This invention relates to a make-up gauge for use in squaring, sizing and justifying type-page forms under lock-up pressure prior to assembling of the forms for transmission to the printing press.

More particularly, my invention is directed to novel means for independently and rapidly advancing and retracting two adjacent pressure bars which are a part of the adjustable form clamping frame embodied in the make-up gauge of my invention.

Reference is made to United States Patents Nos. 2,065,253 and 2,114,946 which disclose make-up gauges of the character to which my invention has been applied. As shown in said patents, the gauge comprises a base plate for supporting a type-page form, a frame hingedly secured to the base plate, a pair of cross bars having separable interfitting connection with the frame whereby they may be fixedly positioned relatively to the frame according to the required size of the type-page form to be justified, and a pair of retractable pressure bars mounted in the frame and adapted to cooperate with the said cross bars to produce form justification under lock-up pressure.

The means hereinafter shown for actuating the said retractable pressure bars in make-up gauges of the character described have not proven entirely satisfactory and efficient, and it is the object of my invention to provide means for actuating the pressure bars whereby said bars can be operated rapidly and independently of each other, and whereby said bars will exert uniform pressure throughout their lengths on the form against which they bear, and whereby said bars will remain square and parallel to opposite bars even when meeting unequal resistance from certain lines of a type form which may be longer than others.

Another object is to provide pressure bar actuating means including a longitudinally movable member adjacent the pressure bar which, when moved a very short distance in the direction of its longitudinal dimension will impart to the pressure bar a relatively long movement transversely of the pressure bar.

The pressure bar actuating means hereinafter more fully described comprises an actuating bar parallel with the pressure bar, provided with a series of double angle, short wedge surfaces adapted to contact with a series of double angle, short wedge surfaces on the proximate edge of the pressure bar. The double angles of the coating wedge surfaces and their disposition on the cooperating actuating and pressure bars throughout their lengths produce rapid advancement and retraction of the pressure bars and also the exertion of uniform pressure by said bars on the work, without distortion to the bars or to the frame members. The operation of the coating wedge surfaces will be fully explained in the following specification.

In the drawings:

Fig. 1 is a plan view of a make-up gauge embodying my invention, showing the pressure bars in advanced positions relatively to the frame, the enclosed parts of the pressure bars and the actuating means within the frame being shown in dotted lines.

Fig. 2 is a plan view of the make-up gauge, showing the pressure bars in retracted positions, part of the frame being broken away to disclose the pressure bars and the pressure bar actuating means.

Fig. 3 is an enlarged plan view of that portion of the make-up gauge shown in the upper left hand corner of Fig. 1.

Fig. 4 is a plan view of one end of the pressure bar actuating bar, detached, on the same scale as Fig. 3.

Fig. 5 is a plan view of one end of the pressure bar, detached.

Figs. 6 and 7 are transverse vertical sectional views taken in the planes of the lines 6—6 and 7—7 of Figs. 4 and 5, respectively.

Figs. 8 and 9 are transverse vertical sectional views taken in the planes of the lines 8—8 and 9—9 of Fig. 3, respectively.

In that embodiment of my invention shown in the drawings, the make-up gauge comprises a base plate 10, which supports the type-page form (not shown), the plate 10 being provided with lugs 11, 11, through which extend pins 12, 12, whereby a rigid frame 13 is hingedly mounted on the plate 10. The frame 13 is rectangular and its four side members have top plates 14, 15, 16 and 17 which define a rectangular opening in the frame. The inner edges of the four frame members are toothed as indicated at 18, and adjacent the teeth said frame members carry numerical scales indicating plia measurements.

A pair of abutment or cross bars 19, 20 are interleaved so as to be movable relatively to each other, at right angles to each other, and they have toothed ends 21 and 22, respectively, adapted to engage the teeth 18 on the frame members 15—17 and 14—15, respectively. The positions of the abutment bars may be adjusted with the aid of the numerical scales on the frame.
members, to provide a rectangular space of the desired size to receive a type-page form. When the cross bars 19 and 20 have been positioned in a teeth-mashing relation in the frame, they will be held stationary until removed.

Mounted in the frame opposite the abutment bar 19 is a pressure bar 23 and opposite the abutment bar 25 is a pressure bar 24. Said pressure bars 23 and 24 lie under the frame plates 16 and 17, respectively, and on the horizontal portion 25 of an L-shaped bottom frame plate 26 secured to the top frame plates by screws 27 as best shown in Figs. 3 and 8.

Between the vertical or thicker outer portion of the L-shaped bottom plate 25 and the pressure bars 23 and 24 are actuating bars 28 and 29, respectively, which, like the pressure bars, are located between the frame top plates and the horizontal or thin portion 25 of the L-shaped bottom plate 26. The actuating bar 28 is parallel with the pressure bar 23 and the actuating bar 29 is parallel with the pressure bar 24. The construction and operation of the two sets of actuating and pressure bars are identical and therefore the following description of the actuating bars 24 and 29 will be applicable also to the bars 23 and 28.

The pressure bar 24 has a straight edge 30, cut away at one end at 31 to accommodate the pressure bar 23 when said bars are in advanced positions. Inwardly of the edge 30, the thickness of the portion 32 of the pressure bar 24 is decreased, the thinner portion 33 lying in the plane of the lower portion of the thicker part of the pressure bar. The edge 33 of the thinner portion of the pressure bar 24 is perpendicular to said portion 32 and is located about midway between the longitudinal edges 30 and 34 of the pressure bar. Said edge 33 is provided with a series of double angle short wedge members 35, the wedge surface 36 of the actuating bar 28 being disposed at an angle of approximately 45° and the wedge surface 37 being disposed at an angle of approximately 14°, the latter being connected to the edge 33 by a right angle surface 38. The thinner part 32 of the pressure bar is provided with a slot 33 near each end for a purpose to be explained.

As exemplified by the bars 23 and 24, each actuating bar has a toothed end 40, a straight edge 41, and a series of wedge members 42 opposite the edge 41. The wedge members 42 have wedge surfaces 43 disposed at an angle of approximately 45° and wedge surfaces 44 disposed at an angle of approximately 14° relative to the edge 45. The wedge surface 44 merges with an edge portion 46 substantially parallel with the edge 45, said portion 45 being connected to the edge 46 by a right angle surface 47.

Each actuating bar has a longitudinally extending groove 48 in its upper surface adapted to receive a guide tongue 49 secured by pins 50 to the frame top plate 16 or 17, as best shown in Fig. 8, to guide the actuating bar in moving longitudinally adjacent the member 25. The bottom of the wedge shaped portion of the actuating bar 24 is cut away as indicated at 50 (Figs. 6 and 8) to allow the wedge members 42 of the actuating bar to rest and slide on the thin portion 32 of the pressure bar 24.

The actuating and pressure bars are loosely connected together by pins 51 fixed in the bottom of the actuating bar and extending into the slot 39 in the thin portion of the pressure bar when they are assembled as shown in Figs. 1, 2, 3 and 8. The actuating bars 28 and 29 are actuated by means of pins 52 and 53, respectively, which engage the toothed ends 49 of said actuating bars. A pinion 54 in mesh with the pinion 53 is shown in the present embodiment. The purpose of these pinions is to impart their intended movements to the actuating bars by rotating the pinions 54 and 55 in opposite directions, so that the power being applied to said pinions will be counterbalanced, and shifting of the device as a whole on its support will be avoided.

The pinions 54 and 55 are rotated by the operator by means of a wrench called a quoin key in the printing industry, whereby the actuating bars 28 and 29 are moved in the direction of their longitudinal dimensions, and the pressure bars 23 and 24 are moved transversely. The wide angles 35 and 43 of the coating pressure and actuating bars produce rapid movement of the pressure bars. The low angles 37 and 44 of said coating pressure and actuating bars produce the lock-up movement. The working range of these wedge surfaces 37 and 44 is equal to the altitude of the low angles, as shown in the case shown, about 3/8°. Thus forms which are sizes more than 3/8° cannot be locked up.

The pressure bars are retracted by rotating the pinions in directions opposite those used in advancing the pressure bars. As the actuating bars move from the positions shown in Fig. 1 to those of Fig. 2, the pins 51 on the actuating bars, engaged in the slots 39 in the pressure bars, retract said pressure bars as shown.

While the type-page form is being placed on the base plate 10, the pressure bars are retracted as shown in Fig. 2, and the working space is defined by the abutment bars 19 and 20 and the frame members 16 and 17 under which the pressure bars 23 and 24 lie when retracted. In this position there is provided a rectangular space 3/4" to 3/2" wider and longer than the type-page form to be justified. When the operator is ready to lock up the form, the pinions 52 and 53 are rotated and the actuating bars 28 and 29 are thereby actuated. The wedge surfaces 43 of the actuating bars then engage the wedge surfaces 35 of the pressure bars and rapidly move the pressure bars into advanced position, about 3/4" beyond the frame members 16 and 17, and then the wedge surfaces 44 and 37 come into coating relation to effect lock-up of the form. The wedge surfaces 44 and 37 may move into fully contacting positions as shown in Figs. 1 and 3, or into positions where they are only partially in contact or overlapping relation depending on the form to be locked.

To facilitate lifting of the frame relative to the base plate 10, I provide a lever 55 at the side opposite the hinge pins 12, 12. The frame may be propped up by the props 56, 56.

After the form has been justified and locked, the type page may be tied and after the pressure bars have been retracted, the tied type-page form may be transmitted to a printing press, as is well understood in the art.

Changes may be made in details of construction without departing from the scope of my invention.

I claim:

1. A make-up gauge comprising a frame, a pair of adjacent abutment bars mounted on the frame, a pair of adjacent retractable pressure bars mounted on the frame for cooperation with said abutment bars, and means for actuating said pressure bars independently of each other, said means comprising a series of short wedge surfaces
on each of said pressure bars, an actuating bar movable in the direction of its longitudinal dimension adjacent each pressure bar, a series of short wedge surfaces on each actuating bar in contact with the wedge surfaces on the adjacent pressure bar, said cooperating wedge surfaces extending from end to end of said bars throughout the pressure-exerting portions thereof, and means imparting movement to said actuating bars and thereby transmitting movement to the pressure bars transversely thereof.

2. A make-up gauge comprising a frame, a pair of adjacent abutment bars mounted on the frame, a pair of adjacent retractable pressure bars mounted in the frame for cooperation with said abutment bars, and means for actuating said pressure bars independently of each other, said means comprising a series of short wedge surfaces on each of said pressure bars, an actuating bar movable in the direction of its longitudinal dimension adjacent each pressure bar, a series of short wedge surfaces on each actuating bar in contact with the wedge surfaces on the adjacent pressure bar, said cooperating wedge surfaces extending from end to end of said bars throughout the pressure-exerting portions thereof, means imparting movement to said actuating bars and thereby transmitting movement to the pressure bars transversely thereof, and, cooperating means on adjacent actuating and pressure bars positively retracting the pressure bar relatively to the frame when the actuating bar is moved in one direction.

3. A make-up gauge comprising a frame, a pair of adjacent abutment bars mounted on the frame, a pair of adjacent retractable pressure bars mounted in the frame for cooperation with said abutment bars, and means for actuating said pressure bars independently of each other, said means comprising a series of short wedge surfaces on each of said pressure bars, an actuating bar movable in the direction of its longitudinal dimension adjacent each pressure bar, a series of short wedge surfaces on each actuating bar in contact with the wedge surfaces on the adjacent pressure bar, said cooperating wedge surfaces extending from end to end of said bars throughout the pressure-exerting portions thereof, means imparting movement to said actuating bars and thereby transmitting movement to the pressure bars transversely thereof, and means on the frame member engaging the actuating bar and guiding the movement in a longitudinal path.

4. A make-up gauge comprising a frame, a pair of adjacent abutment bars mounted on the frame, a pair of adjacent retractable pressure bars mounted in the frame for cooperation with said abutment bars, and means for actuating said pressure bars, said means comprising a series of double angle wedge surfaces on each of said pressure bars, an actuating bar movable in the direction of its longitudinal dimension adjacent each pressure bar, a series of double angle wedge surfaces on each actuating bar in contact with the wedge surfaces on the adjacent pressure bar, and means imparting movement to said actuating bars and thereby transmitting movement to the pressure bars transversely thereof, the cooperating wedge surfaces being disposed at such angles that the initial longitudinal movement of the actuating bar produces relatively wide lateral advancing movement of the pressure bar and the later longitudinal movement of the actuating bar produces increased frictional engagement between the contacting wedge surfaces of the cooperating bars and automatic lock-up pressure.

5. In a make-up gauge, a pressure bar and means for advancing and retracting the bar transversely relatively to a frame, said means comprising an actuating bar and automatic lock-up pressure, and a series of wedge members on the proximate edges of said actuating and pressure bars, each wedge member having two straight edge wedge surfaces disposed at different angles to the longitudinal edges of said bars, said actuating bar wedge members contacting said pressure bar wedge members, said actuating bar moved in one direction first imparting rapid wide lateral movement and then frictional automatic lock-up pressure to the pressure bar in its advancing movement.

6. In a make-up gauge, a pressure bar and means for advancing and retracting the bar transversely relatively to a frame, said means comprising an actuating bar parallel with the pressure bar, a series of wedge members on the proximate edges of said actuating and pressure bars, each wedge member having two wedge surfaces disposed at different angles to the longitudinal edges of said bars, means for imparting movement to said actuating bar and thereby transmitting movement to the pressure bars, and means for positively retracting the pressure bar when the actuating bar is moved in the opposite direction.

7. In a make-up gauge, a pressure bar and means for advancing and retracting the bar transversely relatively to a frame, said means comprising an actuating bar parallel with the pressure bar, a series of wedge members on the proximate edges of said actuating and pressure bars, each wedge member having two wedge surfaces disposed at different angles to the longitudinal edges of said bars, the angle of one of said wedge surfaces on each wedge member being approximately 45° and the angle of the adjacent wedge surface on each wedge member being substantially more acute than said first mentioned angle, said actuating bar wedge members contacting said pressure bar wedge members, said actuating bar moved in one direction first imparting rapid wide lateral movement and then frictional automatic lock-up pressure to the pressure bar in its advancing movement.

8. In a make-up gauge, a pressure bar and means for advancing and retracting the bar transversely relatively to a frame, said means comprising an actuating bar parallel with the pressure bar, and a series of wedge members on the proximate edges of said actuating and pressure bars, each wedge member having two straight edge wedge surfaces disposed at different angles to the longitudinal edges of said bars, each angle of one of said wedge surfaces on each wedge member of the cooperating actuating and pressure bars being sufficiently acute to exert lock-up pressure on the pressure bar and the angle of the adjacent wedge surface on each wedge member being less acute.

9. In a make-up gauge, a pressure bar and means for advancing and retracting the bar transversely relatively to a frame, said means comprising an actuating bar having an edge portion of reduced thickness provided with a series of wedge members, the pressure bar partially underlying the reduced portion of the actuating bar and having a thicker outer portion provided with a straight edge and a series of
wedge members opposite the straight edge in sliding engagement with the wedge members on the actuating bar.

10. In a make-up gauge, a pressure bar and means for advancing and retracting the bar transversely relatively to a frame, said means comprising an actuating bar having an edge portion of reduced thickness provided with a series of wedge members, the pressure bar partially underlying the reduced portion of the actuating bar and having a thicker outer portion provided with a straight edge and a series of wedge members opposite the straight edge in sliding engagement with the wedge members on the actuating bar, angular slots in opposite ends of the pressure bar in that portion underlying the actuating bar, and pins fixed in the actuating bar engaging the slots and positively retracting the pressure bar when the actuating bar is moved in one direction.

11. A make-up gauge comprising a frame, a pair of adjacent abutment bars mounted on the frame, a pair of adjacent retractible pressure bars mounted in the frame for cooperation with said abutment bars, and means for independently actuating said pressure bars, said means comprising a series of short wedge surfaces on each of said pressure bars, an actuating bar movable in the direction of its longitudinal dimension adjacent each pressure bar, a series of short wedge surfaces on each actuating bar in contact with the wedge surfaces on the adjacent pressure bar, and means imparting movement to said actuating bars and thereby transmitting movement to the pressure bars transversely thereof, said last mentioned means comprising teeth on one end of each actuating bar and manually rotatable pinions mounted in the frame, meshing with said teeth, said pinions being located at opposite sides of the frame and being rotatable in opposite directions to counterbalance the force being applied to them to actuate the pressure bars in either their advancing or retracting movements.

12. A make-up gauge comprising a frame, a pair of adjacent abutment bars mounted on the frame, a pair of adjacent retractible pressure bars mounted in the frame for cooperation with said abutment bars, and means for actuating said pressure bars, said means comprising a series of short wedge surfaces on each of said pressure bars, an actuating bar movable in the direction of its longitudinal dimension adjacent each pressure bar, a series of short wedge surfaces on each actuating bar in contact with the wedge surfaces on the adjacent pressure bar, and means imparting movement to said actuating bars and thereby transmitting movement to the pressure bars transversely thereof, said last mentioned means comprising manually rotatable devices mounted in opposite sides of the frame and engaging said actuating bars, said devices being operable in opposite directions to move the actuating bars and transmit either advancing or retracting movement to the pressure bars.

HORACE W. HACKER.