June 26, 1951 L. B. FULLER 2,558,078

COMPARATOR FOR TYPEWRITING MACHINE TYPE

Filed Aug. 20, 1946 4 Sheets-Sheet 1

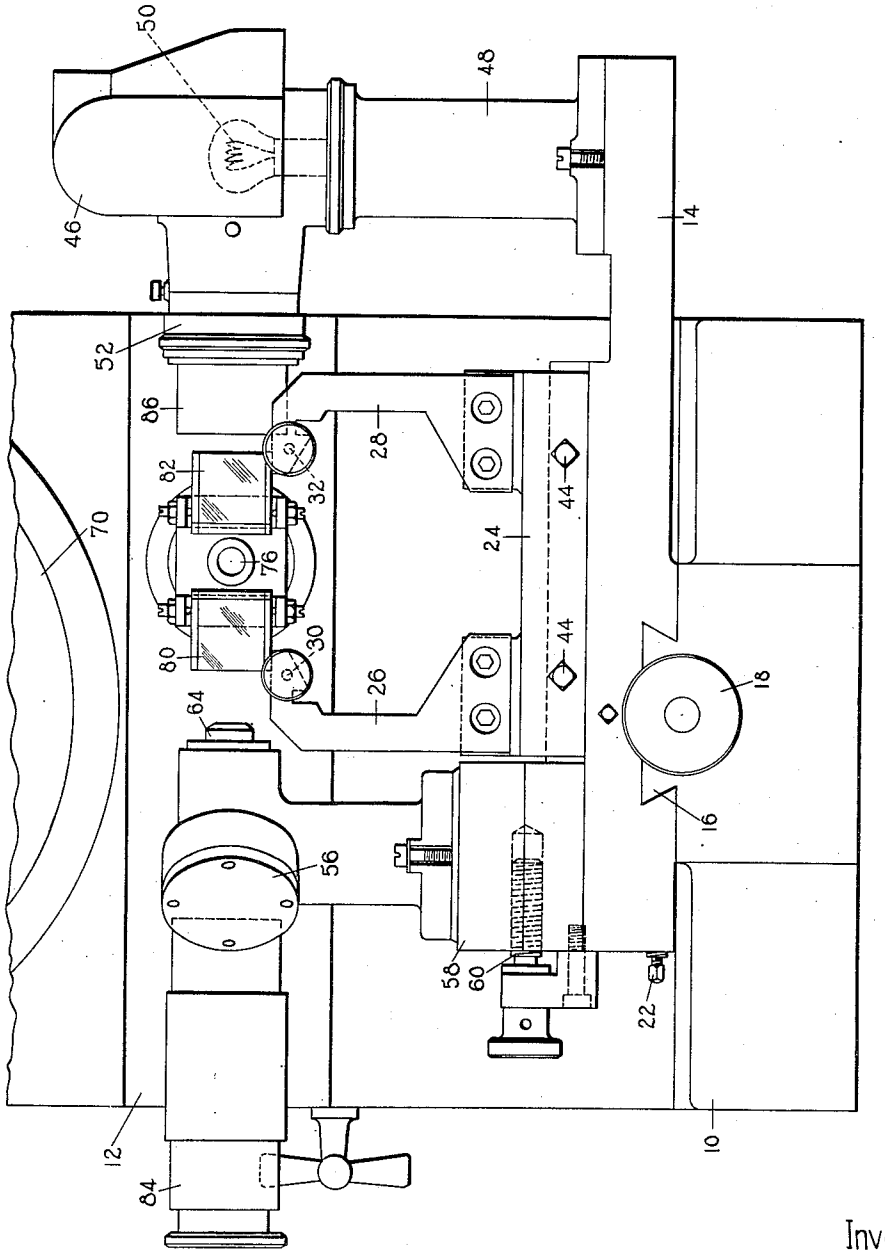


Fig. 1

Inventor
Leon B. Fuller
by Wright, Brown, Quinby & May
Attys

June 26, 1951 L. B. FULLER 2,558,078

COMPARATOR FOR TYPEWRITING MACHINE TYPE

Filed Aug. 20, 1946 4 Sheets-Sheet 2

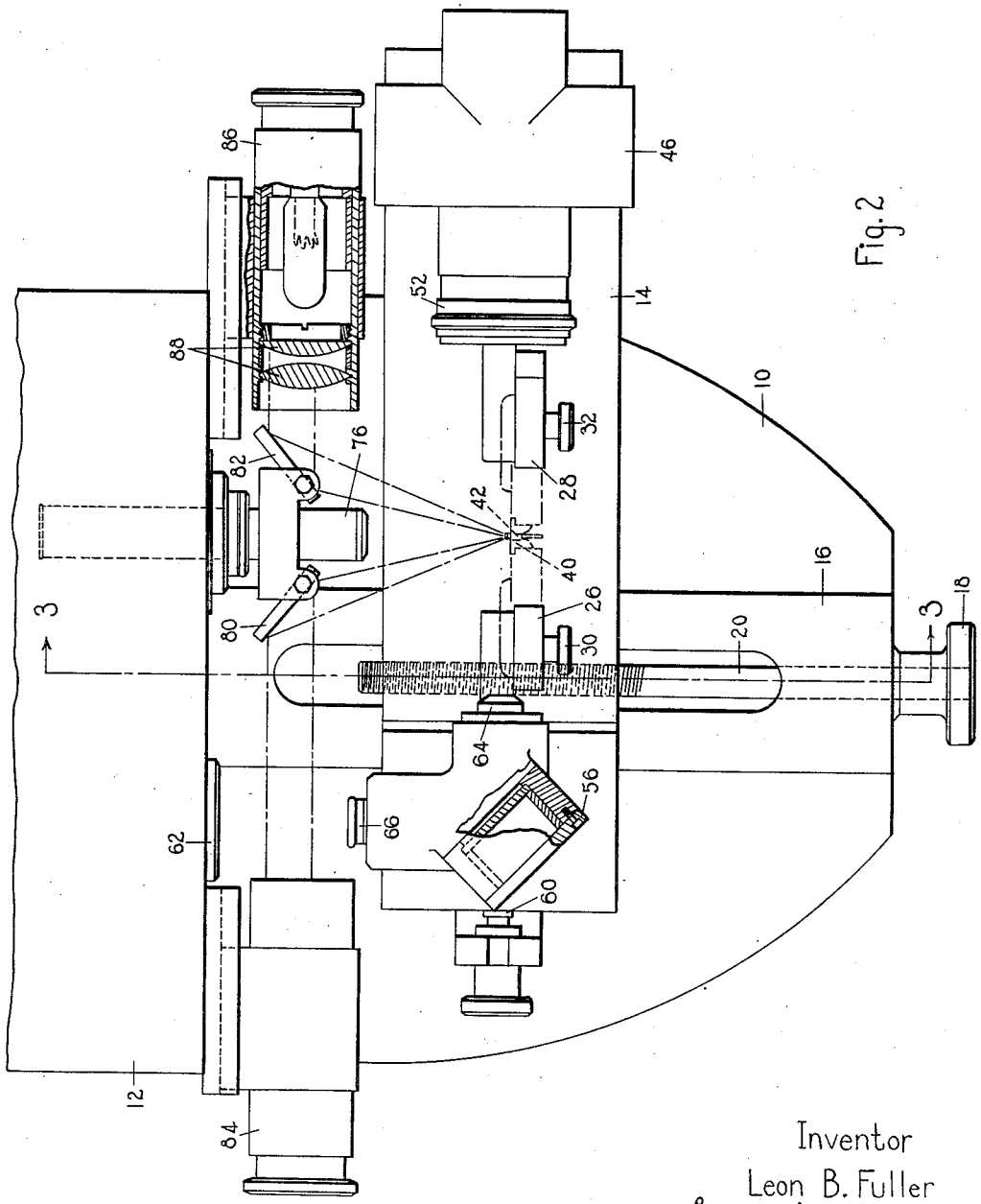


Fig. 2

Inventor
Leon B. Fuller
by Wright, Brown, Quinby & May
Attys

June 26, 1951 L. B. FULLER 2,558,078

COMPARATOR FOR TYPEWRITING MACHINE TYPE

Filed Aug. 20, 1946 4 Sheets-Sheet 3

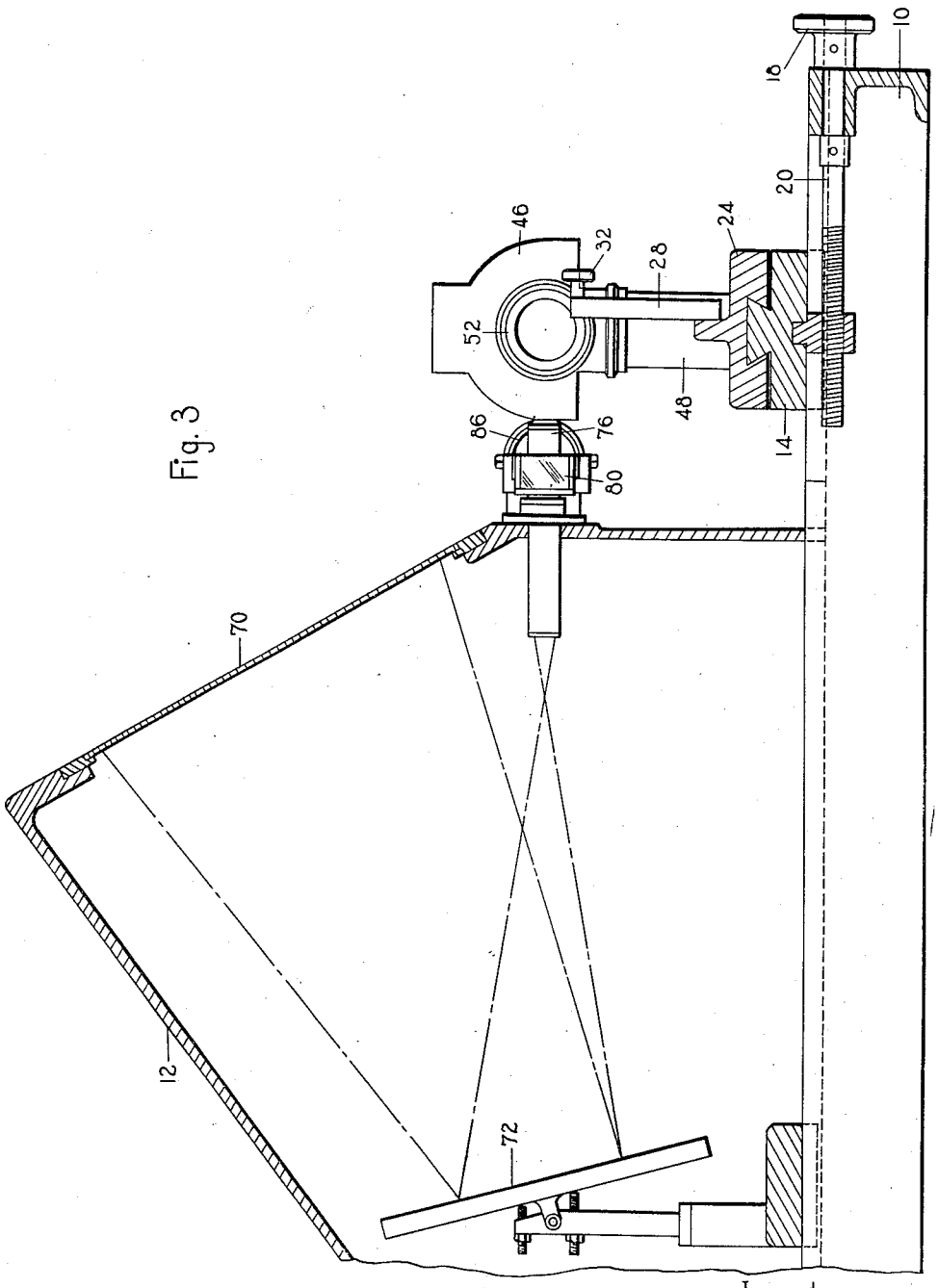


Fig. 3

Inventor
Leon B. Fuller
By Wright, Brown, Quinby & May
Attys

June 26, 1951 L. B. FULLER 2,558,078

COMPARATOR FOR TYPEWRITING MACHINE TYPE

Filed Aug. 20, 1946 4 Sheets-Sheet 4

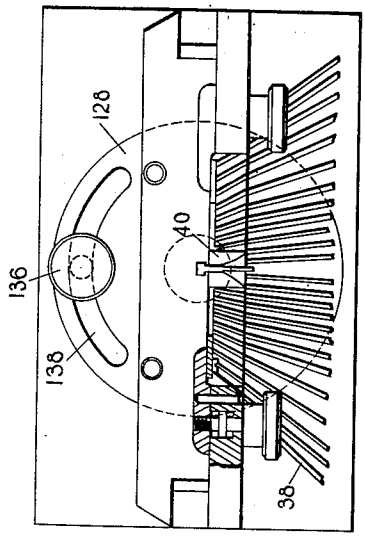


Fig. 7

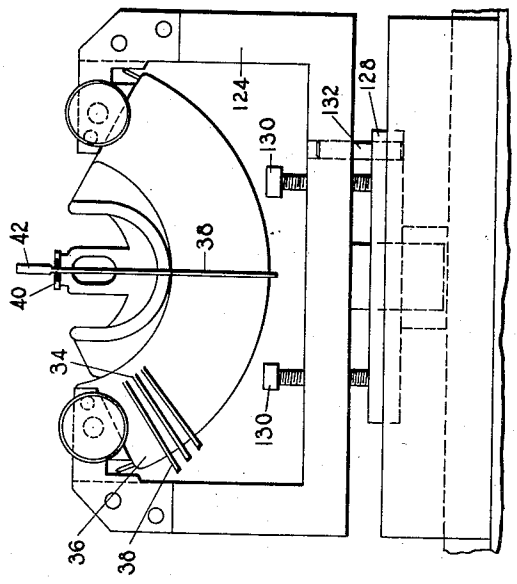


Fig. 6

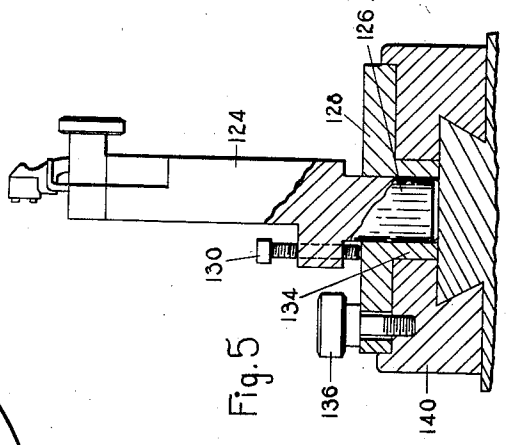


Fig. 5

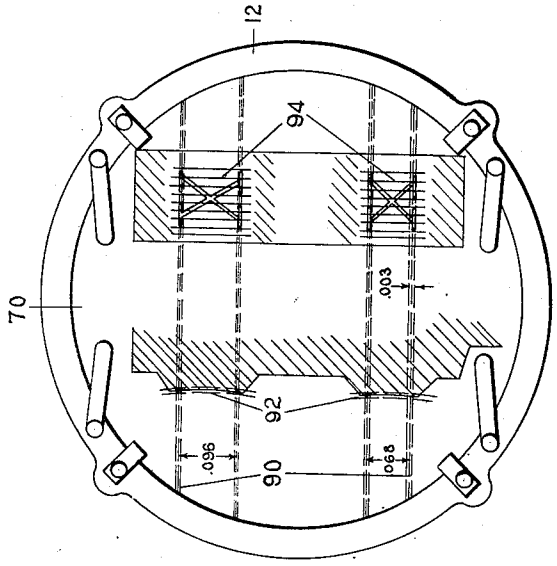


Fig. 4

Inventor
Leon B. Fuller
by Wright, Brown, Quinby & May
Attys

Patented June 26, 1951 2,558,078

UNITED STATES PATENT OFFICE

2,558,078

COMPARATOR FOR TYPEWRITING MACHINE TYPE

Leon B. Fuller, Springfield, Vt., assignor to Jones & Lamson Machine Company, Springfield, Vt., a corporation of Vermont

Application August 20, 1946, Serial No. 691,685

3 Claims. (Cl. 88—24)

1

This invention relates to apparatus for checking up on the alignment of type blocks in a typewriting machine. Such blocks are secured on the ends of type bars which are pivotally mounted on a type segment in the typewriting machine, suitable linkages connecting the type bars with the keys of the machine so that when any individual key is depressed, the corresponding type bar is swung about its pivot to bring its type block against the platen roll of the machine. When a set of type bars has been assembled on a type segment, it is usually necessary to make small adjustments by suitably bending the individual type bars so that when the type faces on the blocks hit against the platen roll, the impressions will be upright and will be horizontally aligned and the pressure evenly distributed over the face of the type. If these adjustments are properly made, the lines of writing will be straight and not irregular, and the individual characters of uniform color depths throughout.

It is an object of the present invention to provide means for easily and accurately observing whether the type bars are correctly shaped so that the type faces will strike accurately against the platen roll when keys of the machine are struck. If any individual type block is not in correct position, its type bar may be slightly bent and another observation can be made to determine whether the new position of the type block is within the limits of tolerance.

In order to determine whether a type block is in its correct position when it reaches its striking position, I provide a means for mounting a complete type segment on the work table of a comparator of the general type described and illustrated in the patent granted to Hartness and Porter, March 5, 1929, No. 1,703,933. This patent shows a bench type comparator having a work table to support an object to be observed or tested in a predetermined position. A beam of light is projected past a portion of a profile of the work piece and a shadow image of this portion of the profile is focused upon a translucent screen which is conveniently located above and behind the work table.

According to the present invention, a work holder is adjustably mounted on the table of a comparator and is adapted to support a type segment in the same manner in which such type segment is to be supported in the typewriting machine for which it is made. The type segment includes a bracket having a guide member for the type bars, the purpose of the guide member being to receive any one of the various type

2

bars which is swung up to its striking position and to ensure the type block being in its proper position when it strikes the roll platen. When a type segment is mounted on the work holder and a type bar is swung up to engage in the throat of the guide member, the type block on that bar is then in position for testing. According to the invention, the comparator is equipped with a lamp arranged to project a beam of light across the front face of the type block from one side so that a profile shadow image of the front face is produced. This shadow image is reflected and focused upon the translucent screen which is mounted in the front wall of the comparator housing above and to the rear of the work table. In addition to the shadow image of the profile of the front face of the type block, a direct image of this front face is also focused upon the screen. For this purpose, the work holder is so arranged as to locate the type block in line with a lens system through which the image of the front face of the type block is focused and cast on the screen beside the shadow image. The direct image requires adequate illumination of the front face of the type block. Hence, according to the invention, provision is made to reflect light against the front face of the type and, as shown, this is done by mirrors mounted adjacent to the lens system to reflect beams of light from two lamps so that these beams converge at a small angle on the face of the observed object in the manner described in Patent No. 2,031,201, granted February 18, 1936.

For a more complete understanding of the invention, reference may be had to the following description thereof and to the drawings, of which:

Figure 1 is a front elevation of the lower portion of a comparator embodying the invention;

Figure 2 is a plan view of the forward portion of the comparator shown in Figure 1;

Figure 3 is a section of the entire comparator on the line 3—3 of Figure 2;

Figure 4 is a front elevation of the screen or chart on which the images of the work piece are thrown;

Figure 5 is a side elevation, partly broken away to show in section a modified form of support for the work piece;

Figure 6 is a front elevational view of the same;

Figure 7 is a plan view of the same.

The comparator illustrated on the drawings comprises a bed or base 10 which supports a housing 12 on the rear portion and a work table

14 on the front portion thereof. The work table 14, as indicated in Figure 1, may be somewhat offset from the center of the comparator and may be adjustable forwardly and rearwardly on a dove tail slide 16. A finger wheel 18 on a screw threaded shaft 20 is conveniently located for shifting the work table so as to adjust the object to be tested or observed toward or from the housing 12. In this way the distance of the work table from the lens holder 76 can be regulated. Suitable set screws 22 may be provided to lock the table 14 in any of its positions of adjustment. On the central portion of the work table 14 is mounted a work holder 24 which is provided with two uprights 26 and 28 to the upper ends of which a type segment for a typewriting machine may be secured by means of screws 30 and 32 which enter holes in the type segment adapted to receive screws by which the segment will be secured to the frame of a typewriting machine. A type segment 34 of the kind designed to be supported by the work holder 24 is illustrated in Figures 6 and 7 and comprises an arcuate member 36 to which a set of type bars 38 is secured, each type bar being independently pivoted near one end so as to bring its other end portion into the throat of a guide member 40 which is mounted on the type segment for the purpose of guiding type blocks to their correct striking position against the platen roll of the typewriting machine in which the type segment is to be installed. Each type bar 38 has a type block 42 mounted at its free extremity, this type block being immediately above the guide member 40 when the type bar is swung up to its striking position.

The work holder is adjustable on the work table and is secured in position by suitable set screws 44. As indicated in Figure 1, a lamp house 46 is mounted on a standard 48 at a right hand end of the work table 14, the lamp house being in a position to support a lamp 50 on a level with the type block 42 which is to be tested or inspected. The lamp house 46 is provided with a lens holder 52 within which is a collimating lens adapted to project a horizontal beam of parallel light rays across the front face of the type block 42 from a side thereof. To the left of the work holder 24 is a mirror 56 supported on a standard 58 which is adjustable toward or from the work table 24 by means of a screw 60. The mirror 56, as indicated in Figure 2, is arranged to reflect the shadow image of the type block 42 through an angle of 90° so that the light beam defining this shadow image will be sent through a window 62 in an aperture in the front wall of the housing 12. Associated with the mirror 56 are suitable lenses mounted in lens holders 64 and 66 for focusing and magnifying the shadow image of the type block 42 upon the screen 70 which is mounted in a large circular aperture in the upper portion of the front wall of the housing 12. The light beam which enters the housing through the window 62 is reflected back by a mirror 72 adjustably mounted within the housing 12 at the rear thereof so that the reflected light strikes the rear surface of the translucent screen 70 and shines through the screen.

When a type block 42 is in the position for testing, it faces the housing. Opposite to the type face is an elongated lens holder 76 which projects through an aperture in the front wall of the housing 12 and supports a system of lenses by which an image of the front face of the type block 42 is enlarged and focused on the screen 70. The lens holder 76 is laterally offset from and on a level with the window 62, these two members being below the screen 70 and preferably equidistant from the center line of the comparator. In order to provide adequate illumination of the front face of the type block 42, a pair of mirrors 80 and 82 are mounted on either side of the exterior portion of the lens holder 76. On a level with these mirrors a pair of lamp houses 84 and 86 are mounted on the front wall of the housing 12 and are equipped with collimating lenses 88 adapted to project beams of light against the mirrors 80 and 82 so that the beams will be reflected to the type face of the type block 42, these beams converging on the type block at a small angle as indicated in Figure 2. As a result of the considerable intensity of light directed to the type face of the type block 42, the image of this type face is sufficiently bright on the screen 70 even though greatly magnified.

Figure 4 is an elevational view of the screen 70 showing thereon the front and profile images of the face of a type block. The screen 70 is preferably provided with suitable horizontal reference lines 90 adapted to indicate the proper elevation of the type block 42 and to show boundaries within which the horizontal portions of both the capitals and the lower case letters on the type block should appear. Thus errors in the type face itself, as well as in the position of the type block, are easily detected. Arcuate lines of reference 92 are also provided on the screen 70 to be fitted by the arcuate profiles of the type face on the type block if the type block is in its correct position, the curvature of the type faces being complemental to that of the platen roll so that all portions of the type face will strike the platen roll with uniform pressure. Vertical lines 94 are also provided to assist in observing any lateral or angular displacement of the type block 42 from its correct striking position. Since the type blocks are greatly magnified on this screen, the order of magnification being 20, any slight variations of form or position of the type block from its correct form and striking position are quickly and easily noted and slight bends can be made in the type bar with suitable tools until additional inspections show the type block to be properly located.

If desired, the work holder can be made rotatably adjustable about a vertical axis. For this purpose the construction thereof can be as illustrated in Figures 5, 6 and 7. As therein shown, the holder 124 is provided with a central spindle 126 which fits in the hole through a base 128. The work holder 124 can be vertically adjusted by means of a pair of screws 130, the lower ends of which bear on the upper surface of the base 128. Relative rotation between the work holder 124 and the base 128 is prevented by a suitable pin 132 which extends through the lower part of the holder 124 and the base 128. The base has a cylindrical projection 134 coaxial with the spindle 126 so that the holder and base can be rotatably adjusted as a unit by releasing a locking screw 136 which extends through an arcuate slot 138 into the work table 140. When the work holder 124 has been adjusted to its desired angular position, the locking screw 136 is set up to clamp the work holder in such position.

What I claim is:

1. In a comparator having a work table and a translucent screen, means on said table for supporting a type segment of a typewriting machine so that when any individual type block thereof

is swung to its striking position it will be in position for testing, and means for projecting on said screen simultaneously enlarged images of the front face and profile of a type block in said position for testing, said projecting means including a lamp and lens system mounted on said table and arranged to project a beam of light across the front face of said type block from a side thereof, means for projecting beams of light upon said front face, and optical means for magnifying and focusing on said screen the shadow image of said profile and the illuminated image of said front face.

2. In a comparator having a bed, a housing on said bed, a work table adjustably mounted on said bed in front of said housing, said housing having a front wall with a translucent screen mounted in the upper portion thereof and two small apertures below said screen, a work-holder mounted on said table, means on said table for projecting a beam transversely past the work carried by said holder in position to be tested, means for reflecting said beam and the shadow image of the work through one of said apertures in the front wall of the housing, means mounted on said housing for projecting converging beams of light upon the work in said position to be tested, a lens system for transmitting through the other aperture of said front wall and focusing reflected light from said work, and means within said housing for simultaneously reflecting to spaced portions of said screen the beams entering said housing through said apertures.

3. In a comparator having two apertures in the front wall thereof and a translucent screen above said apertures, a lens holder mounted in and extending through one of said apertures, an objective lens system in said lens holder, a work

table adjustably mounted in front of said wall, a work-holder on said table including means for holding an object to be tested in line with said lens holder, two light sources mounted on said housing on either side of said lens holder, collimating means for directing beams of parallel rays from said sources toward each other, mirrors carried by said lens holder and arranged at angles to reflect said light beams toward said object, a third light source mounted on said table and arranged to project a horizontal light beam at said object in a direction parallel to said front wall, a lens holder containing an objective lens system and a 45° mirror mounted on said table in line with said last mentioned light beam and directly in front of the other said aperture, and a mirror within said housing adjusted to reflect to the said screen the light beams entering through both said apertures.

LEON B. FULLER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
505,127	Ranger	Sept. 19, 1893
1,377,068	Hartness	May 3, 1921
1,421,042	Twyman	June 27, 1922
1,589,349	Bausch et al.	June 22, 1926
1,687,946	Mossic	Oct. 16, 1928
1,703,933	Hartness et al.	Mar. 5, 1929
1,789,009	Luce	Jan. 13, 1931
2,031,201	Beardsley	Feb. 18, 1936
2,035,780	Beardsley et al.	Mar. 31, 1936
2,192,529	Thomas et al.	Mar. 5, 1940