June 8, 1943. J. E. McMULLEN 2,321,228

GAUGE AND METHOD FOR SETTING THE PLATE MOUNTING MECHANISMS OF PRINTING PRESS CYLINDERS

Filed March 4, 1942 2 Sheets-Sheet 1

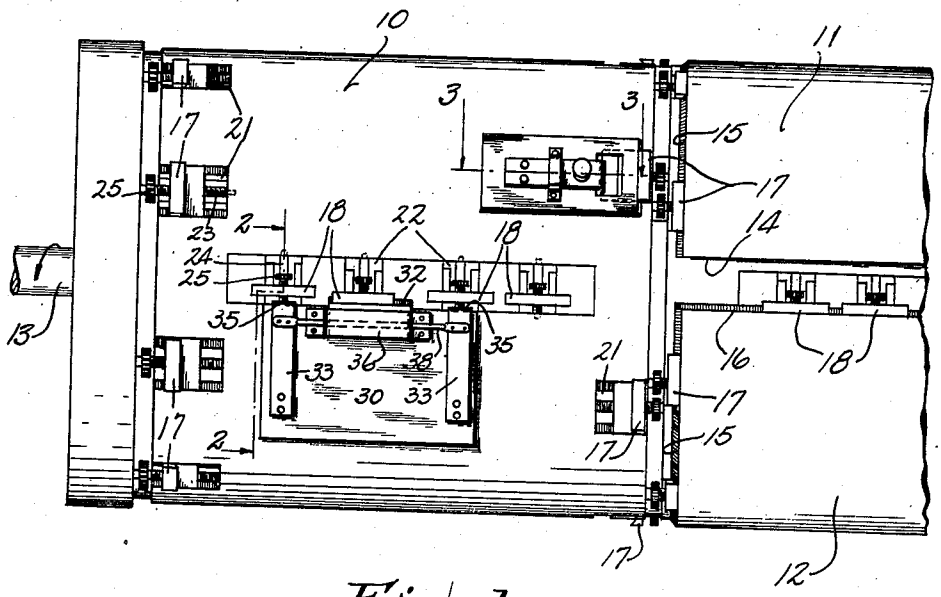


Fig. 1.

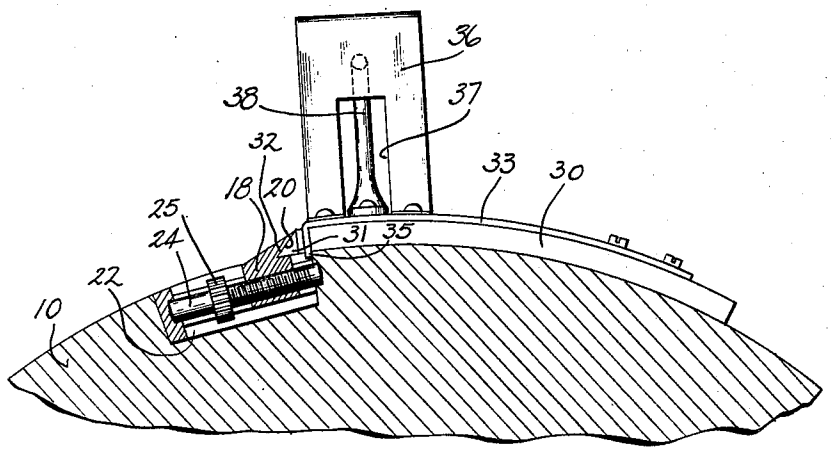


Fig. 2.

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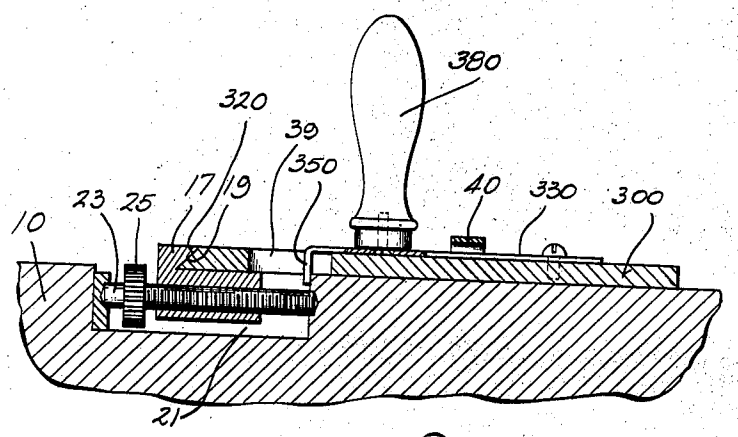


Fig. 3.

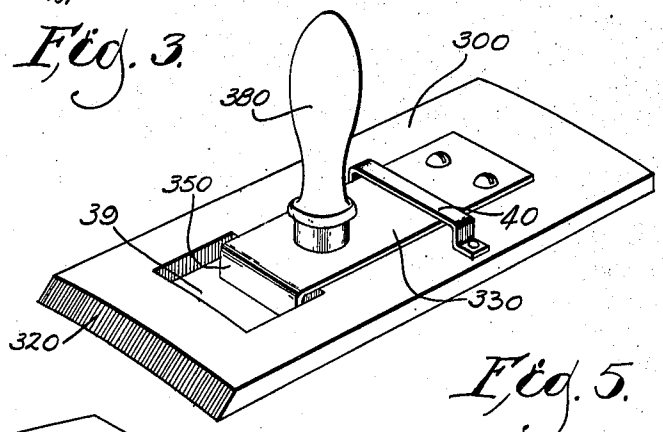


Fig. 5.

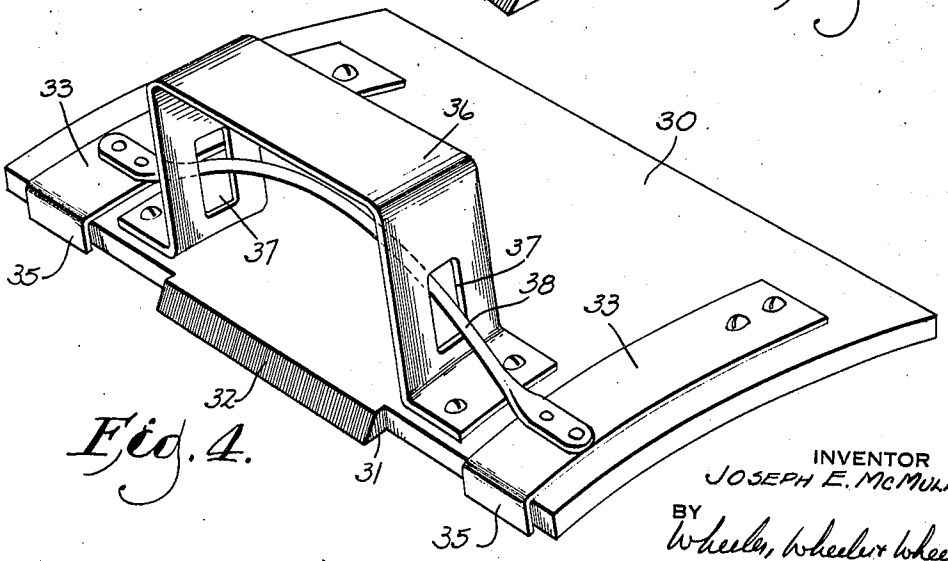


Fig. 4.

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2,321,228

GAUGE AND METHOD FOR SETTING THE PLATE MOUNTING MECHANISMS OF PRINTING PRESS CYLINDERS

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Application March 4, 1942, Serial No. 433,345

17 Claims. (Cl. 33—184.5)

This invention relates to improvements in a gauge and method for setting the plate clamping mechanisms of printing press cylinders.

It is the primary object of the invention to greatly reduce the time required to register the plates in a multi-color press by providing an improved means for determining more accurately than has heretofore been possible, the initial or datum setting in identical positions of the lock-up clamps of successive rolls.

In multi-color press work the web to be printed passes over successive cylinders upon which detachable plates are mounted to imprint the successive colors required. The imprint in a given color which is made by the printing plate on one cylinder must register exactly with the imprint in different colors made by the plates on other cylinders. It has long been possible to locate the designs on the respective plates with great accuracy, but it has been difficult to position the plates in exactly corresponding locations on the respective cylinders.

Some cylinders have been provided with fixed abutments for the rear margins of the respective plates from which the individual plates may be shimmed to provide for such adjustment as is necessary for perfecting registration. In case a single plate has to be moved forwardly from its fixed abutment, this arrangement is satisfactory, but if this plate is out of registration in the other direction then it is necessary to move all of the other plates forwardly on their respective cylinders, since the non-adjustable abutment does not permit the one plate which is out of registry to be moved rearwardly.

While reference has been made to lack of registration in a forward or rearward direction with respect to the direction of cylinder rotation, it will be understood that the same principle is applicable where the lack of registration is in a direction which is axial respecting the cylinders.

Because of the difficulty inherent in cylinders having fixed abutments, it has long been the practice to provide cylinder presses for multiple work with adjustable clamping abutment members of the general order of those shown in Patent 2,050,851. In locking up the printing plates on cylinders so equipped, the operator has attempted by means of lines or pointers to provide corresponding datum adjustments of the clamps of the several cylinders and identical points intermediate their respective ranges of movement, so that if any change in registration is shown by the proof to be required, the clamp used as an abutment for positioning the plate can be moved in either direction from its initial or datum position.

Difficulty has been experienced, however, due to the fact that no mere visual location or positioning of the respective clamping abutments has taken backlash into consideration. The several abutments might, to all appearances, be exactly in corresponding positions on their respective cylinders, but, when subjected to pressure, displacement in varying degree would occur with resulting lack of registration.

In accordance with the present invention I seek to provide means whereby the respective abutment clamps used to determine the position of each plate on its cylinder can be positively and accurately gauged so that corresponding abutments will be identically located in the desired datum positions on the several cylinders. In practice, the invention hereinafter to be disclosed has satisfied this objective to such an extent that the time required for registering and locking up plates on multiple color presses has been reduced by as much as two-thirds, at the same time minimizing the degree of special skill required for this operation.

In the drawings:

Fig. 1 is a fragmentary plan view of a press cylinder to which gauges are shown applied in the manner required for the practice of the present invention.

Fig. 2 is a fragmentary detail on an enlarged scale taken in section on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary detail on an enlarged scale taken in section on the line 3—3 of Fig. 1.

Fig. 4 is an enlarged view in perspective of the gauge shown in Fig. 2.

Fig. 5 is an enlarged view in perspective of the gauge member shown in Fig. 3.

Like parts are identified by the same reference characters throughout the several views.

While only one press cylinder is illustrated, it will be understood that the invention is primarily intended for use in multi-color presses where the work passes through a succession of cylinders, all of which, however, may be identical with that disclosed.

The cylinder itself, as above explained, is conventional. The cylinder is shown at 10 and is mounted on a shaft 13. In practice each of four areas spaced axially of the cylinder 10 receives a pair of plates 11 and 12, each curved to conform to almost 180 degrees of its periphery. The forward margin (margin 14 of plate 11) in the di-

rection of cylinder rotation does not require clamping. Both side margins and the rear margin of each plate are positioned by adjustable clamping members carried by the cylinder. The margins of the plate thus clamped (as side margins 15 of plates 11 and 12 and rear margin 16 of plate 12) are beveled. The lateral clamping members 17 and the rear clamping members 18 are under-cut to provide jaw surfaces 19 (Fig. 3) and 20 (Fig. 2) complementary to the conventionally beveled margins of the printing plates.

As shown in Figs. 1, 2 and 3, the cylinder 10 is provided with side recesses 21 spaced about its periphery and with central recesses 22 spaced axially of its surface. Anchored in these recesses are the rotatable adjusting screws 23, 24, each of which is provided with a toothed adjusting wheel 25. The respective clamping abutments 17, 18, are threaded upon the adjusting screws 23, 24 so that they may be set in any desired position.

As above noted, it is an objective of the present invention to assure the identical positioning of those clamping abutments used for registration purposes (this may be less than the total number available), the initial datum setting being achieved under sufficient pressure to eliminate all play or backlash so that when the plates are locked to the cylinders they will be as nearly as possible identically positioned thereon.

To accomplish this result I employ gauges, two exemplifications of which are shown in the drawings. Although the exemplifications illustrated are specifically different, they operate on the same principle. In each instance the gauge has a beveled marginal portion (corresponding in angle to the beveled margin of the plate) which may be clampingly engaged under pressure against the under-cut jaw of the clamping abutment to determine the datum position of the abutment, following which the gauge may, notwithstanding its interlocking engagement with the abutment, be withdrawn from beneath the overhanging jaw thereof without disturbing the position of the clamp.

The gauge shown in Figs. 2 and 4 has a cylindrically rounded body portion 30 provided at 31 with a rearward projection having a beveled surface 32 (Fig. 4) exactly like that of the conventionally beveled plate.

Fastened at their forward ends to the top surface of the body portion 30 of the gauge, are a pair of detent latches 33 of spring stock which preferably conform in curvature to the body portion and overhang the rear margin thereof, each being provided at its end with a finger 35 extending below the level of the lower surface of gauge body 30 so as to be engageable with the shoulder of the press cylinder at the forward side of the recess 22 therein. For convenience of manipulation, the gauge body 30 is provided with a handle member 36 having at 37 openings through which extends another handle 38 connected at its ends to the spring latch detents 33. Thus the operator, while grasping handle 36 for the manipulation of the gauge as a whole, is able with his fingers to draw upwardly on handle 38 to lift the spring detent latches 33 against their downward bias, thus withdrawing the respective fingers 35 from the recess 22.

In use, all of the several clamping abutments 18 being retracted rearwardly with respect to the direction of cylinder rotation, the gauge is positioned in the manner shown in Fig. 1, and one or more of the clamping abutments 18 is then advanced by means of its adjusting screw and knob 24, 25, until it is tightly engaged with the beveled projection 31 of the gauge. This positively determines, without backlash, a definite datum position of the clamping abutment 18 intermediate its range of movement. The extension of the overhanging jaw of the clamping abutment member 18 with the oppositely beveled margin of the gauge extension 31 would lock the gauge member to the cylinder beyond any possibility of removal were it not for the fact that the fingers 35 are retractible, as above described. Retraction of the fingers 35 from the recess 22 frees the gauge and it is thereupon used in like manner to set the corresponding clamping abutments for all of the other plates used in the press.

The gauge shown in Figs. 3 and 5 is used similarly to fix the datum positions of such of the lateral clamping abutments as are required for initial registration. Its body portion 300 is cylindrically curved transversely with respect to the direction in which its resilient detent 330 extends. In this instance a single detent is employed. It has a finger portion 350 normally extending below the curved under surface of the gauge body 300 to be engaged in one of the recesses 21 of the cylinder. The finger 350 extends through an opening 39 in the gauge body for this purpose. Beyond the opening the gauge body has a terminal face at 320 which has the same bevel as the side faces 15 of the respective plates. A single handle 380 mounted on the spring detent member 330, serves to manipulate not only the detent but the entire gauge, the yielding of the detent respecting the gauge body being limited by a strap 40.

This gauge is used exactly like the gauge first described. The finger 350 of its detent 330 is hooked into the recess of the cylinder. This positions its beveled surface 320 in the path of the clamping abutment 17 to determine the correct position therefor. The abutment is manipulated by means of its screw and knob 23, 25, into tight clamping engagement with the gauge, and thereupon the gauge is released by manipulating the handle 380 to retract the finger 350 against the bias of the spring arm 330. Continued retraction of the handle will withdraw the entire gauge from the cylinder. The operation is then repeated with respect to each of the other clamping abutments along one side of the position in which the plate is to be located (or as many of such abutments as are to be used in effecting initial registration). The operation is then repeated on other cylinders until all of the abutment members required for initial registration are identically positioned under pressure sufficient to eliminate backlash.

After using both of the gauges as above described, the several plates are mounted on their cylinders and the remaining clamping abutment members are tightened on the plates. Since each of the plates will be identically located at its rear edge and one side, the imprints produced by the plates will be in exact registration insofar as the plates themselves have the imprinting surfaces in identical locations on the plates. In some cases perfect registration is shown by the first proof. In all cases deviation from perfect registration is slight and easily correctible as compared with any previously known procedure. While it is only necessary to use sufficient pressure to eliminate backlash in tightening the abutment members against the respective gauges, it is preferred that the pressure used be approx-

imately that ultimately employed against the plate itself.

I claim:

1. A method of determining datum positions for the plate clamping abutments of press cylinders, which method consists in correspondingly positioning on the respective cylinders the corresponding clamping abutments of a plurality of press cylinders under pressure in each instance in the absence of the respective plates, and thereafter forcing the respective plates under pressure against the abutments in substantially the same direction as the direction in which pressure was exerted in positioning the abutments.

2. A method of determining datum positions of the clamping abutments of a succession of press cylinders intermediate the range of movement of the several abutments, which method consists in fixing a gauge member upon each cylinder in the path of movement of corresponding abutments of the respective cylinders, tightening each of such abutments against the gauge member under pressure adequate to eliminate backlash, and withdrawing the gauge member from each such abutment and exposing the abutment for plate engagement.

3. The method of assuring like datum adjustments of corresponding gauge members with overhanging jaws at points intermediate the range of travel of such gauge members upon their respective cylinders in a multi-color press, which method consists in attaching to the faces of the successive cylinders of said press gauge means beveled complementarily to the under-cut jaws of the respective clamping abutments, tightening the respective jaws against said gauge means in overlapping relation to the bevel thereof under pressure substantially like that to be exerted by the respective abutments upon the plate, detaching the gauge means and withdrawing it from beneath the overhanging jaw of the abutment exposing said jaw for plate engagement.

4. A gauge comprising a body portion applicable to the periphery of a press cylinder, a retractible finger engageable in an aperture of a press cylinder for the positioning of the gauge body, and a locating surface positioned to be engaged by the adjustable clamping abutment of a press cylinder at a point intermediate the range of adjustment of said abutment.

5. A gauge for determining datum settings of clamping abutment members adjustable on recessed press cylinders for determining plate locations on said cylinders, said gauge comprising a body member, a detent finger adjustable with respect to the body member to and from a position of projection from the body member for engagement in the press cylinder recess, said body having a locating surface so disposed when the finger is engaged in the cylinder recess as to stop the movement of the abutment member at a point intermediate it range of adjustment.

6. A gauge for the purposes described, comprising a body member provided with a gauge surface, a detent yieldably movable respecting the member and provided with a finger projecting therebeneath and retractible upon the movement of said detent, and means for manipulating the detent.

7. A gauge for the purposes described, comprising a body member having a beveled gauge surface, a detent retractible respecting the body member and connected therewith and provided with a finger normally projecting therebeneath, said detent being biased toward a position of normal finger projection.

8. A gauge for the purposes described, comprising the combination with a body member having a cylindrical lower surface and provided with a beveled gauge surface receding from said cylindrical lower surface, of a spring detent connected with the body member and provided with a finger normally projecting due to the bias of said spring detent below the cylindrically curved lower surface of said body member, and a handle connected with said spring detent for the retraction thereof.

9. The device of claim 8 in which the body member has a separate handle to and from which the detent handle is movable for manipulation by one hand of an operator.

10. A gauge of the character described, comprising the combination with a body member having a beveled gauge surface at its end, of a pair of detents at opposite sides of said beveled surface, each having a finger normally projecting beneath said surface, a handle connecting said detents, said detents being biased toward positions in which said fingers project as aforesaid, and a second handle for said body member.

11. The device of claim 10 in which the respective handles are disposed in proximity to be engaged within the grasp of an operator's hand for concurrent manipulation.

12. A gauge for the purposes described, comprising an apertured body member having a gauge surface at one end, a spring detent connected with the body member and having a finger portion projecting through the aperture to a normal level below the under surface of the body member, a handle connected with the spring detent for retraction thereof respecting the body member.

13. The device of claim 12 including a stop limiting the retractive movement of the detent respecting the body member.

14. The method of determining a datum position for the clamping abutment of a press cylinder having a plurality of clamping abutments at different sides of the location of a printing plate to be clamped thereto, such method comprising the tightening against a gauge of at least one abutment in the absence of the plate, such tightening being effected at approximately the pressure to which the plate is to be subject, the removal of the gauge and the substitution of the plate against such abutment and the subsequent tightening of an opposite abutment against the plate to force said plate against the first abutment under substantially the pressure to which said first abutment was tightened against said gauge.

15. A method of positioning a printing plate on a press cylinder having opposing clamping abutments for such plate, said method comprising the mounting of a gauge member on the cylinder in the absence of a plate, the tightening against the gauge member of at least one abutment, the removal of the gauge member, the application of the plate to the cylinder in engagement with the abutment positioned by tightening against the gauge member, and the adjustment of an opposing gauge member against the plate in a direction to urge said plate against said first mentioned gauge member.

16. A method of positioning a printing plate on a press cylinder having oppositely disposed clamping abutments respectively adjustable to and from each other for engagement with the four sides of

the printing plate, such method comprising the mounting of gauge means on the cylinder in the absence of the plate and in a position predetermined to correspond to the desired location of two contiguous sides of the plate, tightening abutments at such sides under pressure against said gauge means, withdrawing the gauge means, applying the plate to the cylinder in contact with the abutments tightened against the gauge means, and actuating opposing abutments against said plate into pressure engagement with the abutments first mentioned.

17. A method of locating a printing plate on a press cylinder having opposing clamping abutments, such method including the temporary mounting of a gauge upon the cylinder in the plate location in the absence of the plate, the setting of one abutment under pressure against the gauge, the removal of the gauge, the application of the plate to the cylinder against the abutment so set, and the pressure engagement of an opposing abutment with the plate to force the plate against the abutment set against said gauge.

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