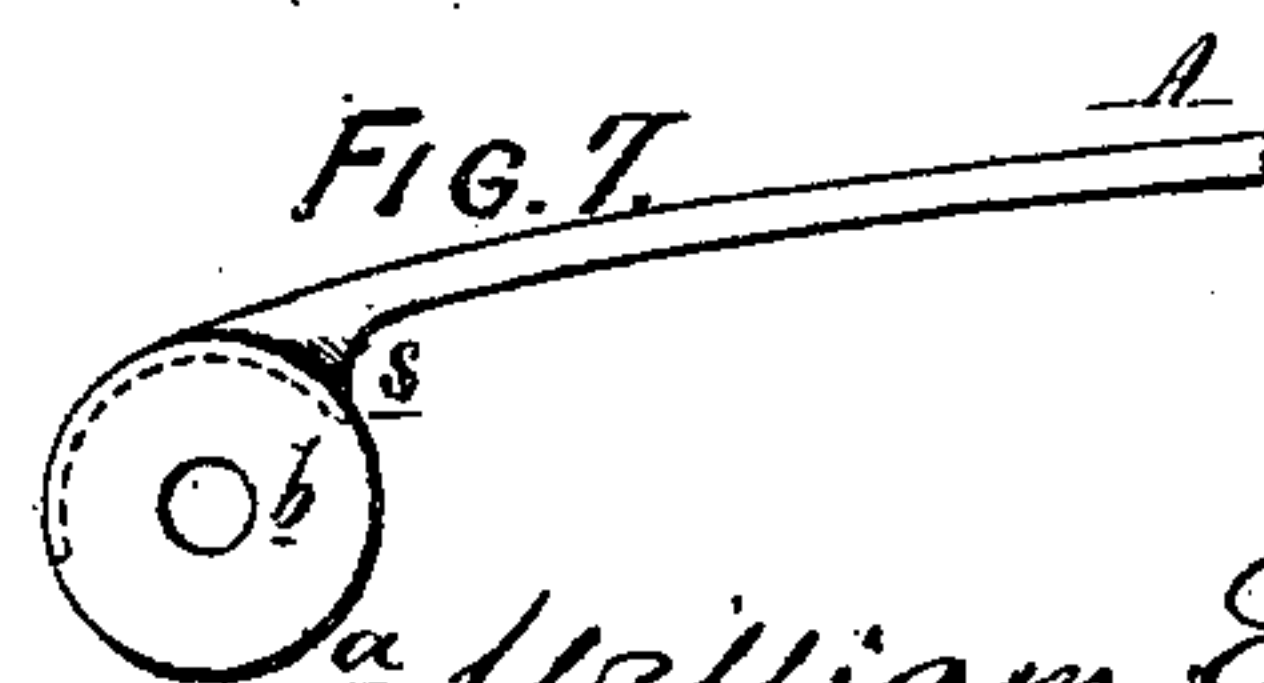
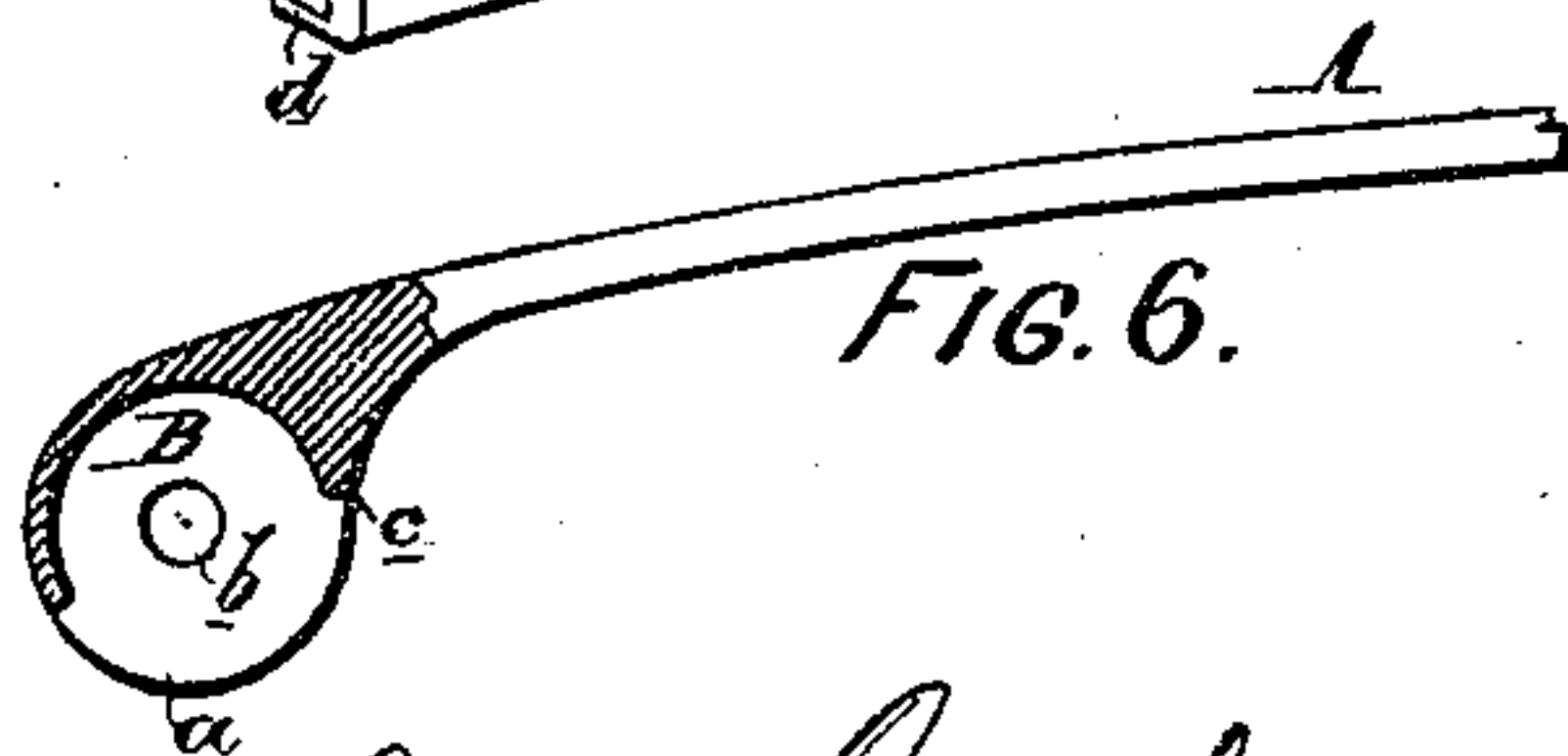
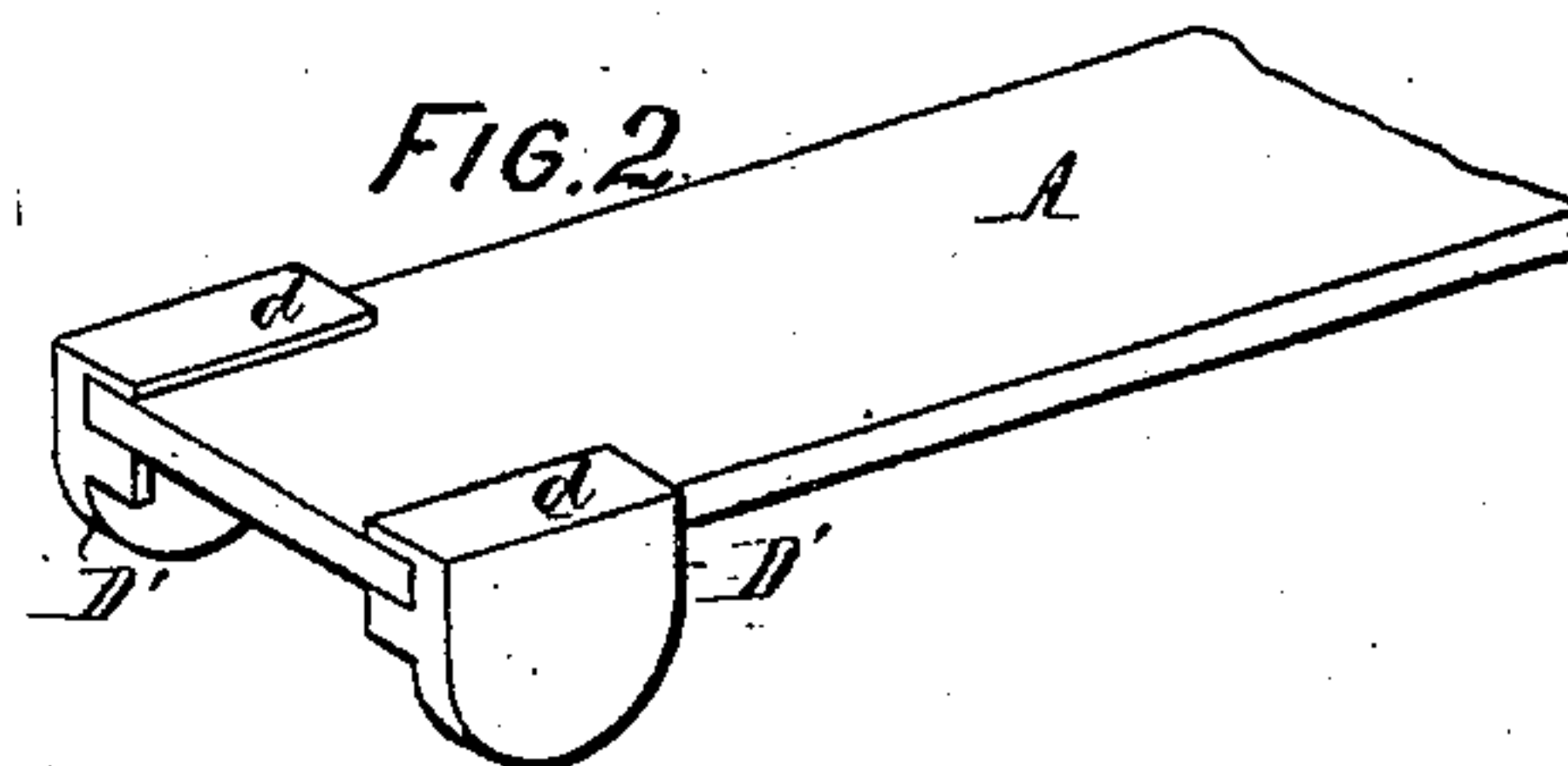
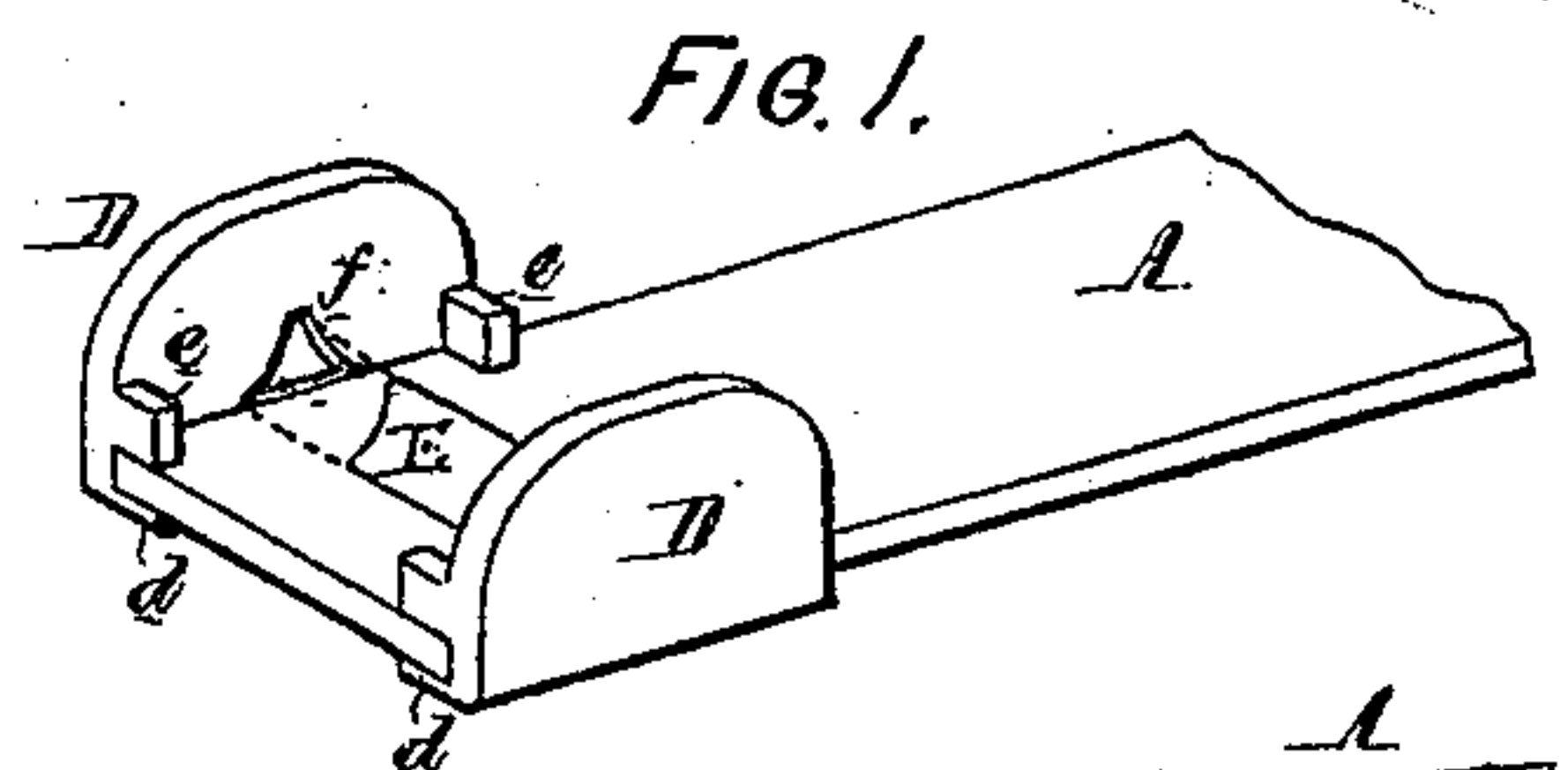
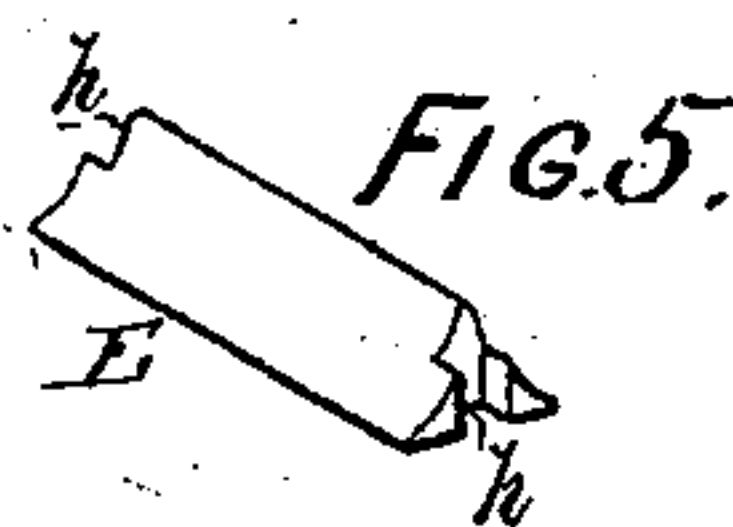
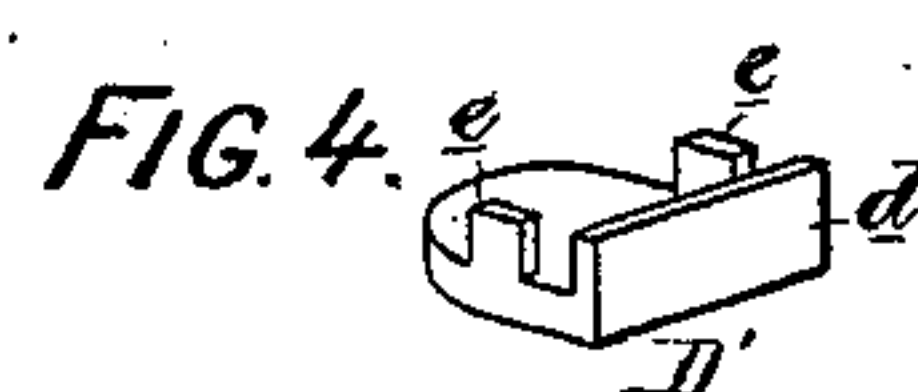
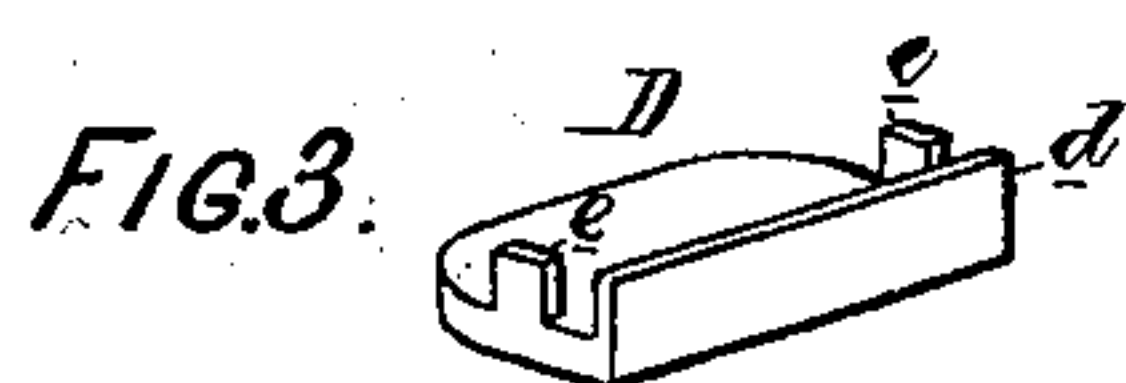
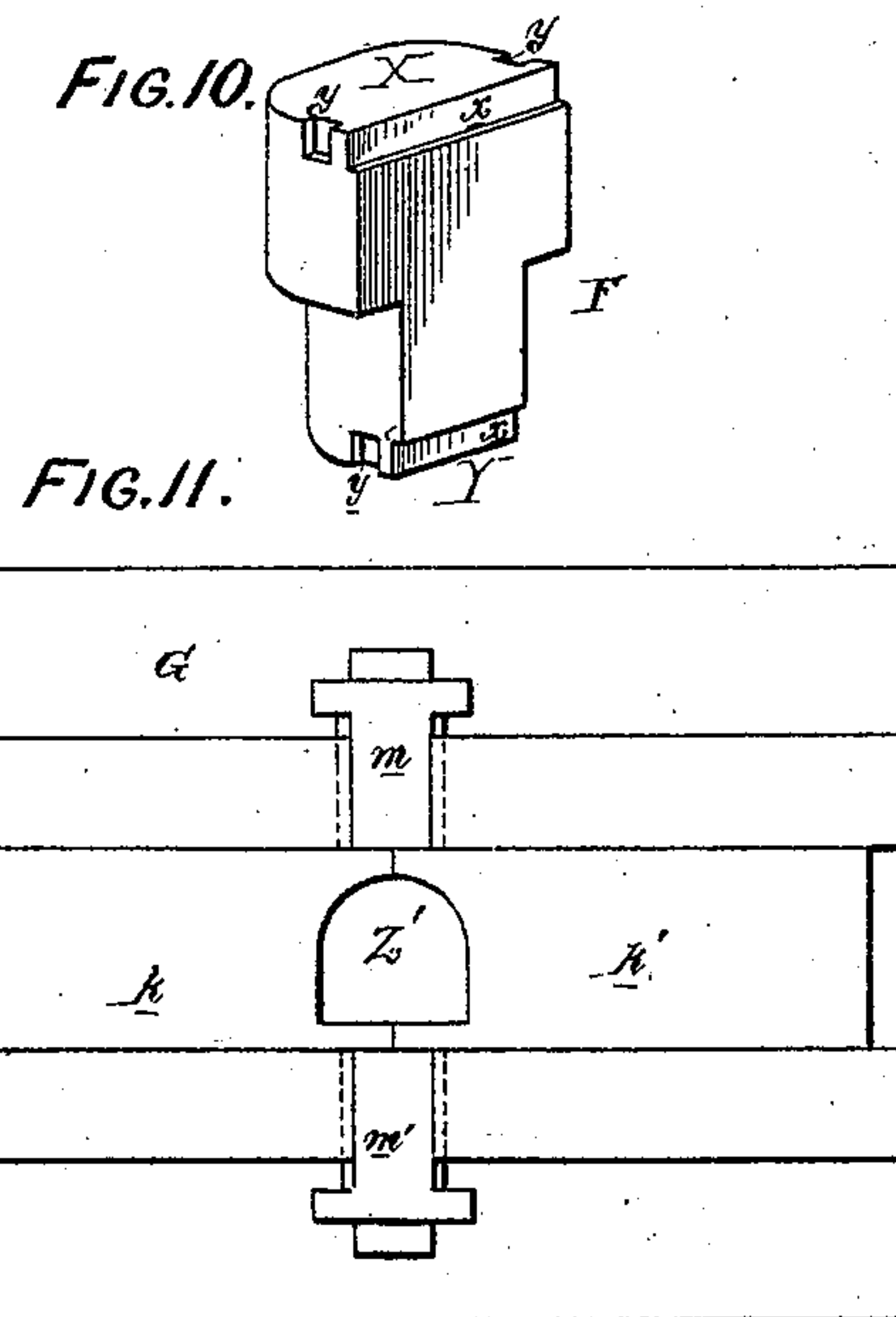
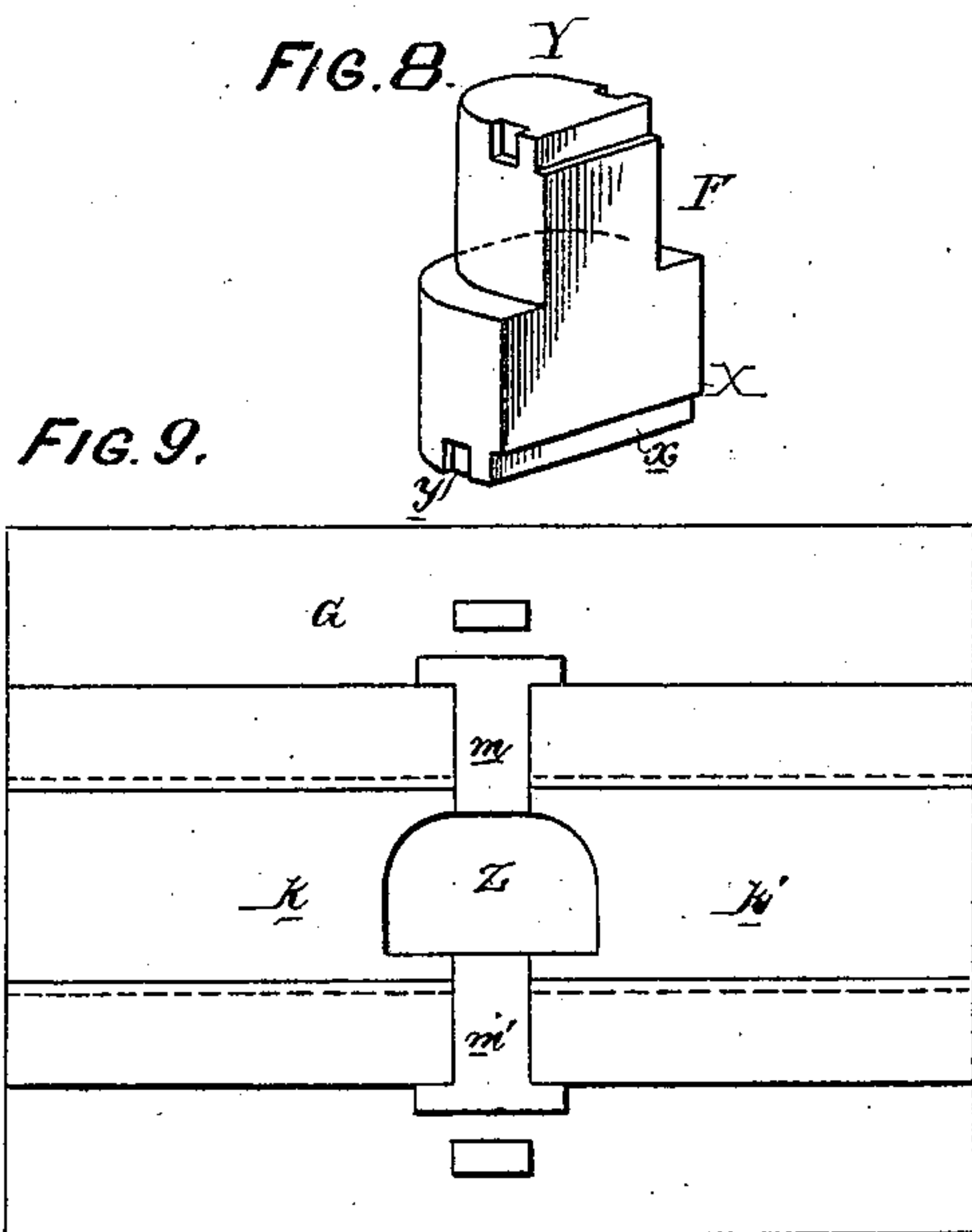


W. EVANS.

Manufacture of Springs.

No. 133,424.

Patented Nov. 26, 1872.



WITNESSES, *Samuel Smith*
Thomas McKeown

William Evans
by his Attys.
Howman and son

UNITED STATES PATENT OFFICE.

WILLIAM EVANS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN THE MANUFACTURE OF SPRINGS.

Specification forming part of Letters Patent No. 133,424, dated November 26, 1872.

To all whom it may concern:

Be it known that I, WILLIAM EVANS, of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in the Manufacture of Springs and in Dies for the same, of which the following is a specification:

My invention consists of a mode or process, too fully explained hereafter to need preliminary description, of forming the heads or sockets of carriage-springs so as to insure strength and solidity. My invention further consists of certain apparatus, described hereafter, whereby the pieces comprising the said ends or sockets may be quickly produced.

In the accompanying drawing, Figures 1 and 2 are perspective views of a strip of spring-steel with cheek and filling pieces attached to the same prior to the formation of the socket or head of the spring; Figs. 3, 4, and 5, perspective views of the cheek and filling pieces; Figs. 6 and 7, views of finished sockets or heads; Figs. 8 and 9, views of the reversible punch and adjustable die for forming the cheek-piece shown in Fig. 3; and Figs. 10 and 11, views of the same punch and die as they appear when arranged to form the smaller cheek-piece illustrated in Fig. 4.

The portion of a carriage-spring to which my invention relates is represented in Fig. 6, and consists of a strip of spring steel, A, having at the end a head or socket, B, in the sides *a a* of which are bolt-holes *b*. I form this, the ordinary head or socket, in the following manner: I take a flat strip, A, of spring steel, such as represented in Fig. 1, and to the opposite side of the same I fit crude cheek-pieces D D, each having a flange, *d*, and two lugs, *e e*, so arranged that the edge of the strip A will fit tightly between them. The cheek-pieces are formed by a punch and die of the peculiar construction fully described hereafter. In forming the head or socket I also use a triangular filling-piece, E, which may be cut from a rolled bar of corresponding shape, and which is placed upon the strip A between the cheek-pieces and fitted at its opposite ends into recesses *f* formed in the said cheek-pieces. (See Fig. 1.) When the several parts have been thus fitted together they and the end of the strip are brought to a welding-heat, and then,

by swaging, are reduced to the shape of the head shown in Fig. 6, the cheek-pieces *a a* becoming the sides *a a*, Fig. 6, and the filling-piece E becoming the mass of metal *c* which tapers gradually into the strip A. The swages for thus shaping the metal may be of the usual construction, and, therefore, require neither illustration nor description. The head is finished by punching the holes *b*, and by filing and by finishing in the usual manner. The head represented in Fig. 7 is shorter and joins the strip A more abruptly than that represented in Fig. 6, so that shorter cheek-pieces D', Figs. 2 and 4, can be used. In making this head the filling-piece E is also fitted somewhat differently to the cheek-pieces and strip, it being recessed at the ends, as shown at *h*, Fig. 5, so that it can be fitted over the lugs *e* at the inner edges of the cheek-pieces instead of into recesses in the latter. The parts thus fitted to the strip A will, when welded and swaged, form a head united abruptly to the strip A, as shown at S, Fig. 7, instead of merging into the same, as shown in Fig. 6. The cheek-pieces D and D', for the two kinds of springs illustrated, are alike except as regards length, and can be formed by the same punch and die, as I will now proceed to describe. The punch F, Figs. 8 and 10, is reversible, one end, X, being adapted to the formation of the cheek-pieces D, and the opposite smaller end Y to the formation of the shorter cheek-pieces D', and in each end X and Y are recesses *x* and *y* corresponding to the flange *d* and lugs *e e* of the cheek-pieces. The die G consists of a frame, to guides on which are adapted four sliding pieces or sections, *k k'* and *m m'*, the latter being inserted between the former, as shown in Fig. 9, so as to form an opening, *z*, corresponding in dimensions and shape with the end X of the punch when the large cheek-pieces D are to be formed. When the smaller cheek-pieces D', however, have to be made, the punch is reversed, as shown in Fig. 11, the sections *m m'* of the die drawn back, and the sections *k k'* brought together, as shown in Fig. 10, so as to form an opening, *z'*, corresponding in size and shape with the said short cheek-pieces and end Y of the punch.

I claim as my invention—

1. As an improvement in the manufacture

of springs for vehicles, welding together and to the strip A the cheek-pieces D D' and cross-piece E, the said pieces being adapted to each other and to the strip, substantially as set forth.

2. The die G, composed of the adjustable sections *k k'* and sections *m m'*, as set forth.

3. The combination of the said adjustable die with the reversible punch F.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM EVANS.

Witnesses:

WM. A. STEEL,
HARRY W. DOUTY.