. In the absence of the automatic gag controlling mechanism, or even in the presence of that mechanism, during certain portions of the stroke of the ram the gags may be adjusted by means of their handles 29. For instance, in Figs. 1 and 2 the gag has been automatically adjusted to idle position and the ram may be assumed as starting downward. At any time after arm 13 has sufficiently cleared its actuating collar and before the punch reaches the metal which it is to punch, the gag may be moved inwardly to active position and cause the punch to do work. By loosening collars 19, the gags become independent of the automatic mechanism and may be controlled at will by their handles 29 after the usual manner of adjusting gags.

The punch holders and dies are adjustable along in their ranks as is usual in this class of machines and this of course necessitates that the gag mechanism should be correspondingly adjustable. In the present case the levers 10 shift along on shaft 9 to accommodate themselves to the position into which the punch holders may be adjusted in the ram, and, similarly, the levers 16 are adjustable along on their shaft 15, and the levers 21 are adjustable along their shafts 20. In short, the individual gag mechanisms are capable of being adjusted into close or open order to correspond with the adjusted positions of the punches.

We claim:—

1. Punch gag mechanism comprising, a frame, a ram, a punch carried by the ram, a gag carried by the ram, a lever carried by the ram and connected with the gag and having two oppositely projecting arms, an adjustable stop device supported by the frame over said lever, and means for adjusting the stop device to be effective over either of said arms alternatively, combined substantially as set forth.

2. Punch gag mechanism comprising, a frame, a ram, a punch carried by the ram, a sliding gag carried by the ram, a lever carried by the ram and connected with the gag and having two oppositely projecting arms, an adjustable stop device supported by the frame over said lever, and means for adjusting the stop device to be effective over either

of said arms alternatively, combined substantially as set forth.

3. Punch gag mechanism comprising, a frame, a ram, a group of punches carried by the ram, an individual gag carried by the ram for each punch, an individual lever carried by the ram and connected with its appropriate gag and having two oppositely projecting arms, an adjustable individual stop device supported by the frame over each lever, and means for independently adjusting the stop devices to be effective over either of their appropriate arms of the first-mentioned lever alternatively, combined substantially as set forth.

4. Punch gag mechanism comprising, a frame, a ram, a punch carried by the ram, a gag carried by the ram, a first lever carried by the ram and connected with the gag and having two oppositely projecting arms, a second lever mounted over the first lever and supported by the frame and provided with a pair of arms, rods projecting from the arms of the second lever down into free engagement with the arms of the first lever, a stop collar on each of the rods over the arms of the first lever, and means for adjusting the second lever so that a selective one of the collars may become effective on the first mentioned lever, combined substantially as set forth.

5. Punch gag mechanism comprising, a frame, a ram, a punch carried by the ram, a gag carried by the ram, a first lever carried by the ram and connected with the gag and having two oppositely projecting arms, a second lever mounted over the first lever and supported by the frame and provided with a pair of arms, rods projecting from the arms of the second lever down into free engagement with the arms of the first lever, a stop collar movably secured on each of the rods over the arms of the first lever, and means for adjusting the second lever so that a selective one of the collars may become effective on the first mentioned lever, combined substantially as set forth.

6. Punch gag mechanism comprising, a frame, a ram, a punch carried by the ram, a gag carried by the ram, a lever carried by the ram and connected with the gag and having two oppositely projecting arms, an adjustable stop device supported by the frame over said lever, a weighted lever adapted for the movement of its weight to either side of the neutral position, mechanism connecting the weighted lever with the stop device, and means for adjusting the weighted lever and stop device to either of two alternative positions so as to cause the stop device to be effective over either of said arms alternatively, combined substantially as set forth.

7. Punch gag mechanism comprising, a frame, a ram, a punch carried by the ram,

a gag carried by the ram, a first lever carried by the ram and connected with the gag and having two oppositely projecting arms, a second lever mounted over the first lever and having two arms, rods connected to the arms of one of said levers and loosely engaging the arms of the second lever, stop collars on the rods, a third lever, a weight carried by the upper end of the third lever, a link connecting the third lever with the second lever, and a handle mechanism for adjusting the third lever, combined substantially as set forth.

8. Punch gag mechanism comprising, a frame, a ram, a rank of punches carried by the ram, a gag carried by the ram for each punch, a rank of first levers carried by the ram and connected each with one of the gags and having each two oppositely projecting arms, a rank of second levers carried by the frame over the first levers and having each two arms, a rod loosely connecting each arm of the second levers with an arm of the first levers, a collar on each of the rods, a rank of third levers, a link connecting each of the third levers with one of the second levers, a sliding rod connected with each of the third levers, and a handle on each of the sliding rods, combined substantially as set forth.

9. Punch gag mechanism comprising, a frame, a ram, a rank of punches carried by the ram, a gag carried by the ram for each punch, a rank of first levers carried by the ram and connected each with one of the gags and having each two oppositely projecting arms, a rank of second levers carried by the frame over the first levers and having each two arms, a rod loosely connecting each arm of the second levers with an arm of the first levers, a collar on each of the rods, a rank of third levers, a weight carried by the upper end of each of the third levers, a link connecting each of the third levers with one of the second levers, a sliding rod connected with each of the third levers, and a handle on each of the sliding rods, combined substantially as set forth.

10. Punch gag mechanism comprising, a frame, a ram, a rank of punches carried by the ram, a gag carried by the ram for each punch, a first shaft carried by the ram parallel with the rank of punches, a rank of first levers pivoted on said first shaft and longitudinally adjustable thereon, and connected each with one of the gags and having each two oppositely projecting arms, a second shaft supported by the frame parallel with said first shaft, a rank of second levers pivoted on the second shaft and longitudinally adjustable thereon over the first levers and having each two arms, a rod loosely connecting each arm of the second levers with an arm of the first levers, a collar on each of the rods, a series of shafts

supported by the frame parallel with said second shaft, a third lever mounted on each of said third shafts and longitudinally adjustable thereon, a link connecting each of the third levers with one of the second levers, a sliding rod connected with each of the third levers, and a handle on each of the sliding rods, combined substantially as set forth.

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