No. 782,536. PATENTED FEB. 14, 1905.

J. S. BANCROFT.

ADJUSTING OR CENTERING MECHANISM FOR TYPE MACHINES.

APPLICATION FILED JULY 11, 1904.

2 SHEETS—SHEET 1.

Fig. 2.

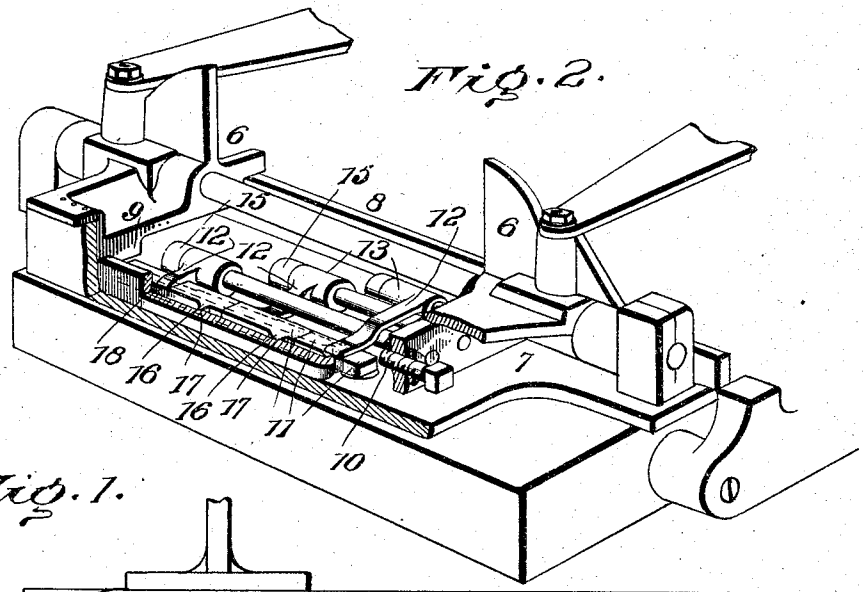

Fig. 1.

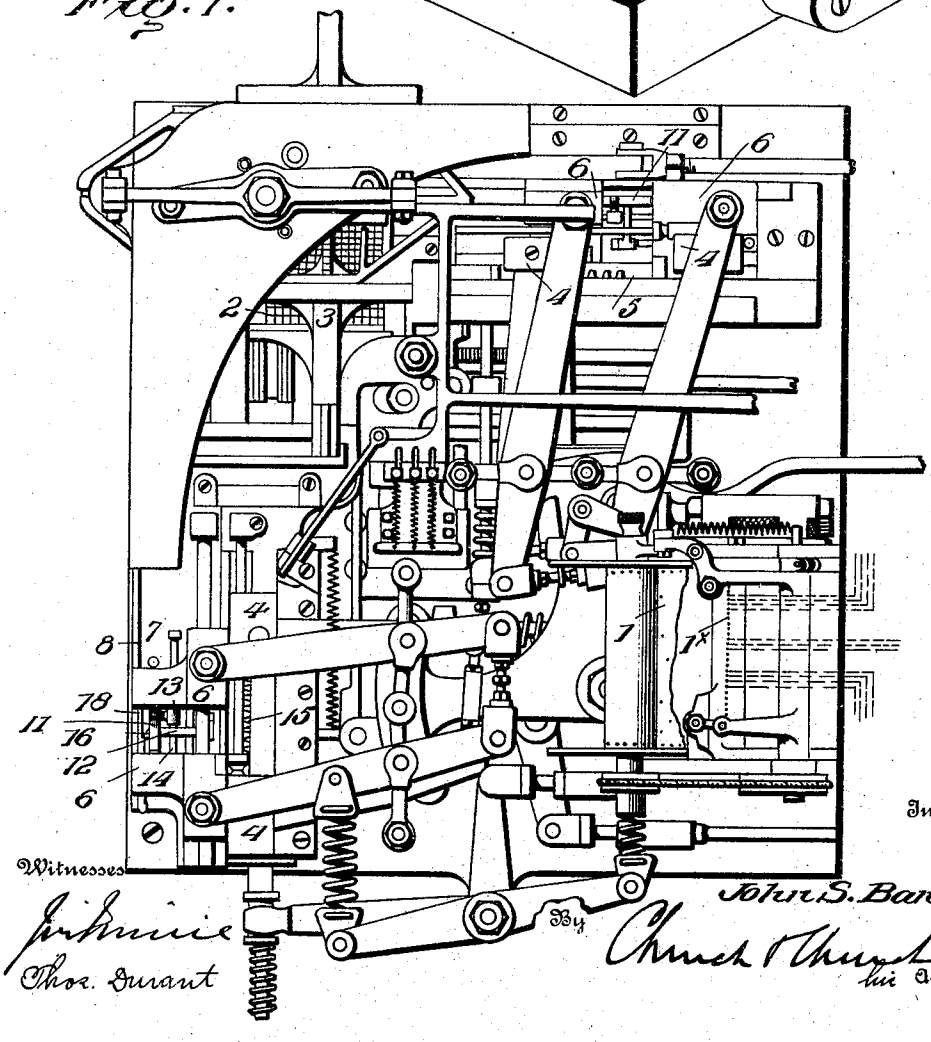

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Fig. 3.

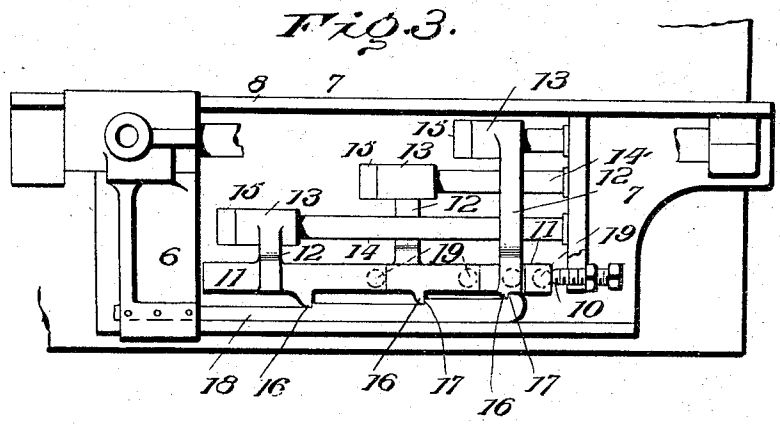


Fig. 4.

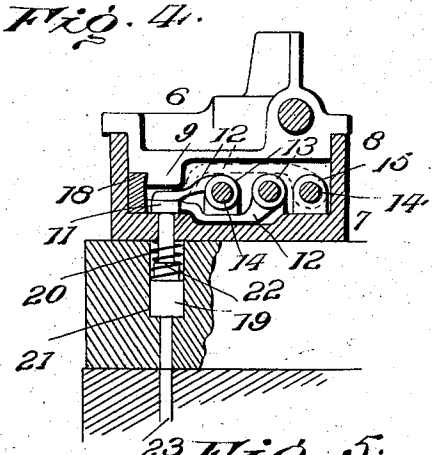
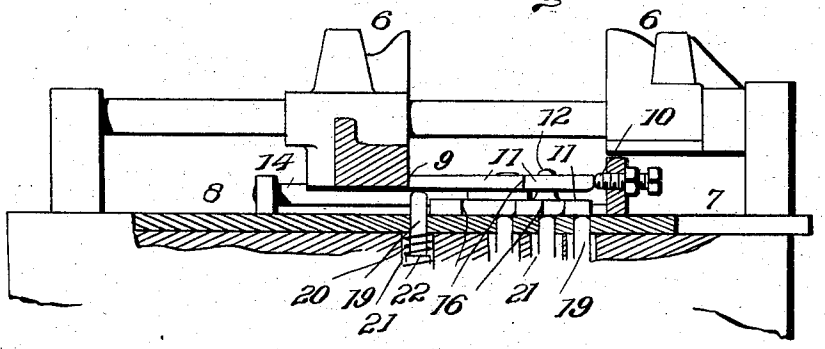


Fig. 5.



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No. 782,536. Patented February 14, 1905.

UNITED STATES PATENT OFFICE.

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ADJUSTING OR CENTERING MECHANISM FOR TYPE-MACHINES.

SPECIFICATION forming part of Letters Patent No. 782,536, dated February 14, 1905.

Application filed July 11, 1904. Serial No. 216,163.

To all whom it may concern:

Be it known that I, JOHN SELLERS BANCROFT, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Adjusting or Centering Mechanisms for Type-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures of reference marked thereon.

This invention relates to improvements in adjusting or centering mechanisms for type-casting and other machines wherein the positioning of a movable element—such as the die-case, its carrier, the mold-adjusting device, or other translatable member—is governed by perforations in a record-strip and effected by a direct movement from one position to another after the manner disclosed in Patents Nos. 625,998, 674,376, and 749,149.

As heretofore constructed machines of the class mentioned have been equipped with a primary gage in the form of a plurality of stop-pins serially arranged, a primary positioning mechanism in the form of oppositely-movable jaws, of which latter one contacted with the selected pin of the primary gage to determine the closed position of the jaws, a secondary gage moved to position by the jaws of the primary positioning mechanism and there locked, a secondary positioning mechanism, including oppositely-movable jaws, contacting with the secondary gage and connected to the die-case or other movable member for shifting the latter to the position designated by the secondary gage, a governing element in the form of a record strip or tape containing perforations designating successive positions for the member to be adjusted, and a control system intermediate the governing element and the primary gage for separately bringing into action the members of the primary gage. Each position or station in the series of movements provided for was represented by a separate pin in the primary gage, and each pin, with the exception of the last in the series, was provided with a separate control mechanism or line of communication with a section of the record-strip, so that a perforation occurring in that section would bring into action the corresponding pin of the primary gage. To each positioning perforation was assigned a section of the record-strip, and the width of the latter was dependent upon the number of individual control elements of the primary gage. Thus the centering mechanism for the die-case for positioning the latter by a two-way movement of fifteen degrees in each direction involved the use of twenty-eight movable gaging members or stop-pins, fourteen for each direction, with separate control devices and a governing perforation for each member. This required that the record-strip should be of such dimensions as to contain at least twenty-eight sections for receiving the positioning signals or perforations and that the punching-machine should be equipped with a like number of punches for producing the signals.

Now the principal object of the present invention is to effect a material reduction in the dimensions of the record-strip and incidentally to simplify the construction of the primary gaging and control mechanisms by the employment of a signal and control system wherein the various positions of adjustment instead of being represented by a corresponding series of differently-located perforations are represented by a limited number of such perforations employed singly and in various combinations to represent successive or different positions.

To this end the invention consists in the construction and use of a composite gaging mechanism, including a plurality of gaging members of different capacities arranged and adapted for separate or conjoint action, each gage member being provided with a control means governed by a perforation in the record-strip, so that any one or more of said gage members may be actuated and the gage thus set to correspond with the position represented by the dimension or capacity of any individual member or by the sum of the capacities of

any two or more members, all as hereinafter fully described, the novel features being set forth in the appended claims.

In the accompanying drawings, illustrating a preferred form of embodiment of the said invention, Figure 1 is a top plan view of a portion of the casting-machine, showing the new gaging mechanism applied thereto. Fig. 2 is a perspective view of the gaging mechanism as applied to the jaws of the primary positioning mechanism. Fig. 3 is a top plan view of the gaging mechanism. Fig. 4 is a transverse and Fig. 5 is a vertical longitudinal section through the gage.

The same numerals desigate like parts in the several figures.

The invention is illustrated as adapted to the die-case centering and mold-adjusting mechanisms of the type casting and composing machine of Patent No. 625,998, wherein it supplants the primary gage in each of the two adjusting or positioning mechanisms. It will suffice for present purposes to designate certain of the prominent elements of said machine, reference being had to the patent mentioned for a more detailed description. These are the paper-feed mechanism, controlling the movements of the perforated record-strip 1, and its application to the ports 1^{x}, leading to the control devices, the die-case 2 and its carrier 3, arranged for independent adjustment on intersecting lines and operated upon by the two positioning mechanisms to center the matrices above the mold by a direct movement from one to another, the secondary positioning mechanisms (represented by jaws 4) for shifting the die-case and its carrier and the mold-adjusting devices, the secondary gages 5 for determining the closed position of jaws 4, and the primary positioning mechanisms (represented by the oppositely-movable jaws 6) for shifting the secondary gages and depositing them at any of a series of predetermined stations. The stations assigned to the secondary gages correspond to the different positions of adjustment permitted the die-case or other adjusted member, and it is the special function of the primary gage to designate the successive positions of adjustment effected by the members of the centering or positioning system. The new controlling or gaging system is illustrated in a preferred form of embodiment as applied to each of the two positioning systems, where it supplants the series of stop-pins and control devices of the prior machine; but as the mechanisms so applied are substantially duplicates a description of one set will suffice for both.

To the top plane of the casting-machine is detachably secured a supplemental frame 7, provided with guides or ways 8 to receive and sustain the oppositely-movable jaws of the primary positioning mechanism. One of said jaws is furnished with a contact or gaging surface 9, located to one side of, preferably below, the plane of movement of the opposite jaw and in line with a fixed contact-surface or abutment 10, carried by frame 7. This fixed abutment, preferably in the form of a screw or equivalent means for initial adjustment, corresponds in position with the fixed stop-pin of the prior primary gage and, like the latter, serves to define one extreme of the series of stations or positions of adjustment to which the system is adapted. In the example given the system corresponds with that of the prior patent—that is, it embraces a series of fifteen equally-spaced stations, of which the abutment represents the last or fifteenth and serves as a datum-line for locating the other stations.

Supported in position to be interposed between the relatively movable gaging-surfaces 9 and 10 is what is herein termed a "differential permutation-gage"—that is, one comprising a plurality of individual gages or interponents of relatively different dimensions or capacities adapted to be interposed separately or serially in combinations of two or more between said gaging-surfaces to admeasure their relative positions. In the preferred form of embodiment herein illustrated the gaging members or interponents of this composite gaging mechanism are represented by four gage-blocks 11 of one, two, four, and eight units capacity, the unit in this case being the interval between adjacent stations in the series. It is of course understood that the dimension of the unit and relative sizes of the individual gages may be varied to suit the particular system employed and that the capacity of the gage as a whole can be increased or diminished by the addition or omission of individual gages; but as applied to the present system it will be found that with four differential gages of the dimensions given all of the stations designated by the fourteen movable stop-pins of the prior machine can be accurately and positively gaged. Thus the fourteenth station, one unit removed from the fixed abutment, can be located by the interposition of the one-unit gage between the abutment and movable jaw 6. The thirteenth station can be located by the interposition of the two-unit gage, the twelfth by the one and two unit gages in combination, the eleventh by the four-unit gage, the tenth by the one and four unit gages, the ninth by the two and four unit gages, the eighth by the one, two, and four unit gages, the seventh by the eight-unit gage, the sixth by the one and eight unit gages, the fifth by the two and eight unit gages, the fourth by the one, two, and eight unit gages, the third by the four and eight unit gages, the second by the one, four, and eight unit gages, and the first by the two, four, and eight unit gages. The significance and advantages of such a system wherein gages of different dimensions are adapted for use singly and serially in combinations of two or

more will be made apparent when we come to consider the control and automatic governing devices in their relation to the record-strip.

With the exception of the smallest or one-unit gage 11 next the abutment 10, which is required to move but slightly, if at all, in the direction of movement of the jaws, each of the gages 11 is supported in a manner to permit motion in a direction parallel with the jaw 6, carrying contact-surface 9, in order that it may be moved into contact with the fixed abutment or an intermediate gage to measure the movement of said jaw and arrest it in designated position, to which end said gages are carried on arms 12, disposed in different planes and each provided with a sleeve 13 or equivalent support engaging one of a series of parallel guides or rods 14. Each rod 14 is provided with a limiting-stop 15 for positioning its gage when retracted, at which time the several gages are supported in alinement and below the plane of movement of contact-surface 9 by resting upon the face of frame 7. To effect and insure the return of the gages to initial position after having been elevated into alinement with the jaw and moved by the latter toward the fixed abutment, the two, four, and eight unit gages 11 are each provided with a shoulder 16 in a position to be engaged by one of a series of shoulders 17 on a rod 18, attached to and carried by the movable jaw 6. The shoulders 16 and 17 for the respective gages are located in different planes, so that as the jaw advances toward the fixed abutment the shoulders on rod 18 will clear any of the gages that may happen to be elevated and upon the return of the jaw each shoulder 17 will engage and draw to initial position the corresponding gage.

Each gage 11 is provided with control means whereby it can be moved into gaging position—that is, in the present instance into alinement with movable contact-surface 9 and the fixed abutment and with any other gage so moved into alinement. For this purpose a piston 19, provided with a retracting-spring 20 and working in a cylinder 21, is located beneath each gage in position to elevate the latter into the plane of contact-surface 9 when pressure is admitted to the cylinder, a shoulder 22 on the piston-rod serving to limit the advance of the latter and prevent contact with the jaws. The first or one-unit gage 11 may be attached to and guided by its piston; but the others merely rest upon the ends of their piston-rods, so that they are free to move thereon when engaged by contact-surface 9. The pistons as applied to these movable gages are preferably located beneath the ends thereon nearest the fixed abutment, in order that each may remain in contact with and support its gage when the latter is moved to an extreme position in either direction, to which end the gages are disposed in sequence in the order of their value. Thus the two-unit gage being next the one-unit gage moves but half its length to contact with the fixed abutment, the four-unit gage is permitted a like movement of three-quarters its length, and the eight-unit gage a movement of seven-eights its length. It is for this reason that an eight-unit gage is employed in this system in preference to one of seven units, as the latter would serve, in connection with the others, to cover all the required stations, but would be permitted a movement of seven units, if used alone, and thus be carried beyond its control-piston unless additional or other means were employed to prevent such action.

Each cylinder 21 is connected, through a passage 23, with one of the induction-ports of the paper-feed mechanism, through which their action is governed by the perforations in the record-strip.

From the foregoing description it is apparent that the composite gaging mechanism, with its fixed abutment or datum-line and separate gages of different dimensions adapted for separate and conjoint use in various combinations, is entirely competent to measure or designate each of the fifteen stations required for positioning the die-case or other movable part in one direction and that but four control devices are required for setting the gage for any position within its capacity, which means, as applied to the machine illustrated, that but eight induction-ports and corresponding perforations in the record-strip are required to compass the thirty adjustments previously effected through the medium of twenty-eight ports and perforations, thus reducing the area of the record-strip assigned to these adjustments to less than one-third that required by the primary gages of the prior machine.

The new gaging system is admirably adapted for expansion to cover a larger range of stations or positions than is required in the machine illustrated—as, for example, in the mold-dimensioning system of application Serial No. 191,382—the number of possible combinations being greatly increased by the addition of each gaging member with its single control means and governing perforations.

Not only does the improved gaging system operate to materially diminish the size of the record-strip without a corresponding change in its capacity; but it contributes to a simplification of the record-strip-perforating mechanism by reducing the number of punches required for forming the designating perforations or signals.

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

1. In a centering mechanism for type-machines such as described the combination with the primary positioning mechanism, of a differential permutation-gage controlled from

the record-strip and serving as the primary gage therefor.

2. In a die-case-centering mechanism such as described, wherein the positioning of the die-case is effected by a two-way movement controlled by independent adjusting systems and in combination therewith a plurality of differential permutation-gages, one for each system and control devices for the permuting members governed by selective perforations in a record-strip.

3. In a positioning or adjusting system for type-machines such as described the combination with the oppositely-movable jaws of the primary positioning mechanism, of a differential permutation-gage for determining the closed position of said jaws.

4. In a centering mechanism for type-machines such as described provided with primary and secondary positioning mechanisms and a secondary gage, and in combination therewith, a differential permutation-gage for admeasuring the action of the primary positioning mechanism.

5. In a centering mechanism for type-machines provided with two positioning systems each equipped with primary and secondary positioning mechanisms and a secondary gage, and in combination therewith two differential permutation-gages, one for each primary positioning mechanism.

6. In a positioning mechanism such as described provided with oppositely-movable jaws and in combination therewith, a fixed abutment and a plurality of gages of different dimensions or capacities arranged for separate or serial interposition between the abutment and one of the jaws, to admeasure the advance of the latter.

7. In a positioning mechanism, such as described, the combination with oppositely-movable positioning-jaws, of a gage comprising a plurality of interponents or gaging members of relatively different capacities or dimensions, adapted for interposition separately or in series between relatively movable gaging-surfaces.

8. In a positioning mechanism such as described the combination, to form a differential permutation-gage for admeasuring the advance or position of a movable member, of a fixed abutment, a plurality of interponents or gages of different capacities, and means for bringing said interponents into action singly or in multiple.

9. In a positioning mechanism such as described, the combination of the following elements, to wit; a pair of relatively movable gaging-surfaces; a plurality of gages or interponents of different capacities adapted to be interposed separately or serially in various combinations between said gaging-surfaces; and means for selectively controlling the interposition of said gages or interponents.

10. In a positioning mechanism such as described, the combination of the following elements to wit; opposing relatively movable gaging-surfaces; a plurality of separately-movable gages of different capacities, arranged for interposition between said gaging-surfaces; selective control devices for said gages; and a record-strip governing said control devices.

11. In a positioning mechanism such as described, the combination of the following elements, to wit; opposing gaging-surfaces; a plurality of movable gages or interponents of different capacities; a control means for each gage; and a governing means common to said control means for selectively operating the gages.

12. In a positioning mechanism such as described, the combination of the following elements, to wit; a positioning mechanism provided with oppositely-movable jaws; a movable member acted upon by said jaws; a fixed abutment or gaging-surface located in the path of movement of one jaw; a plurality of gages of different dimensions arranged for interposition singly or in multiple between one jaw and the abutment and a selective control system for said gages.

13. In a positioning mechanism such as described the combination with the oppositely-movable positioning-jaws of the following elements, to wit; a stationary abutment or gaging-surface opposed to one of said jaws; a plurality of movable gages of different capacities, adapted to be interposed separately or serially in combinations of two or more between the abutment and jaw; control means for each movable gage; and a selective governing means common to all of said gages.

14. In a positioning mechanism for type-machines such as described, wherein the various positions of adjustment are governed by perforations in a record-strip acting through control devices and a primary gage upon a primary positioning mechanism, the combination with oppositely-movable jaws of said primary positioning mechanism of a differential permutation primary gage provided with selective control means adapted to be governed by perforations in the record-strip.

15. In a positioning mechanism such as described, the combination of the following elements to wit; a reciprocating member or jaw; a stationary abutment; a plurality of gages of different dimensions or capacities serially disposed to one side of the plane of movement of said jaw in the interval between the latter, when in retracted position, and the abutment-gage, for selectively controlling the application of said gages singly or in multiple.

16. In a positioning mechanism such as described the combination of the following elements to wit; a reciprocating jaw or member; a stationary abutment; a plurality of gages serially disposed to one side of the path of the jaw and means for supporting and guid-

ing said gages in a manner to permit independent movement thereof in directions transverse and longitudinal of the path traversed by said jaw.

17. In a positioning mechanism, such as described, the combination of the following elements, to wit; a reciprocating jaw or member; a stationary abutment; a plurality of gages separately movable in two directions to bring them into alinement with the jaw and to follow the movement of the latter; and means coupled with the jaw for retracting the gages.

18. In a positioning mechanism such as described the combination of the following elements, to wit; a reciprocating member or jaw; a stationary abutment in alinement with said member; a series of gages supported for independent movement in two directions, the one transverse and the other longitudinally of the path traversed by said movable member; and a retracting-bar carried by said movable member and provided with a series of shoulders in different planes for engaging the gages to retract the latter.

19. In a positioning mechanism such as described, the combination of the following elements, to wit; a reciprocating member; a stationary abutment; a plurality of gages of different dimensions serially arranged in the direction of movement of said reciprocating member but to one side of the path thereof; and a piston for each gage located opposite the end nearest the abutment.

20. In a positioning mechanism such as described the combination to form a differential permutation-gage therefor, of the following elements, to wit; a stationary abutment; and a plurality of gages of different dimensions serially arranged in proximity to the abutment and each provided with a control device or piston.

21. In a positioning mechanism such as described, the combination of the following elements, to wit; an abutment; a plurality of gages of different dimensions serially arranged in the order of their capacity with the smallest next the abutment; suitable supporting and guiding means for said gages permitting movement of each gage in a direction transverse of the gaging-surface of the abutment, and of all the gages beyond the first in the plane of said gaging-surface; and a control piston for each gage located opposite the end thereof nearest the abutment.

22. A differential permutation-gage for application to the positioning mechanism of a type-machine such as described including the following elements, in combination, to wit; a frame provided with guides for the positioning-jaws and an abutment; a series of parallel guide-rods attached to the frame; and a plurality of gages of different capacities serially arranged and connected to said guide-rods by arms disposed in different planes.

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