Sept. 5, 1939. A. DRUCKER ET AL 2,171,785

STRIP PERFORATING AND CUTTING OFF MACHINE

Filed March 20, 1939 3 Sheets-Sheet 1

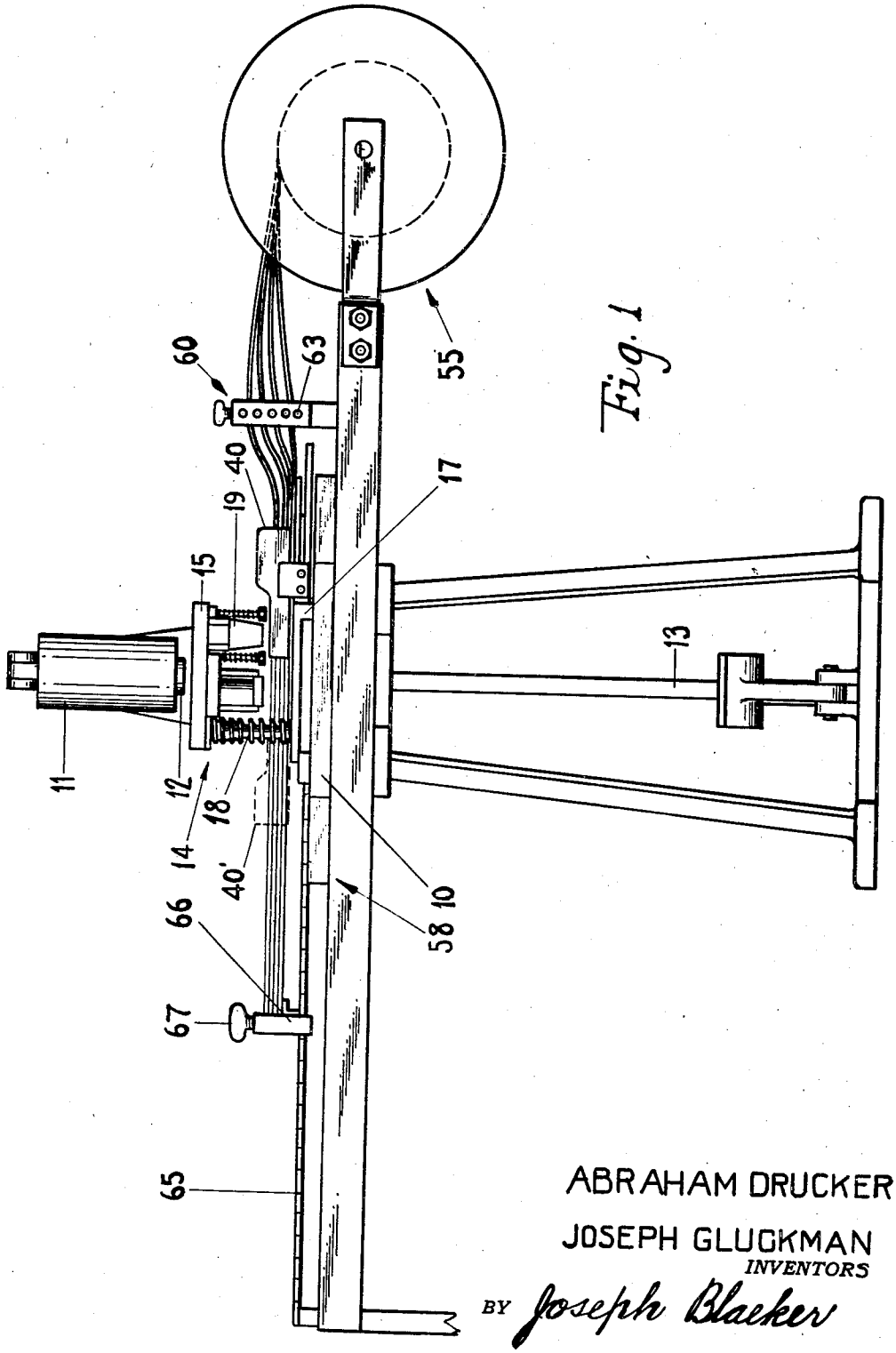


Fig. 1

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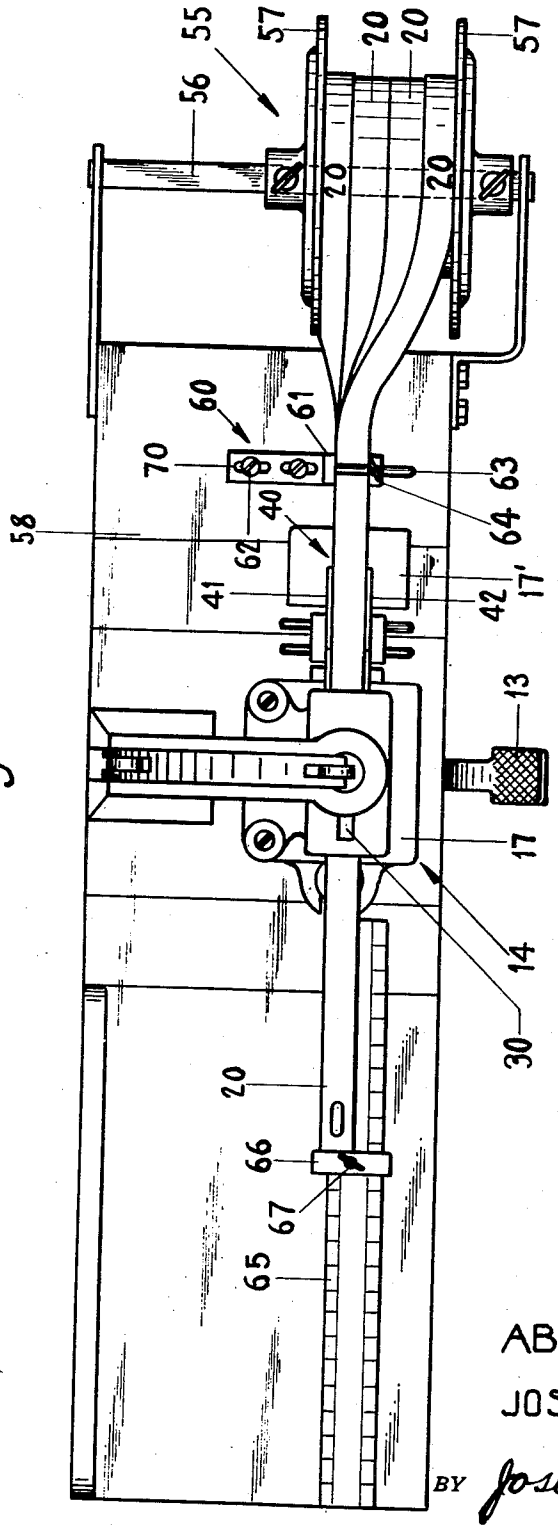


Fig. 2

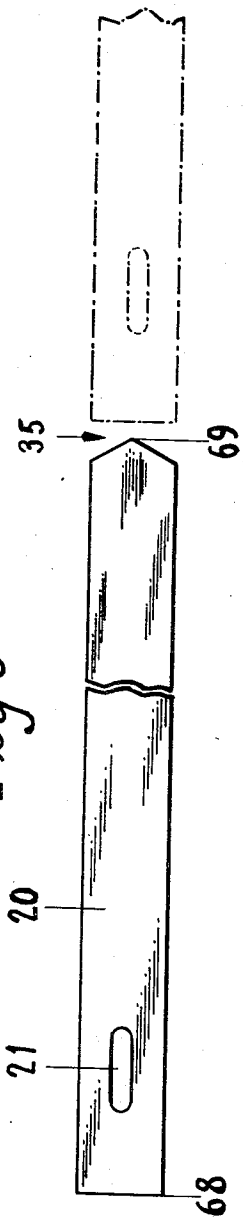


Fig. 3

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Fig. 4

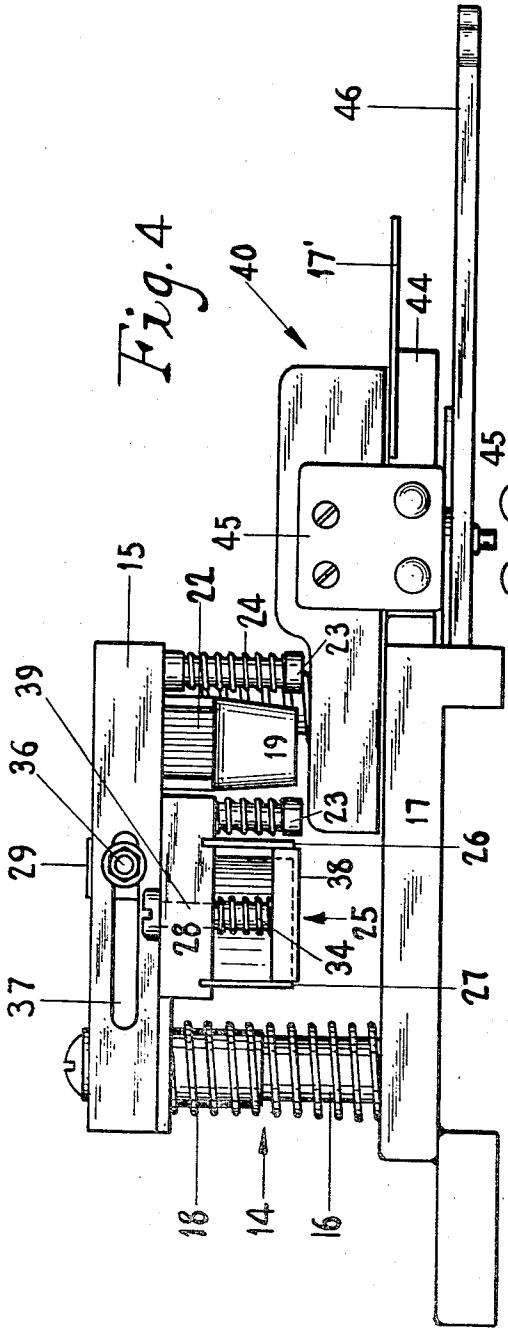
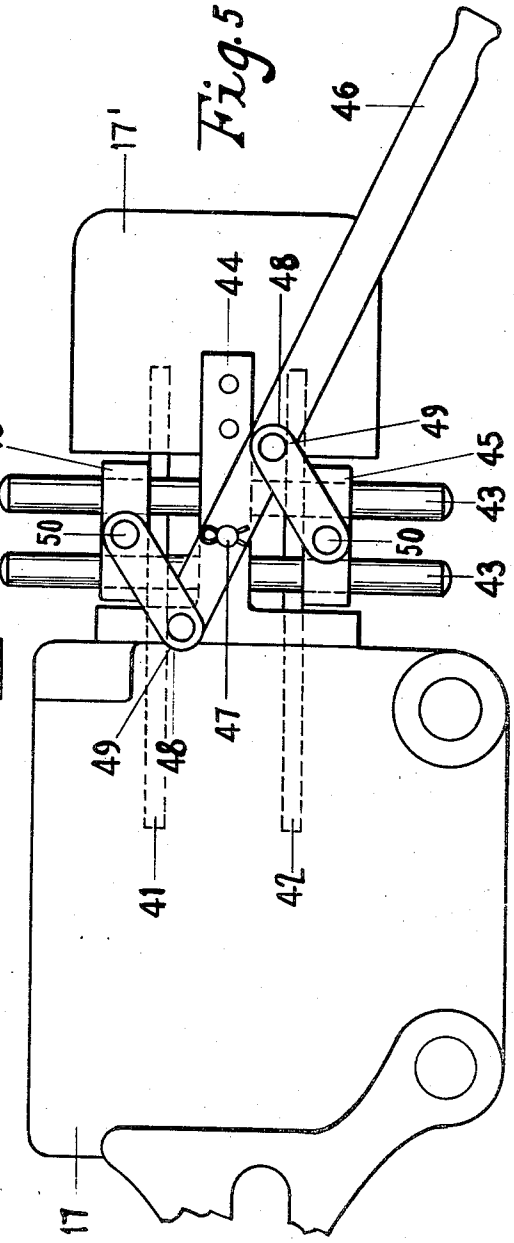


Fig. 5



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Patented Sept. 5, 1939

2,171,785

UNITED STATES PATENT OFFICE

2,171,785

STRIP PERFORATING AND CUTTING-OFF MACHINE

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Application March 20, 1939, Serial No. 263,002

6 Claims. (Cl. 164—15)

This invention relates to a bulk handling and measuring and perforating and cutting off machine designed to perforate to pattern form and cut a plurality of articles to desired length in a single operation from a plurality of superposed strips of material.

An object of this invention is to provide a perforating and cutting off machine designed to form elongated prong slots in belt strip material and simultaneously form a substantially V-shaped cut on the severed portions of the belt strip material and a right-angular cut on the remainder portions of the belt strip material.

Another object of this invention is to provide a unitary die set having a punch holder plate resiliently supported in a raised position for downward and upward motion, the said plate having a tubular punch and two cutting off dies depending therefrom in linearly aligned position.

Another object of this invention is to provide stripper devices operating in conjunction with said punching and cutting off dies.

Another object of this invention is to provide a gauge having two parallel vertical walls and means for moving said vertical walls in equally spaced relation from the centrally aligned linear position of the said punch and cutting off dies.

Another object of this invention is to provide a reel having a horizontal axis adapted for supporting a plurality of belt strip rolls in horizontally spaced relation and to provide means for stacking said strip material in vertical alignment with said gauge and dies.

With the above and other objects in view, the invention will be hereinafter more particularly described, and the combination and arrangement of parts will be shown in the accompanying drawings and pointed out in the claims which form part of this specification.

Reference will now be had to the drawings, wherein like numerals of reference designate corresponding parts throughout the several views, in which:

Figure 1 is a side elevation of our strip perforating and cutting off machine.

Figure 2 is a top plan view of the machine.

Figure 3 is a fractional plan view of a strip of belt material showing a perforated and cut off belt, a type of work that the device of our invention is capable of producing.

Figure 4 is a side elevation of the die-set shown in Figures 1 and 2.

Figure 5 is a bottom plan view of the die-set and showing parallel-motion mechanism for moving two gauge walls in equally spaced relation from the linearly aligned axis of the dies.

In the illustrated embodiment of the invention, there has been shown a foot lever operated machine comprising a work support 10 from which extends upwardly a plunger-housing 11. Slidably mounted for vertical reciprocations in the plunger-housing 11 is a plunger 12 which is actuated by a foot lever 13.

Fixedly mounted on the work support 10 is a unitary die-set 14 having its punch holder plate 15 preferably in slightly spaced relation from the bottom surface of the plunger 12.

The plate 15 is slidably mounted on vertical guide pins 16 fixed in the die-set base 17 and supported in raised position by coil springs 18.

A tubular punch 19 preferably designed to perforate belt strip material 20 with an elongated aperture or prong slot 21, shown in Figure 3, has been fastened in an upright cutting position to the lower surface of the punch holder plate 15. As is well known in the art, the tubular punch 19 has a side opening 22 at its upper end through which the material cut by the punch 19 is discharged therefrom. The punch 19 is provided at opposite ends with stripper pins 23 mounted for vertical sliding motion in the plate 15 and resiliently downpressed by coil springs 24.

A duplex cutting off die 25 having a straight cutting off die 26 and a substantially V-shaped cutting off die 27 has been fastened in an upright cutting position to the lower surface of the punch holder plate 15, the said apex being positioned in alignment with the axis of the tubular punch 19. For the purpose of adjusting the distance from the straight die 26 to the punch 19 we have provided a head-piece 28 on the duplex die 25, the said headpiece having an upper extension 29 preferably of rectangular cross section and which is slidably mounted in a slot 30 extending through the punch holder plate 15. This spacing adjustment between the duplex die 25 and the punch 19 makes it possible to vary the distance 35 shown in Figure 3 to permit the use of the machine for belts adapted for use with various styles and sizes of buckles.

A bolt 36 slidable in a slot 37 serves for locking the duplex die 25 in any desired set position. The duplex die 25 is provided with a stripper plate 38 mounted for vertical sliding motion between the cutting off dies 26 and 27. The stripper plate 38 is integrally connected to guide pins 39 mounted for vertical sliding motion in the head-piece 28 and resiliently downpressed by coil springs 34.

A self-centering gauge 40 having upright side walls 41, 42 has been mounted on the dieset base 17 with the said side walls in parallel alignment with the aligned cutting members 19, 26 and 27.

The side walls 41 and 42 are respectively secured to slide blocks 45, 45, having apertures at their lower elevations. The plates or side walls 41 and 42 are slidably mounted by engagement of the said apertures with elongated guide pins 43, 43. The pins 43 are fixed to a bar 44 which is integral with the die-set base 17.

A lever 46 has been fulcrumed at a point 47 to the bar 44 intermediate the guide pins 43. Links 48, 48 of equal length have been pivotally mounted at one of their ends to the lever 46 at points 49, 49 equidistant from the fulcrum 47. The other ends of the links 48 have been pivotally mounted to the slide blocks 45 at points 50, 50 equidistant from the guide pins 43. It will be seen that motion of the lever 46 will cause motion of the side walls 41 and 42 of the gauge 40 to or from the line of alignment of the dies 19 and 25 and that when a strip of material 20 is placed in the gage 40, movement of the lever 46 will automatically move said material into central or axial alignment with the said dies. A horizontal plate 17' fastened to the bar 44 forms a continuation of the die-set base 17. The plate 17' is positioned in spaced relation from the base 17 to permit motion therebetween of the slide blocks 45.

It is to be noted that lever 46 of the self-centering gauge 40, serving as the means for actuating the mechanism, is designed to be positioned beyond the line of alinement of the dies and that when the strip material is narrow, the said mechanism becomes self-locking.

A reel 55 having a horizontal axis 56 on which side plates 57, 57 are slidably mounted has been secured at one end of an operating table 58. As shown in Figure 2, four rolls of belt strip material 20 have been mounted on the axis 56 in parallel side-by-side relation and so that all the rolls may be unwound simultaneously and equally.

A stacking device 60 has been secured to the operating table 58 intermediate the reel 55 and the gauge 40. The stacking device 60 comprises a right-angular bracket 61 which is fixed to the table 58 such as by screws 62 and having a plurality of spaced guide pins 63 extending therefrom in spaced relation and preferably positioned in a single vertical plane. The stacking device has been positioned in central alignment with the gauge 40 and with the cutting dies 19 and 25. A plate 64 slidably mounted on the pins 63 is spaced from the bracket 61 a distance corresponding to the width of the strip material 20.

As best shown in Figure 2, the rolls of strip material 20 are of the same width and are unwound in spaced vertical planes and are brought into superposed relation by threading said strips individually between the stacking pins 63.

A graduated scale 65 has been fastened to the operating table 58 in line with the superposed strips 20. A stop 66 slidably mounted on the scale 65 carries a screw 67 by means of which the stop may be adjusted any desired distance from the apex of the V-shaped cutting off die 27. The operator may thus set the stop 66 to produce measured cut lengths such as belts of the desired overall dimension between the right-angular end 68 and the V-shaped end 69, Figure 3.

While we have illustrated our strip perforating and cutting off machine as utilizing a tubular punch 19 and a duplex cutting off die 25 especially adapted for forming elongated prong slots in belt strip material and simultaneously forming a V-shaped cut on the severed portions of the belt strip material and a right-angular cut on the remainder portions of the belt strip material, it is obvious that we may employ dies or tools which will perform other functions in strip material. We do not, therefore, limit ourselves to the type of die-set shown in the drawings, as we contemplate in connection with our strip fabricating machine the manufacture of quite a number of unitary die-sets designed for performing different functions but being interchangeable and adapted to be mounted on the operating table 58 in operating alignment with the reel 55 and the vertical stacking device 60. The die-set, best shown in Figure 4, is resiliently supported in raised position for simultaneous movement to and from the base and may be actuated by a foot press as shown, or by a hand press, etc.

It is to be noted that the die-set base comprises two sections 17 and 17^1 positioned in one horizontal plane, the said sections being integrally connected by means of a narrow connecting bar corresponding to the width of the narrowest strip material to be fabricated. Also that the vertical walls 41 and 42 of the self-centering gauge 40 are actuated by mechanism positioned below the upper surface of the said die-set base, whereby the entire upper surface of the die-set base is unobstructed throughout its entire length and thus permitting passage thereover of elongated strip material at all times.

The self-centering gauge 40 serves to automatically center belts of various widths such as from three-eighths of an inch to one inch in width, etc. A self-centering gauge 40^1 of the same structure as the gauge 40 may be used to center the belts or pliable strip material to align said material with the dies at opposite ends of the dies.

The bottom leg of the bracket 61 has slots 70 through which the screws 62 pass and by means of which the bracket 61 and the entire stacking device 60 may be adjusted in accurate alignment with the dies.

We claim:

1. An apparatus for the bulk handling and measuring and punching and cutting off belts, comprising a work supporting base, a plurality of aligned dies supported for movement to and from said base, a self-centering gauge adapted for receiving belt strip material in superposed relation and for aligning said strip material in central relation with said dies, a reel adapted for supporting a plurality of belt strip rolls in direct side by side horizontal relation on a common axis, a stacking device positioned intermediate said gauge and said reel for stacking said horizontally positioned belt strip material in vertically superposed relation, a graduated scale in alignment with said superposed strips and having stop means slidably mounted thereon to measure off required lengths to be cut, means for actuating said dies and means for stripping said cut belts from said dies.

2. An apparatus for the bulk handling and measuring and punching and cutting off belts, comprising a work supporting base, a plurality of aligned dies supported for movement to and from said base, a self-centering gauge having upright side walls adapted for receiving a plurality of belt strips in superposed relation and for aligning said strip material in central relation with said dies, a reel adapted for supporting a plurality of belt strip rolls in direct side by side horizontal relation on a comomn axis, a stacking

device positioned intermediate said gauge and said reel for stacking said horizontally positioned belt strip material in vertically superposed relation, a graduated scale in alignment with said superposed strips and having stop means slidably mounted thereon to measure off required lengths to be cut, means for actuating said dies and means for stripping said cut belts from said dies.

3. An apparatus for the bulk handling and measuring and punching and cutting off belts, comprising a work supporting base, a prong slot forming die and a right-angular cutting die and a V-shaped cutting die mounted in alinement in a punch holder and being supported for movement to and from said base, a self-centering gauge having upright side walls adapted for receiving a plurality of belt strips in superposed relation and for aligning said strip material in central relation with said dies, a reel adapted for supporting a plurality of belt strip rolls in direct side by side horizontal relation on a common axis, a stacking device positioned intermediate said gauge and said reel for stacking said horizontally positioned belt strip material in vertically superposed relation, a graduated scale in alignment with said superposed strips and having stop means slidably mounted thereon to measure off required lengths to be cut, means for actuating said dies and means for stripping said cut belts from said dies.

4. An apparatus for the bulk handling and measuring and punching and cutting off belts, comprising a work supporting base, a prong slot forming die and a right-angular cutting die and a V-shaped cutting die mounted in alinement in a punch holder and being resiliently supported in raised position for simultaneous movement to and from said base, a self-centering gauge having upright side walls adapted for receiving a plurality of belt strips in superposed relation and for aligning said strip material in central relation with said dies, a reel adapted for supporting a plurality of belt strip rolls in direct side by side horizontal relation on a common axis, a stacking device positioned intermediate said gauge and said reel for stacking said belt strip material in vertically superposed relation, a graduated scale in alinement with said superposed strips and having stop means slidably mounted thereon to measure off required lengths to be cut, means for actuating said dies and means for stripping said cut belts from said dies.

5. An apparatus for the bulk handling and measuring and punching and cutting off belts, comprising a die-set having a work supporting base, a prong slot forming die and a right-angular cutting die and a V-shaped cutting die mounted in alinement in a holding plate and being resiliently supported in raised position for simultaneous movement to and from said base, a self-centering gauge having upright side walls spaced apart and being adapted for receiving a plurality of belt strips in superposed relation and for automatically aligning said strip material in central relation with said dies, a reel having side plates slidably mounted on a spindle and being thereby adapted for supporting a plurality of belt strip rolls in direct side by side horizontal relation on said spindle, a stacking device positioned intermediate said gauge and said reel for individually stacking said belt strip material in vertically superposed relation, a graduated scale in alinement with said superposed strips and having stop means slidably mounted thereon to measure off required lengths to be cut, means for actuating said dies and means for stripping said cut belts from said dies.

6. An apparatus for the bulk handling and measuring and punching and cutting off strip material, comprising a die-set having a work supporting base, a plurality of aligned dies mounted in a holding plate and being resiliently supported in raised position for simultaneous movement to and from said base, a self-centering gauge having upright side walls spaced apart and being adapted for receiving a plurality of strips of material in superposed relation and for automatically aligning said strip material in central relation with said dies, a reel having side plates sildably mounted on a spindle and being thereby adapted for supporting a plurality of strip material rolls in direct side by side horizontal relation on said spindle, a stacking device having a plurality of spaced guide pins and being positioned intermediate said gauge and said reel for individually stacking said strip material in vertically superposed relation, a graduated scale in alinement with said superposed strips and having stop means slidably mounted thereon to measure off required lengths to be cut, means for actuating said dies and means for stripping said cut strip material from said dies.

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