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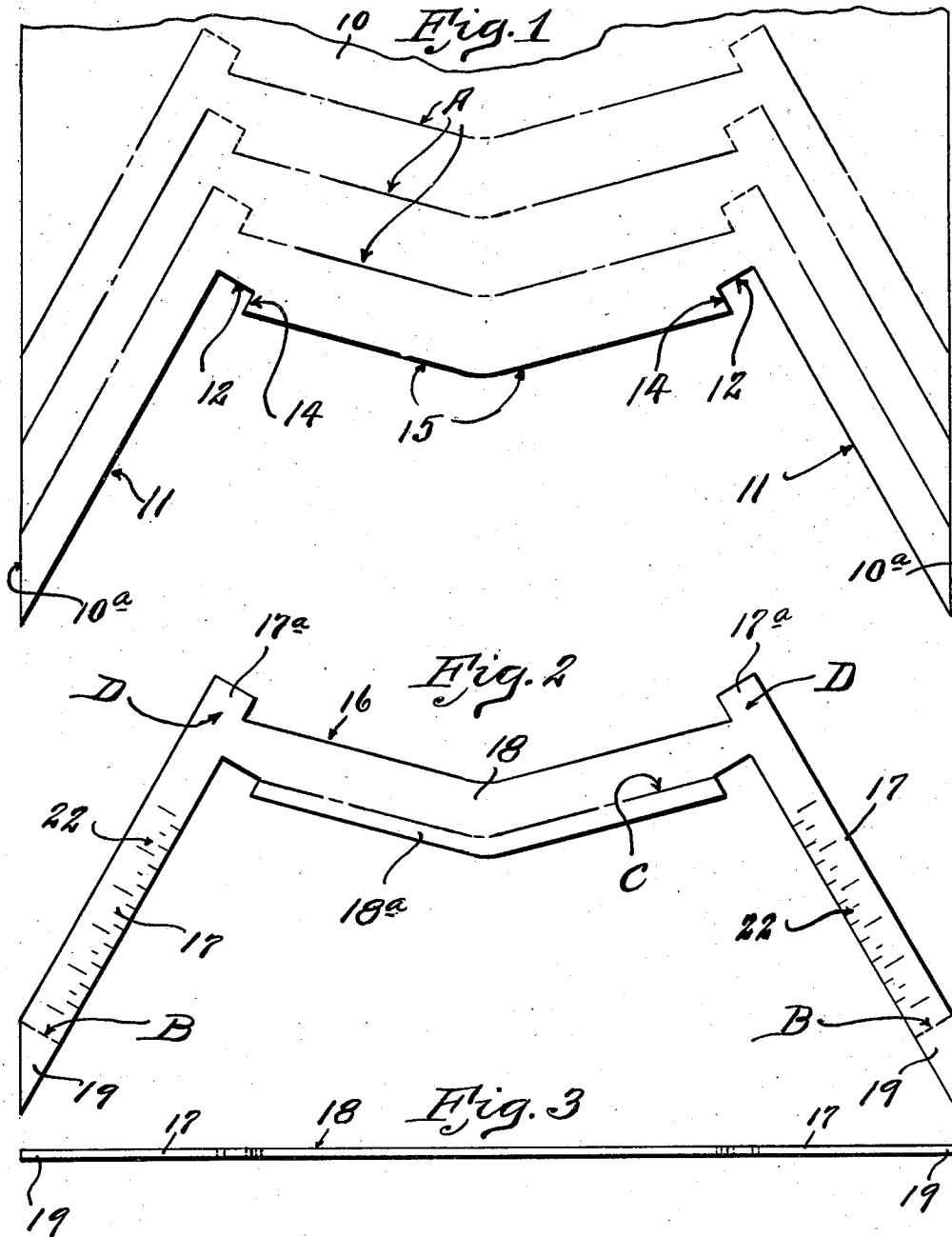
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1,736,231

VALVE SPRING CLIP AND METHOD OF MANUFACTURING SAME

Filed Sept. 21, 1927

2 Sheets-Sheet 1



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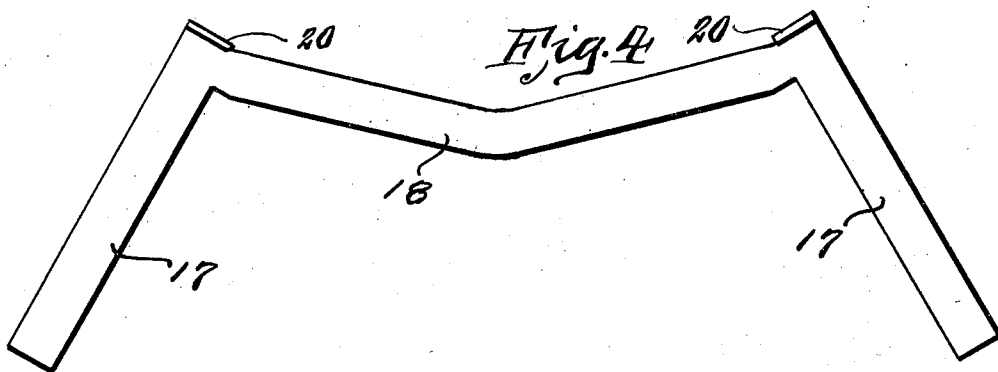
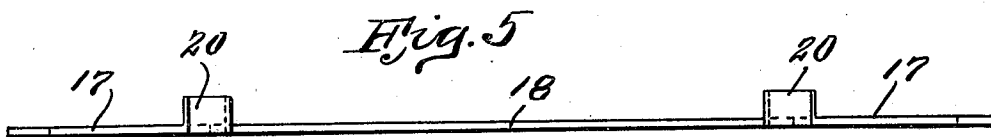
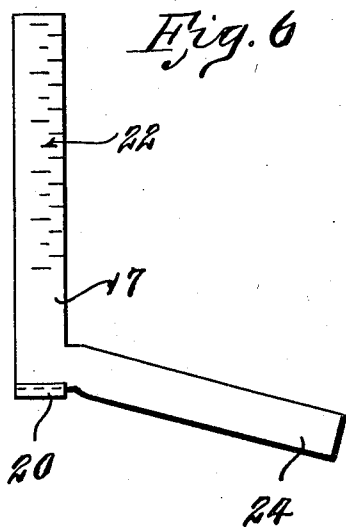
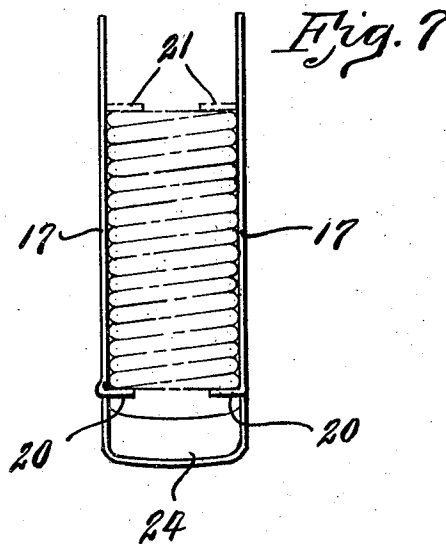
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2 Sheets-Sheet 2



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VALVE-SPRING CLIP AND METHOD OF MANUFACTURING SAME

Application filed September 21, 1927. Serial No. 220,998.

This invention relates to new and useful improvements in valve spring clips of the type designed to hold a valve spring of an internal combustion engine in compressed position preparatory to the insertion of said spring in position on the engine and to a novel method of manufacturing such spring clips. This type of spring clip is particularly designed for use in conjunction with spring compressors of my improved design as shown and described in my copending application filed December 18, 1926, Serial No. 155,723, which matured into United States Patent No. 1,720,802.

The objects of the present invention are to provide a spring clip which is of simple construction, is so constructed as to enable the use thereof in combination with a suitable spring compressor and which has its handle portion arranged at a predetermined angle to the spring engaging portions in order to enable the use of the clip on engines inaccessible to spring clips now in use.

Further objects of the invention are to provide an improved spring clip which may be stamped out of sheet material and to provide a novel method of manufacturing said spring clips in an economical and efficient manner, thereby reducing the wastage of material to a minimum and enabling the production of the clips in large quantities and at a comparatively low cost.

Still further objects of the invention are to provide a spring clip having its spring engaging portions provided at one of their ends with spring receiving seats and having its opposite ends adapted to be cut to proper length and bent laterally to form seats for engaging the opposite end of said spring thereby adapting said clip for use with valve springs of different lengths.

With these and other objects in view my invention consists in certain novel features and arrangements of parts hereinafter more fully described, claimed and illustrated, in which—

Figure 1 is a fragmental top plan view of a piece of metal from which the clip blanks are stamped as indicated in dot-and-dash lines.

Figure 2 is a top plan view of one of the blanks.

Figure 3 is a front elevational view of the same.

Figure 4 is a view similar to Figure 2 but showing the blank trimmed and having portions bent upwardly to form seats for the lower end of the valve spring.

Figure 5 is a front elevation view of the blank shown in Figure 4.

Figure 6 is a side elevation of the formed spring clip and showing the upper ends of the spring engaging portions left straight.

Figure 7 is a front elevation of the spring clip showing the valve spring in dotted lines and showing the upper ends of the spring engaging portions cut and bent at right angles for engagement with the upper end of the compressed spring.

The spring clip is made by forming into proper shape a blank which is stamped from a sheet of metal. The size and shape of each blank is so arranged as to enable the stamping thereof out of a sheet of metal of a certain size with a minimum of wastage of material and a minimum amount of labor.

Referring by numerals to the accompanying drawings 10 indicates a sheet of metal of proper size and thickness. The forward end of the sheet is cut as shown in Figure 1 on a line which runs obliquely from each edge 10^a of the sheet as indicated at 11. These lines run for a suitable distance inwardly and are then deflected at right angles for a short distance as indicated at 12, the distance being equal to the width of the side leg portions of the clip. The lines of the cut then run for a short distance parallel to lines 11 as indicated at 14, then converge forwardly as indicated at 15.

The sheet of metal 10 is fed forward a suitable distance step by step and a similarly formed cut is made at each operation as indicated by dot-and-dash lines A thereby forming blanks 16 as illustrated in Figures 2 and 3. The blank thus formed comprises side leg portions 17 and an intermediate portion 18 which unites said side portions at points spaced a short distance from the square rear ends or portions 17^a of said blank. The op-

posite or forward ends of said side portions terminate in sharp points as indicated at 19, said points being formed by virtue of the fact that lines 11 are disposed obliquely to the edges 10^a of metal sheet 10.

In the next operation the ends 19 are cut on lines B thereby finishing said ends parallel with ends 17^a. In the same operation the forward offset portion 18^a of the intermediate portion is severed on line C, thereby reducing the width of said intermediate portion. Projections 17^a are bent upwardly along dotted lines D, thereby forming seats 20 for the lower end of the spring as shown in Figures 4 and 5.

By bending the central or intermediate portion 18 into U-shape the side portions 17 are brought in parallel relation with each other and are spaced from each other a suitable distance to correspond with the diameter of the valve spring. When in this position portions 20 occupy horizontal positions and project inwardly a sufficient distance to engage the lower end of the spring. The opposite ends of leg portions 17 are left straight. When it is desired to use the clip these leg portions are trimmed or cut to the proper length and are then bent inwardly as indicated at 21 in Figure 7 to provide horizontal disposed portions for engaging the upper end of the compressed spring. The outer faces of leg portions 17 are provided with suitable marks 22 to form guides in trimming said leg portions to proper length for use with springs of various lengths. The intermediate portion, when formed into U-shape, provides a handle 24 by means of which the clip can be manipulated. This handle portion preferably extends obliquely and downwardly from the spring engaging positions 17 in order to provide greater freedom in placing the spring contained in the clip in its operating position.

By leaving ends of the spring engaging portions 17 straight, only one size of the clip is manufactured and carried in stock and each clip can be finished by the user to fit the various sized springs. My improved spring clip is of very simple construction, is very compact so that it will not interfere with the positioning of the spring, and is arranged so as to fit over the valve spring when the latter is compressed by a suitable spring compressor such as is disclosed in the aforesaid copending application. The manufacture of spring clips in accordance with my novel method insures commercial production of the clips in an efficient and economical manner and eliminates waste of material and expensive labor operations.

While I have shown and described the preferred form of my invention, it is obvious that various minor changes in the construction and shape of my improved spring clip

can be made without departing from the spirit of my invention.

I claim:

1. The method of manufacturing spring clips which consists in cutting a sheet of metal of predetermined width to provide a blank having an intermediate portion and leg portions disposed angularly relatively to said intermediate portion, trimming one of the ends of the leg portions and one edge of the intermediate portion of said blank, bending laterally the other ends of said leg portions and forming said intermediate portion to bring said leg portions in parallelism with each other and form a handle out of said intermediate portion.

2. The method of manufacturing spring clips which consists in cutting a sheet of metal of predetermined width along lines extending obliquely from the edges of said sheet, then inwardly at right angles to said oblique lines, then parallel with said oblique lines and then converging towards said center, thereby forming a blank having an intermediate portion and leg portions, trimming the oblique ends of the leg portions and said intermediate portion of said blank, then upturning the other end of each leg portion, then forming said intermediate portion U-shape to bring said leg portions in parallelism with each other with the upturned ends of said leg portions extending toward each other to form seats for the compressed spring.

3. The method of manufacturing valve spring clips which consists in cutting a blank from a sheet of metal of predetermined width, said blank having obliquely disposed side portions and an intermediate portion disposed at obtuse angles to said side portions, trimming the pointed ends of said side portions squarely with the edges thereof, upturning the other ends of said side portions and bending said intermediate portion into U-shape, thereby bringing said side portions parallel with each other with the upturned ends thereof extending inwardly, the opposite ends of said side portions being left straight and adapted to be cut to proper length and bent inwardly to receive a compressed spring of predetermined length.

4. A valve spring clip comprising a single piece bar bent to provide two spaced parallel portions and a U-shaped portion formed integral at its ends with said parallel portions near the lower ends thereof, each of said side parallel portions being formed with laterally and oppositely projecting ends for receiving therebetween a compressed valve spring, said U-shape portion forming a handle for said clip.

5. A clip for receiving compressed valve springs comprising a single piece blank having an intermediate portion and side portions disposed obliquely to said intermediate portion, said intermediate portion being bent

into U-shape to bring said side portions into spaced parallel relation with each other, whereby when said side portions occupy spring engaging positions, said U-shaped portion forms a handle inclined downwardly from the horizontal, the ends of said side portions being bent laterally and inwardly to form projecting lugs adapted to receive the ends of the compressed spring.

6. As a new article of manufacture, a spring clip comprising a single piece blank having an intermediate portion and side portions connected to the ends of the last mentioned portion and disposed obliquely thereto, said intermediate portion being adapted to be bent into a U-shape, thereby bringing said side portions in parallel spaced relation, one end of each side portion being bent laterally and inwardly to form a seat for the lower end of a compressed valve spring, the other end of each side portion being left straight and adapted to be bent inwardly toward each other at a point spaced the desired distance from the first end to engage the upper end of the compressed spring, said U-shaped portion being disposed obliquely to said parallel portions to form a handle for the clip.

7. As a new article of manufacture, a clip for compressed springs comprising a single piece blank having formed integral an intermediate portion and a pair of side portions disposed obliquely thereto and connected to the ends thereof, said intermediate portion being adapted to be bent into a U-shape, thereby bringing said side portions in parallel spaced relation, that end of each side portion adjacent to the respective end of said U-shaped portion being disposed laterally and inwardly to provide a seat for the lower end of a compressed valve spring, the other ends of said side portions being left straight and adapted to be cut to proper length and bent inwardly to receive the upper end of said spring.

In testimony whereof I hereunto affix my signature this 19th day of September, 1927.

JOSEPH SUNNEN.