

Aug. 29, 1933.

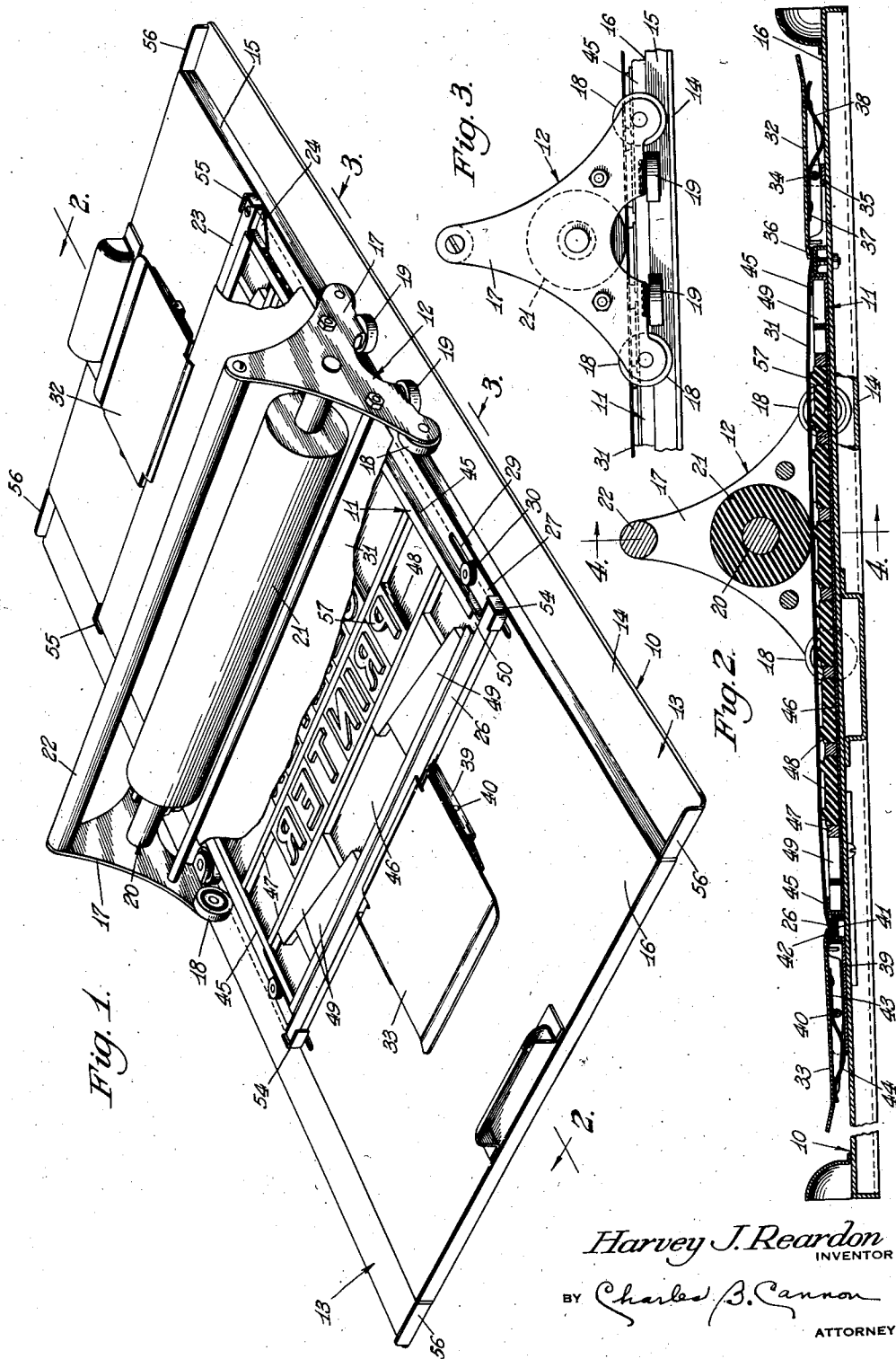
H. J. REARDON

1,924,288

PRINTING PRESS

Filed May 4, 1933

3 Sheets-Sheet 1



Harvey J. Reardon
INVENTOR

BY Charles B. Cannon
ATTORNEY

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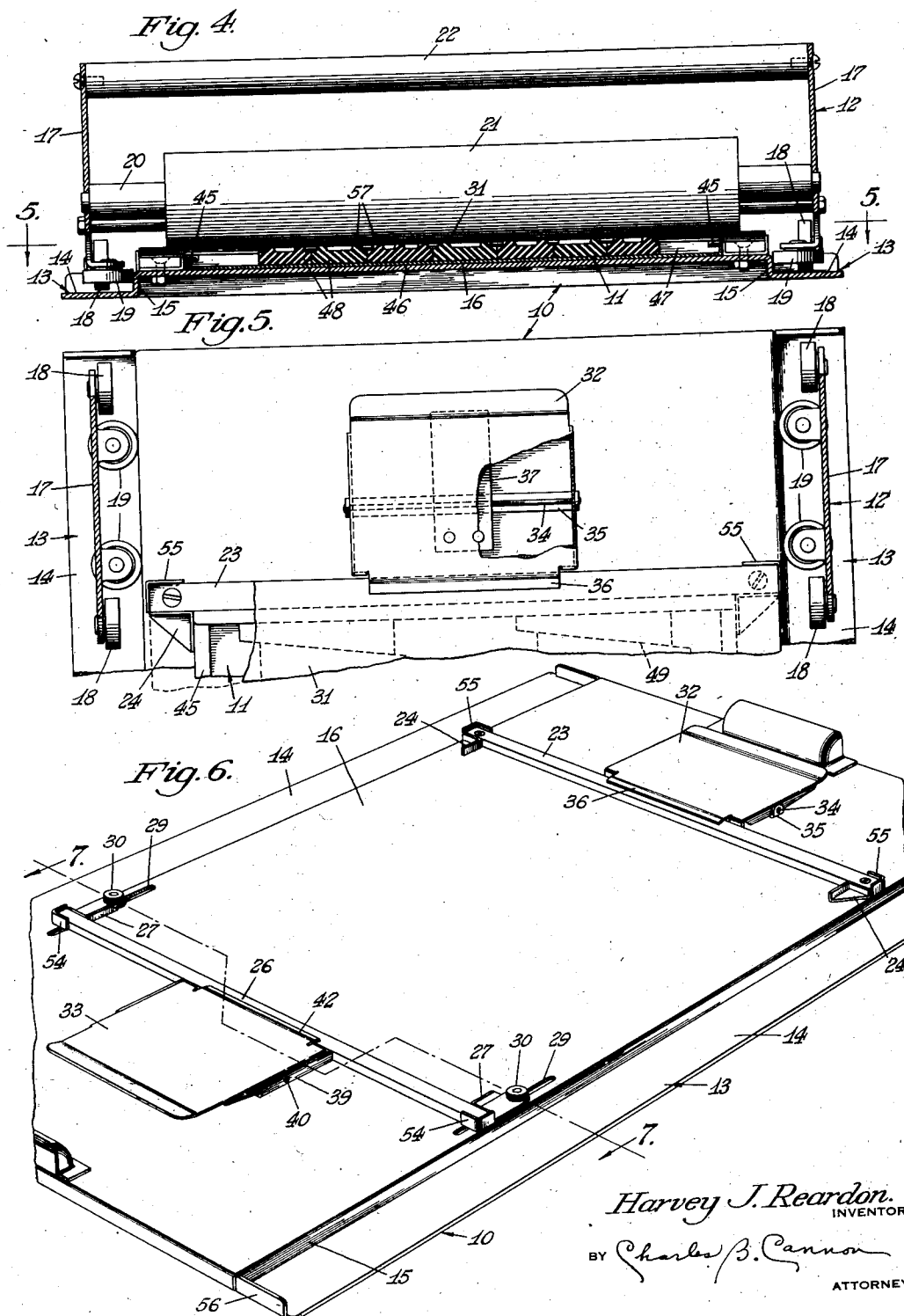
H. J. REARDON

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3 Sheets-Sheet 2



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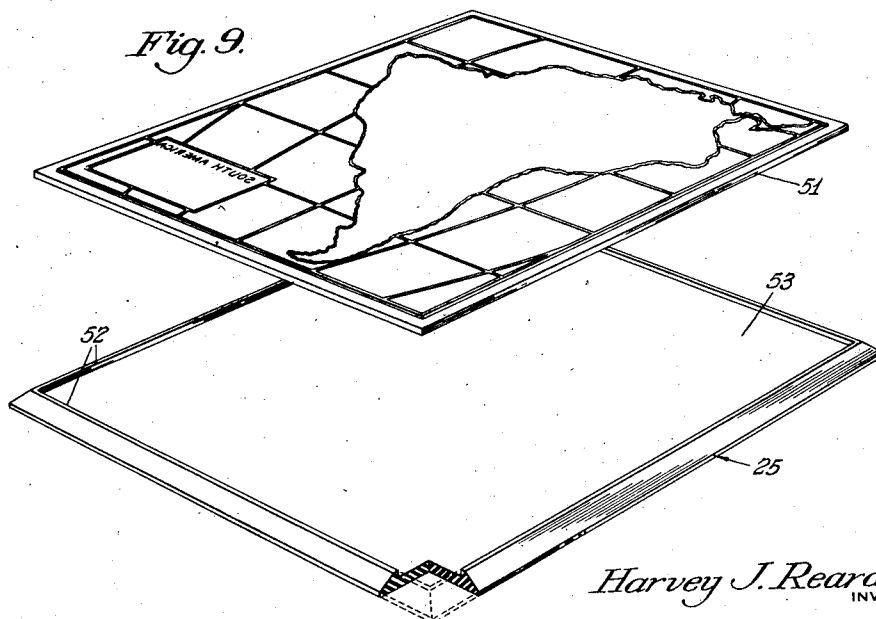
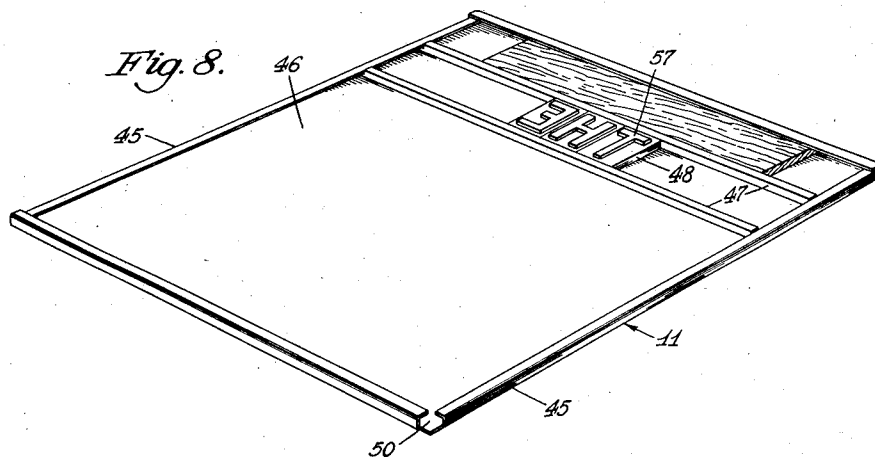
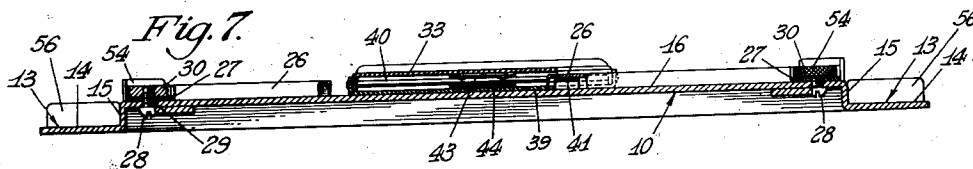
H. J. REARDON

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PRINTING PRESS

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,924,288

PRINTING PRESS

Harvey J. Reardon, Chicago, Ill.

Application May 4, 1933. Serial No. 669,392

22 Claims. (Cl. 101—269)

This invention relates to certain novel improvements in printing presses.

Objects of this invention are: to provide a hand printing press that is particularly adapted for the use of school children and others unskilled in the art of printing; to provide a press that is especially designed for printing from flat, shallow, rubber type, that are less than "type" high (0.918''); and to provide a press that is designed for printing from unmounted rubber and linoleum cuts.

Another object of the invention is to provide in a printing press, the combination of: a bed having parallel trackways; each of the trackways including a horizontal wall and a vertical wall; a carriage movable along the trackways and including an impression roller; said carriage including vertical anti-friction elements or rollers movable over the trackways in engagement with the said horizontal walls thereof; and said carriage including horizontal rollers or anti-friction elements movable over the trackways in engagement with the said vertical walls thereof to prevent lateral, shifting movement of the carriage and impression roller during the printing operation.

An additional object of the invention is to provide in a printing press, the combination recited in the last-named object plus a chase arranged on the bed of the press and a form of type assembled therein having their printing faces projecting slightly above the lowest point of the impression roller when the vertical rollers of the carriage are in engagement with the horizontal walls of the trackways so that the impression roller is forced to climb slightly up onto the printing faces of the type as it passes thereover; whereby the impression roller rides with its own weight and the weight of its carriage upon the printing faces of the type during the printing operation; the impression roller thereby accommodating itself and the paper thereunder, in a manner more fully explained hereinafter, to any little irregularities that may exist between the vertical heights of the several type in the chase prior to the start of the printing operation. This eliminates the necessity for planing and proving up the type and is an important feature of the new press.

A further object of the invention is to provide a novel combination of: means for locating a chase upon the bed; and means for locating paper sheets successively upon the chase, in printing position; said means including a slidable work-

and said means including a paper clamping member pivotally mounted on the said slidable work-locating bar for slidable movement therewith to accommodate itself to sheets of paper of different sizes, according to the size of the chase engaged by the slidable work-locating bar.

Another object of the invention is to provide, in combination, a hand printing press and a chase for printing from rubber type, unmounted rubber and linoleum cuts, rubber map printing forms or mats and the like; and in the use of which the necessity for planing and proving up the type assembled in the chase is eliminated.

A still further object of the invention is to provide a hand printing press that is especially designed for use with the chase described and claimed in my co-pending application, Ser. No. 669,083, filed May 3, 1933.

Still another object of the invention is to provide a novel arrangement of means for successively locating the corners of paper sheets in printing position upon the chase; said means including corner-locating pieces attached to and slidable with the aforementioned slidable work-locating bar and paper clamping member carried thereby.

A still further object of the invention is to provide a press that is so constructed that as many as ten good clear copies may be printed after each inking operation; the later copies being obtained by applying downward pressure upon the impression roller carriage to urge the impression roller into engagement with the type, or the like, in the chase.

Additional objects of the invention are: to provide the hand printing press hereinafter described and claimed; and to provide a press that is generally efficient in use, and relatively simple and inexpensive in construction.

Other objects will appear hereinafter as the description proceeds.

In the drawings:

Fig. 1 is a perspective view of a preferred form of the new printing press showing the chase assembled on the bed plate thereof in printing position;

Fig. 2 is a longitudinal sectional view on line 2—2 in Fig. 1;

Fig. 3 is a fragmentary end elevational view, on line 3—3 in Fig. 1, showing how the impression roller rides with its own weight and the weight of its carriage upon the rubber type during the printing operation, causing the vertical rollers of the impression roller carriage to ride up slightly off the horizontal walls of their trackways;

Fig. 4 is a vertical sectional view on line 4—4 in Fig. 2, also illustrating the feature referred to in the description of Fig. 3;

Fig. 5 is a fragmentary top plan view on line 5—5 in Fig. 4;

Fig. 6 is a perspective view of the bed plate of the press showing the construction of the trackways, work-locating bars, and paper clamps or clips;

Fig. 7 is a sectional view on line 7—7 in Fig. 6, also illustrating the parts referred to in the description of Fig. 6;

Fig. 8 is a perspective view of the chase showing rubber type and locking bars arranged therein; and

Fig. 9 is a perspective view showing a rubber map printing form or mat which may be arranged in the rubber chase shown in the lower half of the figure and used in the press for printing or reproducing geographical maps and the like.

A preferred form of the new printing press is illustrated in the drawings and the same includes a bed 10, chase 11, and impression roller carriage 12.

The bed 10 is preferably, and most economically, made by forming the same from a single plate or sheet of light metal, for which an aluminum alloy is preferred. This is, however, not to be considered in any way a limitation upon the selection of material used in making the bed 10, or the manner of forming the same.

Formed in the bed plate 10 along the longitudinal edges thereof are parallel trackways 13. Each of these trackways includes a horizontal wall 14 and a vertical wall 15 so that the top or upper surface 16 of the bed plate, upon which the chase 11 lies, is disposed somewhat above the horizontal walls 14 of the trackways 13.

Movable over the trackways 13, in engagement with the horizontal walls 14 thereof, are vertical rollers or anti-friction elements 18, which are carried by the frame 17 of the impression roller carriage 12. Also carried by the frame 17 of the carriage 12 and movable over the trackways 13, but in engagement with the vertical walls 15 thereof, are horizontal guiding rollers or anti friction elements 19. The frame 17 of the carriage 12 includes a handle 22, and a shaft 20 has its ends or trunnions rotatably journaled in the frame 17. Also a part of the carriage 12 and mounted on the shaft 20 is an impression roller 21 which is preferably made of relatively yieldable, so-called "hard" rubber, for reasons to appear hereinafter. This impression roller may, however, be made of wood, metal, or other equivalent substance.

Mounted on the surface 16 of the bed plate 10 are a fixed work-locating bar 23 and corner-locating pieces 24 (Fig. 6) for locating one end of the chase in printing position on the upper surface 16 of the bed plate. This chase may be either the metal chase 11 of Fig. 8 or the rubber tray or chase 25 of Fig. 9.

Slidably mounted on the upper surface 16 of the bed plate for locating the other end of the work (that is, one end of either the chase 11 or the chase 25) is a slidable work-locating bar 26 which has corner locating pieces 27 (Fig. 6) attached thereto. The slidable work-locating bar 26 is guided over the upper surface 16 of the bed plate 10 by means of bolts 28. These bolts 28 are carried by the corner-locating pieces 27 and project through, and work in, slots 29 formed in the bed plate 10. The bolts 28 carry clamping nuts 30 on their upper ends and these nuts 30 project

above the upper surface 16 of the bed plate 10 for movement thereover with the work-locating bar 26.

To hold an impression-receiving sheet, such as a sheet of paper 31, in printing position upon the type 48 assembled in the chase 11 a pair of paper-clamping members or clips 32 and 33 are provided. The clamp or clip 32 is pivotally mounted on a shaft 34 (Fig. 2). The shaft 34 is in turn mounted in a bracket 35 that is fixed to the upper surface 16 of the bed plate 10. The clamp or clip 32 has an angled end or lip 36 and this lip 36 is urged downwardly into clamping engagement against the top of the work-locating bar 23 by means of a flat, leaf spring 37. This spring 37 is attached to the bottom side of the clamp or clip 32 and has an angled portion 38 that bears on the top surface 16 of the bed plate 10.

The paper-clamping member or clip 33, instead of being fixed relative to the bed plate 10, as is the clamp 32, is slidable over the bed plate 10 with the work-locating bar 26. To this end the clamp 33 is pivotally mounted on a shaft 40 which is carried by a slidable supporting frame or plate 39. This plate 39 has an end portion 41 (Fig. 2) which is angled under the work-locating bar 26. This end portion 41 is channel-shaped in cross section to correspond to the cross sectional shape of the bar 26, so that the bar 26 is in effect mounted on, and carried by, the angled end portion 41 of the paper-clamping member 33 for slidable movement therewith over the upper surface 16 of the bed plate 10.

The paper clamping member 33 has an angled lip 42 at its inner end and this lip 42 is urged into engagement with the upper surface of the fixed work-locating bar 26 by means of a flat, leaf spring 44. The leaf spring 44 is attached to the under side of the clip 33 and has an angled portion 44 bearing on the base 39 (Fig. 2) to urge the clamp 33 clockwise (Fig. 2) on its shaft 40.

The case 11 (Fig. 8) has a flat base 46 and a marginal flange 45 formed integrally therewith. This flange provides a channelway or groove that extends around the edges of the base 46 and slidably receives the end portions of the locking bars 47 (Fig. 4) that are slidably mounted on the base 46. These locking bars 47 cooperate with the other elements of the lock-up means assembled in the chase, including the wedges or quoins 49 (Fig. 1), and suitable furniture assembled in the chase, to lock up the form of flat, shallow, rubber type 48, either alone or with an unmounted rubber or linoleum printing cut, as more fully set forth in my aforementioned co-pending application.

It will be noted by a careful study of Figs. 2 and 4 that the printing faces 57 of the rubber type 48 project slightly above the lowermost point that the impression roller 21 assumes when the vertical rollers 18 are in engagement with the horizontal walls 14 of the trackways 13, for a reason to be explained hereinafter.

An inlet 50 is provided in the flange 45 at one corner of the chase 11 for slidably inserting the locking bars 47 onto the base 46 of the chase 11. A second inlet may be provided, for convenience, if desired, at the corner of the chase 11 that is diagonally opposite the corner at which the inlet 50 is formed.

In place of the chase 11 and the form of rubber type 48 and/or any unmounted rubber or linoleum printing cuts assembled therewith, a rubber printing form or mat 51 (Fig. 9) may be substituted. The rubber printing form or mat 51

shown is thin and flexible, is designed for printing geographical maps, and has a raised outline map formed thereon.

In using the printing form, or mat 51, the same is assembled in the tray or chase 25. This tray 25 is relatively rigid, compared to the flexible printing form 51, and has a flat base 53 and a raised marginal edge 52 extending therearound. This edge 52 is of the same size as the printing form or mat 51 so that the latter may be fitted onto the base 53 within the raised edge 52 and held by the edge 52 against shifting on the base 53. The tray 25 and the form 51 assembled therein are placed in printing position upon the upper surface 16 of the bed plate 10. The base 53 of the tray 25 then serves as a mounting for the form 51 to raise the printing face of the printing form 51 up high enough to engage the impression roller 21.

Formed in the bed plate 10 at the ends of the trackways 13 to prevent the carriage 12 from overrunning the trackways are stops 56.

Attached to, and projecting slightly above, the work-locating bars 26 and 23, respectively, (Figs. 1, 5, 6 and 7) are means in the form of angled corner-locating pieces 54 and 55 which cooperate with the clamping members 32 and 33 to register successive sheets of paper in printing position upon the chase 11 or tray 25.

Operation

To print with the new press from the chase 11, a form of flat, shallow, rubber type 48 and/or an unmounted rubber or linoleum cut, (shown in my aforementioned co-pending application), or a combination of these, may be assembled in the chase 11 and locked therein by the lock-up means; which lock-up means includes the locking bars 47 and wedges 49. The chase 11 is then placed on the upper surface 16 of the bed 10, with one end of the chase 11 abutting the fixed work-locating bar 23 and fitting within the corner-locating pieces 24 (Fig. 1). The slidable work-locating bar 26 is then slid over the top surface 16 of the bed plate, toward the bar 23, and into engagement with the other end of the chase 11, so that the corners of the chase lie within the corner-locating pieces 24-27. The clamping nuts 30 are then tightened down against the corner-locating pieces 27 to clamp the work-locating bar 26 and the chase 11 in assembled, printing, position on the bed plate 10 of the press.

An inking roller or brayer (not shown) is then run over the printing faces 57 of the type 48, and/or any unmounted rubber or linoleum cuts that may be assembled therewith in the chase 11. A sheet of paper 31 is then laid over the chase 11 above the printing faces 57 of the inked type 48 and/or any unmounted rubber or linoleum cuts (not shown) locked therein; the corners of the paper 31 being arranged in the corner-locating pieces 54 and 55 that are attached to, and project slightly above, the work-locating bars 26 and 23, respectively, (Figs. 1, 5, 6, and 7). The impression roller carriage 12 being disposed, at one end of the bed plate 10, for example at the right hand end, as the press is seen in Figs. 1 and 2, the right hand edge of the sheet 31, as seen in Figs. 1 and 2, is then clamped down by inserting the same under the lip 36 of the clamping member 32, thereby clamping this edge of the paper sheet 31 against the upper surface of the work-locating bar 23. The paper sheet 31 is thus registered and held in printing position

upon the chase, whereupon the impression roller carriage 12 is moved across the bed 10 (to the left, Figs. 1 and 2) to complete the operation of printing upon the sheet 31.

After the operation of printing upon the first sheet 31 has been completed, another sheet 31 is laid over the chase, and the left hand edge of the sheet (as seen in Figs. 1 and 2) is inserted under the lip 42 of the paper clamping member 33, and the corners of the sheet are inserted into the corner-locating pieces 54 and 55, whereupon the carriage 12 is again moved across the bed 10 to the right, Figs. 1 and 2. The second sheet 31 thus printed upon is thereupon removed and this cycle of operations completed; successive sheets 31 being thus laid and registered in printing position upon the chase so that successive copies of the form of type, type and cuts, or printing cuts alone, assembled in the chase may be printed therefrom by successively registering the sheets 31 in printing position upon the chase in the manner stated. It is to be noted that it is necessary to clamp down only one end of the paper sheet 31, namely, the end away from which the carriage 12 is to travel during the printing operation.

As the carriage 12 moves over the chase 11 during the printing operation, the vertical rollers 18 of the carriage travel on the horizontal walls 14 of the trackways 13 and the horizontal rollers 19 engage or bear against the vertical walls 15 of the trackways 13. As the carriage 12 and its impression roller 21 run over the chase 11, the impression roller 21 climbs slightly, over the paper 31, up onto the printing faces 57 of the rubber type 48, and, in so doing, the impression roller 21 lifts the vertical rollers 18 of the carriage 12 slightly above and off the horizontal walls 14 of the trackways 13 (see Figs. 2, 3, and 4). The effect of this action of the impression roller 21 in climbing up onto the printing faces 57 of the rubber type 48 is that it causes the impression roller 21 to ride with its own weight and the weight of its carriage 12 upon the printing faces 57 of the rubber type 48 during the printing operation. During this time, however, the horizontal rollers 19 remain in engagement with the vertical walls 15 of the trackways 13 and cooperate therewith to prevent lateral or shifting movement of the impression roller 21 and its carriage 12 during the printing operation. This cooperation of the horizontal rollers 19 with the vertical walls 15 of the trackways 13 to guide and prevent lateral or shifting movement of the impression roller 21 and its carriage 12, during the printing operation, is an important feature of the new press. This is because of the fact that the vertical rollers 18 do not at any time in the present apparatus function to guide the carriage 12 against lateral movement. This duty is performed by the horizontal rollers 11 both before and after the impression roller 21 climbs up onto the printing faces 57 of the type 48 and thereby lifts the vertical rollers 18 off the horizontal walls 14 of the trackways 13 during the printing operation. It is to be noted, therefore, that this arrangement of the trackways 13 and carriage 12 is unique in that the carriage may ride up off the horizontal walls of its trackways and still be guided by the vertical walls of the same against lateral movement. It is considered that this feature is new in the art.

The carriage 12 may also be operated with unmounted rubber or linoleum cuts assembled in

the chase 11, either with or without the rubber type 48, and also when using a flexible rubber printing form or mat such as the map printing form 51, assembled in a tray, such as 25, on the bed plate 10.

As the impression roller 21 rides with its own weight and the weight of its carriage 12 upon the rubber type 48, during the printing operation, it compresses the rubber type 48 slightly and, in so doing, accommodates itself and the paper 31 thereunder to any little irregularities or differences in height that may exist between the printing faces 57 of the several rubber type 48, or between the printing faces of the type and the printing faces of any unmounted rubber or linoleum cuts that may be assembled therewith in the chase 11. This is an important feature of the new printing press since it is this feature of the press that eliminates the prior art practice and necessity for planing and proving up the printing faces of the heretofore customarily used metal type to a common level prior to the printing operation. This result could not be effected, of course, with incompressible metal type and is considered new in the art. The following example will better explain how the present apparatus accomplishes this result of eliminating the necessity for planing and proving up the type: Assume that there is a slight difference in vertical height between the printing faces 57 of the type "P" and "R" which form the first two letters of the word "Printer" in the chase 11 (Fig. 1). If the type 48 were metal type this difference would necessitate planing and proving up the type to a common height or else a poor reproduction or print would be formed on the paper sheet 31, since metal type are, of course, incompressible. However, in the use of the present apparatus, including the compressible rubber type 48, as the impression roller 21 is run over the chase during the printing operation it "climbs" slightly, in the manner hereinbefore described, up onto the printing faces 57 of the type 48, whereupon the weight of the impression roller 21 and its carriage 12 compresses the higher of the two type "P" and "R", referred to in this example, and in so doing brings the printing face 57 of the higher type down to a common level with the printing face of the lower type. Thus, the paper 31 is forced into engagement with the inked printing faces 57 of both type and a good sharp, clear print or reproduction on the paper 31 is thus assured and the prior art necessity for, and customary practice of, planing and proving up the metal type always heretofore used is thereby eliminated.

The best results have been obtained in the use of the present apparatus when using an impression roller 21 that is made of so-called hard rubber that has some yieldability. This is because of the fact that some yieldability in the impression roller 21 helps the impression roller better to accommodate itself during the printing operation to any little irregularities that may exist between the vertical heights of the printing faces 57 of the rubber type 48 assembled in the chase. However, the impression roller 21 may be made of wood, metal, or other substance, and the present apparatus will still function satisfactorily.

The present apparatus is especially designed for the use of, and will find its greatest use among, school children. Because of this fact, the elimination of the necessity for planing and proving up the rubber type, and the consequent need for a proof table, mallets, and other apparatus

used in planing and proving up type, is a matter of considerable importance. This feature is especially important because of the fact that school children do not possess the skill necessary to plane and prove up type; and because, furthermore, proof tables, mallets and other apparatus used for planing and proving up type are expensive and could not be considered in the budgets of the schools in which the present apparatus will find its greatest use, namely, in schools that are, in general, too small to support a machine operated printing press.

The flexible rubber map printing form or mat 51 is made relatively thin and flexible to minimize the cost of the same, as the cost of these flexible rubber printing forms, or dies, increases greatly with the thickness of the same. To bring the printing face of the rubber map form or mat 51 up sufficiently high to engage the impression roller 21 during the printing operation, the rubber chase or tray 25 is provided. In use the chase or tray 25 is placed on the upper surface 16 of the bed 10, and the form or mat 51 placed therein. The slidable work-locating bar 26 is then slid into engagement with one end of the tray 25 to locate the latter and the form 51 in printing position. A sheet of paper is then laid over the printing form 51 and tray 25 and located and clamped in printing position, in the manner hereinbefore described for locating and clamping the sheet 31, whereupon the carriage 12 and impression roller 21 are run over the paper to complete the printing operation.

The tray 25 permits the use of relatively thin and flexible printing forms or mats 51 which would otherwise buckle or curl up if the slidable work-locating bar 26 were forced directly thereagainst to clamp the flexible printing form or mat 51 in printing position upon the bed 10. The tray 25 thus provides an external support to prevent buckling of the flexible printing form 51 used therein. The tray 25 shown is made of rubber but it may be made of other material than rubber, such, for example, as wood, metal, or other material. However, the tray 25 is preferably made of resilient rubber because when made of this material it provides a resilient, yieldable base for the printing form or mat 51. This enables the mat 51 to yield slightly under the weight of the impression roller 21 and its carriage 12 so that the impression roller 21 and the paper sheet laid over the mat 51 may accommodate themselves during the printing operation to any little irregularities that may exist between the vertical heights of the lines inscribed or molded on the printing face of the map printing form 51. Since the tray 25 thus permits the use of thin, flexible printing forms 51, it materially reduces the expenditure involved in the use of these printing forms, the cost of which increases greatly with the thickness of the same.

The printing faces 57 of the rubber type 48 assembled in the chase and the bottom of the impression roller 21 are less than "type" high (0.918") above the upper surface 16 of the bed 10. This arrangement permits the use of unmounted rubber cuts and unmounted linoleum cuts in the chase 11, either with or without rubber type 48. As set forth in my aforementioned copending application, this is a matter of considerable importance since it effects a distinct economy in the use of rubber and linoleum cuts. The explanation of this resides in the fact that mounted linoleum and mounted rubber for use in making these cuts is very much more expensive than the

unmounted material. This form of art work has become increasingly popular in the schools in recent years, and to be able to practice it using unmounted linoleum and unmounted rubber for making the cuts greatly reduces the expense and expenditure involved, especially when considering the fact that mounted linoleum blocks are very expensive (ten to fifteen cents per square inch) while unmounted linoleum is, relatively, very cheap; and scraps of this material may often be obtained for the asking by school children at stores and factories where this material is cut up, used, and sold.

The reason for the prior art practice of using mounted material for making these cuts resides in the fact that the prior art chases have in general been designed for use with metal type of the conventional type height (0.918"), and, in order to use rubber or linoleum cuts with metal type of this height it is necessary to bring the printing faces of the cuts up to the same height, that is, "type" height, (0.918"). Consequently, in order to bring the printing faces of the rubber or linoleum cuts up to "type" height (0.918") it has always been the prior art practice to mount the material used in making these cuts on a wooden block or base. The present apparatus is, therefore, believed to be the first ever designed so that printing may be done therewith from unmounted rubber and linoleum cuts. This belief is supported by the fact that inquiry made of persons employed at the Chicago Art Institute, who are thoroughly familiar with this form of art work, revealed that to their knowledge printing from unmounted rubber and linoleum cuts had never been done and that no apparatus was available for so doing.

It may also be said here that unmounted linoleum cuts for use with the present apparatus may be made directly from so-called "battleship" linoleum by cutting the same into the desired sizes. This material comes on the market in two standard sizes, namely, 6 mm., and 6.35 mm., both thicknesses of which are less than the conventional "type" height (0.918"), of metal type with which mounted linoleum and rubber cuts have always heretofore been used.

The work-locating bar 26 is slidably mounted on the bed plate 10 so that it may be at different times moved into engagement with one end of the chase 11 or into engagement with one end of the printing form tray 25; the tray or chase 25 being shorter in length than the chase 11. The paper clamp 33 is mounted on and made slidable with the slidable work-locating bar so that it may be accommodated to the size of the paper sheets that are used when printing from the tray 25 and printing form 51; these sheets being shorter than the sheets used when printing from the chase 11.

The feature of mounting one of the two pivotal paper clamping members and two of the corner-locating pieces 54 on the slidable work-locating bar 26 for slidable movement therewith relative to and over the bed 10, while mounting the other paper clamping member and the other two corner-locating pieces 55 so that the same are fixed, relative to the bed 10, is an important feature of the present apparatus since it readily enables printing to be done upon sheets of paper of different sizes or lengths.

It has been found by experiment with the present apparatus that as many as ten good, clear copies can be printed after each inking operation. This is because of the fact that when the ink on,

for example, the printing faces 57 of the rubber type 48 (or on the printing form 51, or on a rubber or linoleum cut assembled in the chase 11) begins to play out, after the first four or five copies or so have been made, on paper sheets, such as 31, downward pressure may be applied on the handle 22 of the impression roller carriage 12 to urge the impression roller 21 against the paper sheet 31, thereby urging the sheet 31 into engagement with the inked printing faces 57 of the type 48 (for example). In this way a larger number of good, clear copies can be obtained after each inking operation than would otherwise be possible. The explanation of this lies, of course, in the downward pressure applied upon the handle 22 of the impression roller carriage 12. This pressure is effective to force the impression roller 21 against the paper sheet 31 because of the fact that the impression roller 21 and its carriage 12 ride upon the printing faces 57 of the type 48 during the printing operation and thereby lift the vertical rollers 18 of the carriage 12 up off the horizontal walls 14 of the trackways 13. It is, therefore, evident that if the vertical rollers 18 did not ride up slightly off the horizontal walls 14 of the trackways 13 during the printing operation, downward pressure applied upon the carriage 12 would be ineffective to force the impression roller 21 forcibly against the paper sheet 31 and the latter against the inked printing faces 57 of the type 48, and hence downward pressure on the carriage 12 would be unable to accomplish its intended purpose.

It is desirable to be able to print ten or so copies after each inking operation because this minimizes the time and labor involved in inking the type. Some of the prior art presses seek to accomplish this by making the impression roller vertically adjustable on the frame of the carriage, relative to the bed of the press, but in the present apparatus this variation of the downward pressure of the impression roller may be controlled by the operator, in the manner hereinbefore explained, without necessitating any adjustment of the impression roller 21 in, or relative to, its frame 17; it being noted that the roller 21 in the present apparatus is incapable of any adjustment in the carriage frame 17 relative to the bed 10. Thus the present carriage 12 accomplishes, without adjustment of the impression roller 21 in its carriage 12, what some of the prior art impression roller carriages seek to accomplish by making the impression roller vertically adjustable in its carriage, relative to the bed of the press, namely, variation in the downward pressure that the impression roller exerts on the impression-receiving paper sheet and type thereunder during the printing operation.

Another feature of the present press that is considered new in the art, and of merit, is that it is possible to print with the present press on sheets of paper, poster cardboard, and the like, of different thicknesses, without adjusting either the height of the type, chase, or impression roller. This is because of the fact that the impression roller 21 and its carriage 12, being freely movable vertically, and yet guided against lateral movement by the engagement of the rollers 19 with the vertical walls 15 of the trackways, accommodate themselves to paper, cardboards, and the like of different thicknesses, that may be laid over the chase 11 or tray 25, without adjustment of the height of the impression roller 21, the chase, or the type or printing form therein. This could not be done in the prior art presses, in so far as I

am aware. Thus, for example, if, in the prior art presses it were desired to print, from the same form or set up of type, ten hand bills on ordinary paper of approximately 0.003" thickness, and then ten posters on regulation poster cardboard, which is about 0.050" in thickness, it would be necessary in the latter case either to raise the height of the impression roller, or to lower the height of the type.

The term "printing form" as used in the appended claims is generic and is intended to include a form of rubber type 48, a printing mat or form, such as 51, an unmounted linoleum cut, an unmounted rubber cut, a wood cut, or any combination of these that may be assembled upon the bed of the press in a chase, such as 11, or a tray such as 25, in the manner hereinbefore set forth or otherwise.

While I have described the preferred embodiments of the present printing press, the invention is not limited to the exact details of construction set forth, it being intended that the present invention shall include such variations and modifications as come within and are permissible within the scope of the appended claims.

I claim:

1. In a printing press, the combination of: a bed; work-locating means on the bed including a work-locating bar slidably mounted on and guided over the bed; and paper-locating means on the bed including a paper-clamping member pivotally mounted on and slidable with the said work-locating bar over the said bed.

2. In a printing press, the combination of: a bed having parallel trackways each including a horizontal wall; relatively flat, shallow rubber type arranged upon the said bed; and a carriage including an impression roller movable over the said bed and including vertical rollers movable along the horizontal walls of said trackways; the printing faces of said type being arranged slightly above the lowermost point of the impression roller when the said vertical rollers are in engagement with the horizontal walls of said trackways so that the impression roller is forced to climb slightly up onto the printing faces of the type as it moves thereover, thereby causing the impression roller to ride with its own weight and the weight of its carriage upon the printing faces of the type during the printing operation and thereby slightly compressing the said type and accommodating the impression roller and the impression-receiving sheet thereunder to any little irregularities that may exist between the vertical heights of the printing faces of the several type prior to the printing operation.

3. In a printing press, the combination of: a bed having parallel trackways each including a horizontal wall; relatively flat, shallow rubber type arranged upon the said bed; and a carriage including an impression roller movable over the said bed and including vertical rollers movable along the horizontal walls of said trackways; the printing faces of said type being arranged slightly above the lowermost point of the impression roller when the said vertical rollers are in engagement with the horizontal walls of said trackways so that the impression roller is forced to climb slightly up onto the printing faces of the type as it moves thereover, thereby causing the impression roller to ride with its own weight and the weight of its carriage upon the printing faces of the type during the printing operation and thus accommodating the impression roller and the paper sheet thereunder to any little irregularities

that may exist between the vertical heights of the printing faces of the several type prior to the printing operation; the said carriage including other rollers movable over the trackways and cooperating therewith to prevent lateral shifting movement of the carriage and impression roller both when the impression roller is riding upon the printing faces of the type and when riding off the same during the printing operation.

4. In a hand printing press, the combination of: a bed; means including a slidable work-locating bar arranged upon the bed for locating a chase in printing position upon the bed and means including a paper clamping member pivotally mounted on and slidable with said slidable work locating bar for locating a paper sheet in printing position upon, and relative to, the said chase.

5. In a hand printing press, the combination of: means arranged upon the bed for locating a chase and printing form therein in printing position upon the bed; said locating means including a slidable work-locating bar guided for movement over said bed and adapted for engagement with one end of said chase; and means for successively locating paper sheets in printing position upon, and relative to, the said bed and chase; said paper locating means including a paper-clamping member pivotally mounted on and slidable with said slidable work-locating bar; said paper-locating means including pieces attached to said slidable bar and movable therewith for successively locating corresponding corners of the said paper sheets upon, and relative to, the said chase.

6. In a printing press, the combination of: a bed having parallel trackways; a printing form arranged upon the bed; and a carriage including an impression roll movable over the said bed; said carriage including anti-friction elements movable over and normally bearing with their own weight and the weight of said carriage upon said trackways; said printing form including a printing face have component parts and said printing face projecting slightly above the lowermost point of said impression roll when the said anti-friction elements are in bearing engagement with the said trackways; so that the said impression roll is forced to climb slightly up onto the said printing face as it is moved thereover; thereby lifting the said anti-friction elements up out of engagement with said trackways and causing the impression roll to ride with its own weight and the weight of its carriage upon the said printing face of the form during the printing operation; thereby accommodating the said impression roll and the impression-receiving member adapted to be laid thereunder upon said printing face to any little irregularities or differences that may exist between the vertical heights of the said component parts of said printing face prior to the start of the printing operation; the said carriage including other anti-friction elements cooperating with the said trackways to prevent lateral movement of the carriage and its impression roll both when the impression roll is riding with its own weight and that of its carriage upon the said printing face and when the said impression roll is riding off from the said printing face as the carriage is moved over the bed.

7. In a printing press, the combination of: a bed having parallel trackways; a resilient, compressible printing form arranged upon the bed; and a carriage including an impression roll movable over the said bed; said carriage including

anti-friction elements movable over and normally bearing with their own weight and the weight of said carriage upon said trackways; said printing form including a printing face having component parts and said printing face projecting slightly above the lowermost point of said impression roll when the said anti-friction elements are in bearing engagement with the said trackways; so that the said impression roll is forced to climb slightly up onto the said printing face as it is moved thereover; thereby lifting the said anti-friction elements up out of engagement with said trackways and causing the impression roll to ride with its own weight and the weight of its carriage upon the said printing face of the form during the printing operation; thereby slightly compressing the said form and thus accommodating the said impression roll and the impression-receiving member adapted to be laid thereunder upon said printing face to any little irregularities or differences that may exist between the vertical heights of the said component parts of said printing face prior to the start of the printing operation; the said carriage including other anti-friction elements cooperating with the said trackways to prevent lateral movement of the carriage and its impression roll both when the impression roll is riding with its own weight and that of its carriage upon the said printing face and when the said impression roll is riding off from the said printing face as the carriage is moved over the bed.

8. In a printing press, the combination of: a bed having parallel trackways; a resilient, compressible printing form arranged upon the bed; and a carriage including a resilient, compressible impression roll movable over the said bed; said carriage including anti-friction elements movable over and normally bearing with their own weight and the weight of said carriage upon said trackways; said printing form including a printing face having component parts and said printing face projecting slightly above the lowermost point of said impression roll when the said anti-friction elements are in bearing engagement with the said trackways; so that the said impression roll is forced to climb slightly up onto the said printing face as it is moved thereover; thereby lifting the said anti-friction elements up out of engagement with said trackways and causing the impression roll to ride with its own weight and the weight of its carriage upon the said printing face of the form during the printing operation; thereby slightly compressing said printing form and impression roll and thus accommodating the said impression roll and the impression-receiving member adapted to be laid thereunder upon said printing face to any little irregularities or differences that may exist between the vertical heights of the said component parts of said printing face prior to the start of the printing operation; the said carriage including other anti-friction elements cooperating with the said trackways to prevent lateral movement of the carriage and its impression roll both when the impression roll is riding with its own weight and that of its carriage upon the said printing face and when the said impression roll is riding off from the said printing face as the carriage is moved over the bed.

9. In a printing press, the combination of: a bed having parallel trackways; a printing form arranged upon the bed; and a carriage including an impression roll movable over the said bed; said carriage including anti-friction elements mov-

able over and normally bearing with their own weight and the weight of said carriage upon said trackways; said printing form including a printing face having component parts and said printing face projecting slightly above the lowermost point of said impression roll when the said anti-friction elements are in bearing engagement with the said trackways; so that the said impression roll is forced to climb slightly up onto the said printing face as it is moved thereover; thereby lifting the said anti-friction elements up out of engagement with said trackways and causing the impression roll to ride with its own weight and the weight of its carriage upon the said printing face of the form during the printing operation; thereby accommodating the said impression roll and the impression-receiving member adapted to be laid thereunder upon said printing face to any little irregularities or differences that may exist between the vertical heights of the said component parts of said printing face prior to the start of the printing operation.

10. In a printing press, the combination of: a bed having parallel trackways; a resilient, compressible printing form arranged upon the bed; and a carriage including an impression roll movable over the said bed; said carriage including anti-friction elements movable over and normally bearing with their own weight and the weight of said carriage upon said trackways; said printing form including a printing face having component parts and said printing face projecting slightly above the lowermost point of said impression roll when the said anti-friction elements are in bearing engagement with the said trackways; so that the said impression roll is forced to climb slightly up onto the said printing face as it is moved thereover; thereby lifting the said anti-friction elements up out of engagement with said trackways and causing the impression roll to ride with its own weight and the weight of its carriage upon the said printing face of the form during the printing operation; thereby slightly compressing the said form and thus accommodating the said impression roll and the impression-receiving member adapted to be laid thereunder upon said printing face to any little irregularities or differences that may exist between the vertical heights of the said component parts of said printing face prior to the start of the printing operation.

11. In a printing press, the combination of: a bed having parallel trackways; a resilient, compressible printing form arranged upon the bed; and a carriage including a resilient, compressible impression roll movable over the said bed; said carriage including anti-friction elements movable over and normally bearing with their own weight and the weight of said carriage upon said trackways; said printing form including a printing face having component parts and said printing face projecting slightly above the lowermost point of said impression roll when the said anti-friction elements are in bearing engagement with the said trackways; so that the said impression roll is forced to climb slightly up onto the said printing face as it is moved thereover; thereby lifting the said anti-friction elements up out of engagement with said trackways and causing the impression roll to ride with its own weight and the weight of its carriage upon the said printing face of the form during the printing operation; thereby slightly compressing said printing form and impression roll and thus accommodating the said impression roll and the impression-receiving

member adapted to be laid thereunder upon said printing face to any little irregularities or differences that may exist between the vertical heights of the said component parts of said printing face prior to the start of the printing operation.

12. In a printing press, the combination of: a bed; work-locating means on the bed including a work-locating member slidably mounted on and guided for movement over said bed; and means for locating an impression-receiving sheet upon and relative to said bed including a clamping member movably mounted on and slidable with the said work-locating member over said bed.

13. In a printing press, the combination of: a bed; work-locating means on the bed including a work-locating member slidably mounted on and guided for movement over said bed; and means for successively locating impression-receiving sheets in printing position upon and relative to said bed including a clamping member movably mounted on and slidable with said slidable work-locating member; said second-named and sheet-locating means including members attached to and slidable with said slidable work-locating member for successively locating corresponding corners of the said impression-receiving sheets in printing position upon and relative to said bed.

14. In a printing press, the combination of: a bed having parallel trackways each including a vertical wall and a horizontal wall; and an impression-roll carriage movable over said bed; said carriage having vertical anti-friction elements movable over, and normally bearing with their own weight and the weight of said carriage upon, the upper surfaces of the said horizontal walls of said trackways; said carriage being free to move and being adapted to move during the printing operation in a vertical plane relative to and above said bed up onto the printing face of a printing form assembled upon said bed; and said carriage including other and horizontal anti-friction elements having bearing engagement with the said vertical walls of the trackways and cooperating with the latter to prevent lateral or shifting movement of the carriage both when the said vertical anti-friction elements are in engagement with and bearing upon the said horizontal walls of the said trackways and when said carriage climbs slightly up onto the printing face of said printing form and thereby raises said vertical anti-friction elements up off from and above the horizontal walls of said trackways during the printing operation.

15. In a printing press: a bed having substantially parallel trackways each including a vertical wall and a horizontal wall; and an impression roll carriage movable over said bed; said carriage including vertical anti-friction elements normally bearing with their own weight and the weight of said carriage upon the upper surfaces of said trackways; and said carriage including other and horizontal anti-friction elements having bearing engagement with the said vertical walls of the trackways and cooperating with the said vertical walls to prevent movement of the carriage in a direction transverse to the axis of the trackway as it is moved over said bed.

16. In a printing press: a bed having substantially parallel trackways each including a substantially vertical wall and a substantially horizontal wall; and an impression roll carriage movable over said bed; said carriage including anti-friction elements movable along said track-

ways; certain of said anti-friction elements bearing with their own weight and the weight of said carriage upon the upper surfaces of the said horizontal walls of the trackways; and certain others of said anti-friction elements having bearing engagement with the said vertical walls of the trackways and cooperating with the latter to prevent movement of the carriage in a direction transverse to the axis of the trackways as it is moved over said bed.

17. In a printing press: a bed having substantially parallel trackways each including a substantially vertical wall and a substantially horizontal wall; and an impression roll carriage movable over said bed; said carriage being freely movable in a vertical plane relative to and above said bed and trackways so as to enable it to climb slightly during the printing operation up onto the printing face of a printing form assembled on the bed but normally bearing with its own weight upon the upper surfaces of the said horizontal walls of the trackways as it is moved over said bed; and said carriage including anti-friction elements having bearing engagement with the said vertical walls of the trackways and cooperating with the latter to prevent movement of the carriage in a direction transverse to the axis of the trackways both when the carriage is riding with its weight upon the horizontal walls of said trackways and when it is riding off from and above the said horizontal walls and upon the printing face of said printing form during the printing operation.

18. In a printing press, the combination of: a bed having substantially parallel trackways each including a vertical wall and a horizontal wall; an impression-roll carriage movable over said bed; said carriage being freely movable in a vertical plane relative to and above said bed as it is moved thereover during the printing operation so as to accommodate its impression roll to any little irregularities or differences in vertical height that may exist between the component parts of a printing form or the like assembled on the bed; but said carriage normally riding and bearing with its own weight upon the said horizontal walls of the trackways; said carriage being equipped with anti-friction means and said anti-friction means cooperating with the said trackways to prevent movement of the carriage in a direction transverse to the axis of the trackways both when the carriage is riding and bearing with its own weight upon the horizontal walls of the trackways and when the carriage is riding off from and above the said horizontal walls of the trackways as it is moved over the bed during the printing operation.

19. In a printing press, the combination of: a bed adapted to have arranged thereon an impression-transmitting form or body and having substantially parallel trackways each including a vertical wall and a horizontal wall; an impression-roll carriage movable over said bed; said carriage being freely movable in a vertical plane relative to and above said bed as it is moved thereover during the impression-transmitting operation to enable its impression roll to climb slightly up onto the impression-transmitting face of an impression-transmitting form or body arranged upon the said bed; but said carriage normally riding and bearing with its own weight upon the said horizontal walls of the trackways; said carriage being equipped with guiding means and said guiding means cooperating with said

trackways to prevent movement of the carriage in a direction transverse to the axis of the trackways both when the carriage is riding and bearing with its own weight upon the horizontal walls of the trackways and when the carriage is riding off from and above the said horizontal walls of the trackways during the impression-transmitting operation.

20. In a printing press, the combination of: a bed adapted to have arranged thereon an impression-transmitting form or body and having substantially parallel trackways each including a vertical wall and a horizontal wall; an impression-roll carriage movable over said bed; said carriage being freely movable in a vertical plane relative to and above said bed as it is moved thereover during the impression-transmitting operation to enable its impression roll to climb slightly up onto the impression-transmitting face of an impression-transmitting form or body arranged upon the said bed; but said carriage normally riding and bearing with its own weight upon the said horizontal walls of the trackways; said press being equipped with guiding means and said guiding means preventing movement of the carriage in a direction transverse to the axis of the trackways both when the carriage is riding and bearing with its own weight upon the horizontal walls of the trackways and when the carriage is riding off from and above the said horizontal walls of the trackways during the impression-transmitting operation.

21. A printing press comprising the combination of: a bed having substantially parallel trackways; a carriage movable over the bed along

the trackways and including an impression roll; said carriage and its impression roll being movable vertically relative to the bed when moved thereover to accommodate the impression roll to any little differences that may exist between the vertical heights of the printing faces of type assembled upon the bed prior to the start of the printing operation; said press including means cooperating with the trackways to guide the carriage as it is moved over the bed while permitting vertical movement of the carriage and the impression roll relative to the bed to effect said accommodation of the impression roll to such differences in the vertical heights of the type assembled upon the bed as may exist prior to the start of the printing operation.

22. A printing press comprising the combination of: a bed having substantially parallel trackways; a carriage movable over the bed along the trackways and including an impression roll; said impression roll being movable vertically relative to the bed when moved thereover to accommodate itself to any little differences that may exist between the vertical heights of the printing faces of type assembled upon the bed prior to the start of the printing operation; said press including means cooperating with the trackways to guide the carriage as it is moved over the bed while permitting vertical movement of the impression roll relative to the bed to effect said accommodation of the impression roll to such differences in the vertical heights of the type assembled upon the bed as may exist prior to the start of the printing operation.

HARVEY J. REARDON.

40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150