

in Fig. 8, comprising a fixed V jaw 198 in which the carbon is clamped by a finger 200 pivoted at 202 on 198 and pressed toward the carbon by thumb screw 204. The lower carbon holder 182 is provided with adjusting devices (Figs. 1, 8 and 10) now to be explained, by which the lower carbon may be adjusted laterally in all directions relatively to the upper carbon.

10 Passing through one end of holder 182 is a screw 206 provided with a collar 208 set into holder 182 in such manner as to prevent longitudinal movement of shaft 206 while permitting rotation thereof. The rear end
15 of shaft 206 is joined by a universal coupling to a shaft 210 provided with a hand wheel 212 at the rear of the machine. The front end of screw 206 is threaded through the end of a cross bar 212^a, from which, near the
20 middle and end thereof, extend guide rods 214 and 216 rearwardly through the lower side and end of holder 182 (Figs. 6 and 8). When screw 206 is turned, bar 212^a will be moved toward or away from holder member
25 182, thereby moving carbon 150 fore or aft relatively to carbon 140. Extending forwardly from the middle of bar 212^a is a boss 218 upon which is mounted cross member 220 to a rock about a vertical hinge pin 222 which
30 passes downwardly through boss 218 and ears 224 projecting from member 220.

Passing forwardly through the end of bar 212^a opposite screw 206 is a screw 226 threaded in the bar 212^a. The forward end of screw
35 226 is provided with a ball 228 fitted into a socket in the end of member 220 so that when screw 226 is turned member 220 will be rotated about pin 222 with the result that carbon 150, which is rigidly attached to member
40 220, as will appear, may be swung sidewise relatively to upper carbon 140.

Screw 226 is connected by universal joint 230 to rearwardly extending shaft 323 having a hand wheel 234 for the convenience of
45 the operator.

V clamp member 198 has a cross bar 236 which is rigidly attached to member 220 but insulated therefrom by a layer of insulating material 238. A similar layer of insula-
50 tion is inserted in upper holder 180. One end of bar 236 is bent at right angles as at 240 to provide a convenient location for attaching wiring terminals.

It is to be understood that the invention is not limited to the construction herein specifically illustrated but can be embodied in other forms without departure from its spirit as defined by the appended claims.

60 We claim—

1. In apparatus of the class described, in combination, a lens, means for moving said lens along the optical axis to various positions within the apparatus, and devices operable automatically when said lens is moved

to prevent movement of the center of gravity of the apparatus.

2. In apparatus of the class described, in combination, a lens, means supporting said lens for fore and aft movement, a counterweight, and means operable automatically when said lens is moved on its supporting means for moving said counterweight in a direction opposite to the movement of the lens, whereby the location of the center of gravity of the apparatus is unmoved. 70 75

3. In apparatus of the class described, in combination, a lens, means supporting said lens for fore and aft movement, means under control of the operator for moving said lens on said supporting means, and a device operable automatically to indicate to the operator the location to which said lens has been moved. 80

4. In apparatus of the class described, in combination, a lens, a guideway supporting said lens for fore and aft movement in the apparatus, means comprising a manually operable chain for moving said lens on said guideway, a counterweight, and means connecting said counterweight to said chain whereby said weight moves in a direction opposite to said lens in order to prevent movement of the center of gravity of the apparatus. 85 90 95

5. The invention set forth in claim 4, in which means is provided to automatically indicate the position of said lens in the apparatus.

6. In apparatus of the class described, in combination, a lamp, a shutter, and a lens in optical alignment with each other, said lens being independently adjustable relatively to said lamp and shutter and interconnected with a shiftable counterweight whereby the center of gravity of the apparatus is unmoved when the lens is adjusted. 100 105

7. In apparatus of the class described, in combination, a lamp, a shutter, and a lens in optical alignment with each other, said lens and said lamp being adjustable relatively to said shutter, said lens being independently adjustable relatively to said lamp and shutter and a counterweight shiftable when said lens is adjusted, whereby movement of the lens does not move the center of gravity of the apparatus. 110 115

8. In apparatus of the class described, in combination, a lamp, a shutter, and a lens in optical alignment with each other, a casing enclosing said elements, means operable without the casing for adjusting said lens relative to said lamp and shutter, and means interconnected with said adjusting means whereby the position of said lens is automatically indicated at a point without the casing. 120 125

9. In apparatus of the class described, in combination, a lamp, a shutter, and a lens in optical alignment with each other, said lens 130