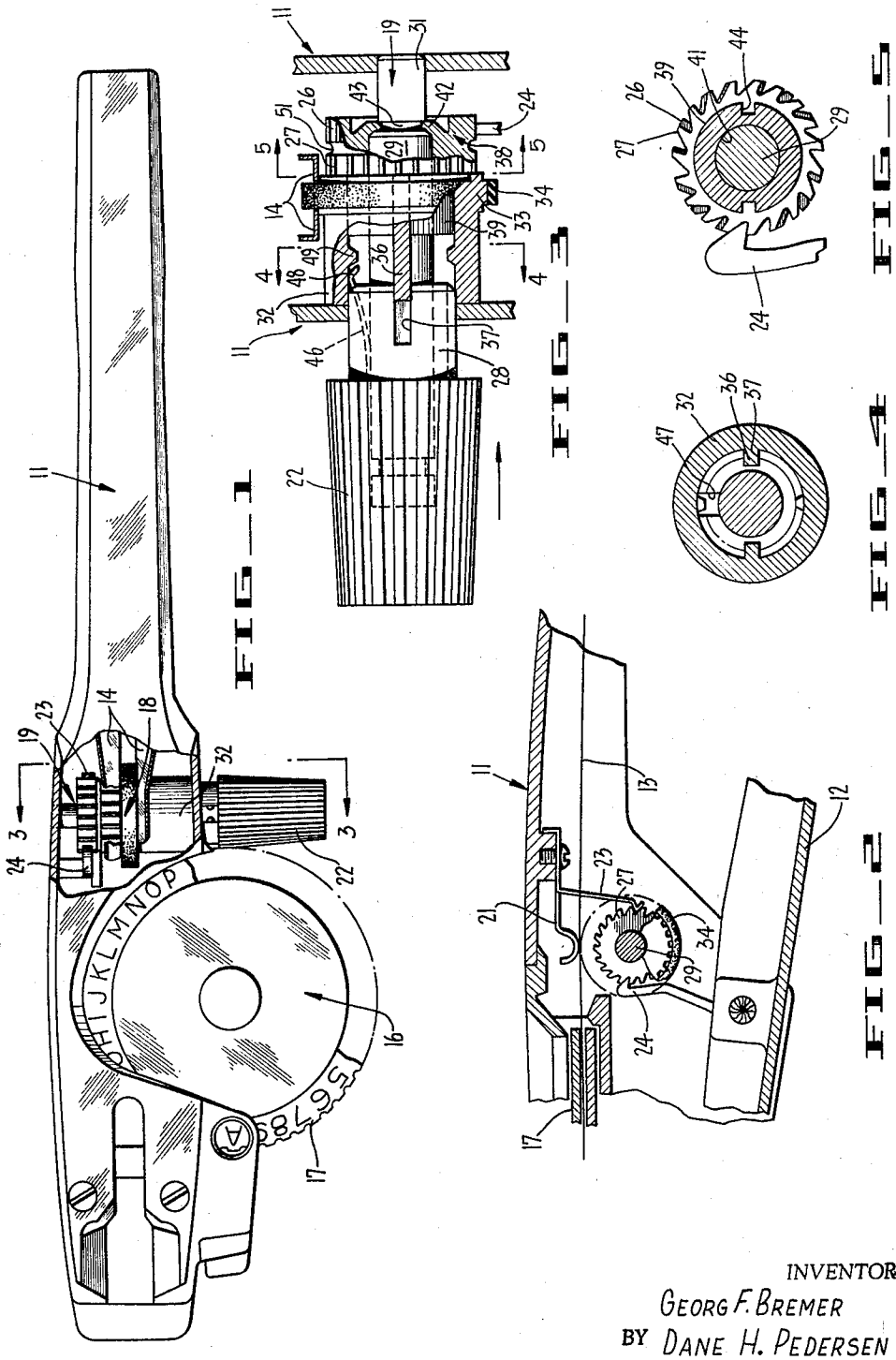
Aug. 2, 1966 G. F. BREMER ET AL 3,263,790

VARIABLE SPACER ARRANGEMENT FOR EMBOSSING TOOL

Filed Aug. 17, 1964 2 Sheets-Sheet 1



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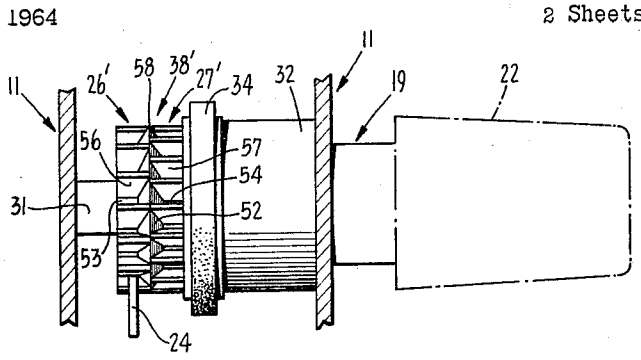

FIG_6

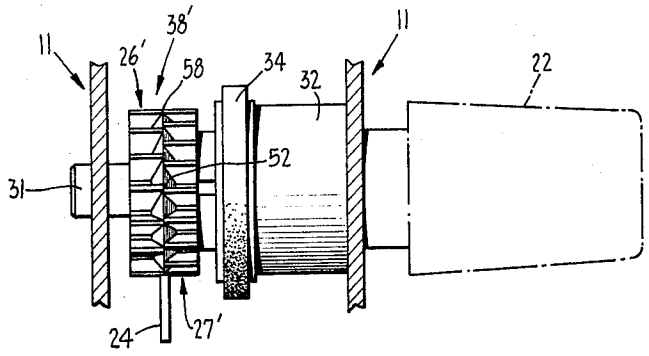

FIG_7

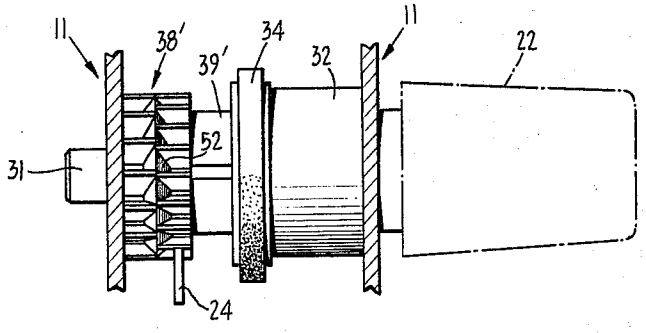

FIG_8

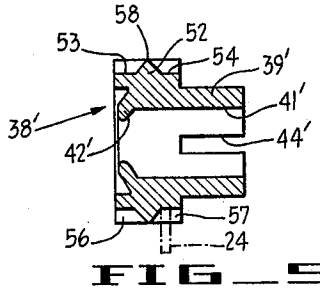

FIG_9

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United States Patent Office 3,263,790 Patented August 2, 1966

3,263,790

VARIABLE SPACER ARRANGEMENT FOR EMBOSSING TOOL

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Filed Aug. 17, 1964, Ser. No. 390,156
7 Claims. (Cl. 197—6.7)

The present invention relats generally to tools for embossing various letters, numbers, or other indicia on a strip of tape-like material, and is more particularly directed towards a variable spacer arrangement for tools of this type whereby the spacing between successive indicia embossed on the strip may be selectively varied.

In order to provide a convenient method of identifying a wide variety of objects, the use of embossing tools of the general type described in U.S. Patents Nos. 2,275,670 and 3,006,451 has become widespread. In such tools, a strip of material to be embossed is fed past a pair of complementary dies, actuation of a handle effecting movement of the dies to emboss the strip and release of such handle serving to advance the strip and place the same in position for receiving the next embossment. A number of pairs of the dies are generally provided in an indicia selector disc, pairs of dies for different indicia being circumferentially spaced about the disc and the disc being selectively rotatable to move the respective sets of dies into embossing position. Such indicia selector discs are advantageously removably mounted in operative position in the tool such that several discs having varied selections of indicia may be interchangeably employed in the single tool. In this manner, a large assortment of indicia may be embossed with the single tool, one disc for example having dies for upper case letters, another disc having dies for lower case letters, a further disc having dies for script letters, etc.

The provision of interchangeable indicia selector discs presents a problem in that the indicia of different discs as embossed upon the strip may require different spacings therebetween, whereas existing embossing tools are capable of providing for but a single fixed spacing. If the feed mechanism of a tool is, for example, designed to advance the strip a distance commensurate with the proper spacing between upper case letters, and a lower case letter selector disc is mounted in the machine, the resulting embossed lower case letters are spaced farther apart than desired for best appearance. Conversely, if the machine advanced the strip a shorter distance appropriate to lower case spacing, the letters embossed upon employment of an upper case disc in the machine would to some extent overlap. Therefore, it has been the usual practice to design an embossing machine for a spacing compatible with the largest size indicia to be encountered and to tolerate the inordinate spacing which results when discs bearing smaller size indicia dies are interchangeably employed in the machine.

It is therefore an object of the present invention to provide variable spacing means for facilitating a selective variation in the spacing between successive indicia embossed upon a tape-like strip by an embossing tool.

Another object of the invention is the provision of a variable spacer feed arrangement for incorporation in an embossing tool whereby the feed of the strip or tape may be selectively varied to be compatible with the best spacing between different size indicia respectively embossable with different indicia selector discs which may be interchangeably employed in the tool.

Still another object of the invention is to provide a variable spacer arrangement of the class described which includes inoperative association with the strip feed roll of the embossing tool, a plurality of ratchet wheels respectively having different numbers of teeth which are selectively shiftable into engagement with the usual handle or otherwise operated feed pawl of the tool to thereby vary the extent of strip advancing rotation of the feed roll.

It is a further object of the invention to provide a variable spacer arrangement of the character outlined above featuring a readily manipulatable ratchet wheel shifting mechanism capable of maintaining the ratchet wheels operatively coupled to the feed roll in any of a plurality of shiftable positions of the ratchet wheels relative to the feed roll.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

FIGURE 1 is a plan view with portions broken away of a hand operated embossing tool provided with the variable spacer arrangement of the present invention.

FIGURE 2 is a fragmentary cross-sectional side elevation view of the embossing tool.

FIGURE 3 is a sectional view on an enlarged scale taken in the plane indicated by line **3—3** of FIGURE 1, particularly indicating details of the variable spacer arrangement.

FIGURE 4 is a sectional view taken in the plane indicated by line **4—4** of FIGURE 3.

FIGURE 5 is a sectional view taken in the plane indicated by line **5—5** of FIGURE 3.

FIGURE 6 is an elevation view of a modified form of variable spacer arrangement and viewed looking rearwardly of the embossing tool.

FIGURE 7 is a view similar to FIGURE 6, but with the spacer arrangement in a partially shifted position from that shown in FIGURE 6.

FIGURE 8 is a view similar to FIGURES 6 and 7, but with the spacer arrangement in a fully shifted position.

FIGURE 9 is a sectional view taken at a diametric plane through a plural ratchet wheel element of the modified variable spacer arrangement.

The variable spacer arrangement of the present invention is illustrated in the drawing in association with a hand operated embossing tool of the general type disclosed in U.S. Patents Nos. 2,275,670 and 3,006,451. It is to be appreciated, however, that the invention is also applicable to embossing tools other than the hand operated variety. Hand operated embossing tools are typically provided with an elongated body member **11** and a handle member **12** pivotally attached thereto. A strip **13** of material to be embossed is adapted to be carried by the member **11** for longitudinal movement therethrough. In this regard transversely spaced longitudinal guide plates **14** are mounted in the body member for guiding the strip into operative relation to embossing means **16** carried by the body member. The embossing means are herein provided as a plurality of complementary sets of dies disposed at circumferentially spaced points of a split indicia selector disc **17** through which the strip **13** extends. The handle member **12** is operatively associated with the embossing means in such a manner that in response to movement of the handle member towards the body member, a set of the embossing dies are caused to emboss the strip. No further explanation of the embossing operation is deemed necessary, since reference may be made to previously referenced U.S. Patents Nos. 2,275,670 and 3,006,451 for added constructional and operational details.

Feeding of the strip **13** through the tool is typically ac-

complished by means of a feed roll assembly **18** associated with a shaft **19** extending transversely of and journalled in a medial portion of the body member **11**. The roll extends slightly upward through the slot between the guide plates **14** and the strip **13** is engaged between the roll and a resilient pressure foot **21** secured to the body member. The shaft **19** is terminated in an external feed knob **22** and a detent **23** secured to the body member and a feed pawl **24** secured to the handle member are provided to, in a typical arrangement engage a ratchet wheel secured to the shaft. The arrangement is such that when the handle member is moved towards the body member to effect an embossing operation, the pawl will freely ride over the teeth in the ratchet wheel. However, upon release of the handle the pawl will engage the teeth and rotate the ratchet wheel to thereby rotate shaft **19** and its associated feed roll **18** for advancing the strip. The amount of tape advance thus effected is fixed by the distance between adjacent teeth of the ratchet wheel and thus by the number of teeth on the wheel. Similarly, upon twisting the feed knob **22** an amount equal to the distance between adjacent teeth, as can be readily ascertained by the detent engaging the next ratchet tooth, the strip is advanced the same fixed distance. Conventionally the number of teeth on the ratchet wheel is selected to provide a strip advance compatible with a spacing between indicia embossed on the strip appropriate to the particular size of the indicia of the embossing means **16**. Of course in embossing tools which are other than hand operated, the feeding operation is effected in a similar manner, the difference being that the pawl is actuated by means other than by hand.

From the foregoing description, it will be understood that the conventional feed arrangement of an embossing tool provides a fixed spacing between the indicia embossed on the tape and this fixed spacing is only suited to a given size of indicia. Such a feed arrangement is of course adequate where the tool embosses indicia of but one size. However, as previously mentioned, embossing tools are frequently arranged to emboss different sizes of indicia. For example, the disc **17** may be removably mounted on the machine such that other similar discs, but having indicia embossing dies of a different size, may be interchangeably employed with the machine. Under these circumstances the fixed spacing provided by a conventional feed arrangement is not satisfactory to all of the various size indicia that may be embossed by the tool.

Accordingly, as the principal feature of the invention a variable spacer arrangement is provided which facilitates selective variation of the amount of feed of the strip **13** to provide the best spacing between indicia embossed thereon for any of a number of different sizes of indicia. As herein illustrated, this is preferably accomplished by means of a plurality of juxtaposed ratchet wheels **26, 27** respectively having different numbers of teeth fixedly coaxially secured to the shaft **19**. The shaft is arranged to be selectively movable transversely of the body member **11** between positions wherein the ratchet wheels **26, 27** are respectively engaged by the pawl **24** and detent **23**. By virtue of the different numbers of teeth of the respective ratchet wheels, different amounts of feed of strip **13** are effected depending upon which ratchet wheel is operatively engaged with the feed pawl and detent.

It will be appreciated that with the foregoing general arrangement wherein the shaft **19** is transversely shiftable, the feed roll assembly **18** cannot be fixedly secured to the shaft as was previously the practice. More particularly, the feed roll is necessarily fixed in its transverse position by virtue of the guide plates **14**. Yet, the feed roll must be keyed to the shaft in all of its shiftable transverse positions such that the shaft, feed roll, and ratchet wheels will rotate as an integral assembly. Thus, the feed roll assembly and shaft must be transversely movable relative to each other and at all times keyed together. Moreover, provision must be made to lock the shaft in its respective transverse positions wherein the ratchet wheels are respectively engaged with the feed pawl and detent.

To the foregoing ends, the shaft **19** in conjunction with the knob **21** is arranged to include an enlarged journal portion **28** inwardly stepped from the knob, an inwardly stepped central portion **29**, and a reduced journal portion **31** inwardly stepped from the central portion. The journal portions **28, 31** are respectively rotatably and slidably disposed in apertures provided in the opposite sides of the body member **11**. The feed roll assembly **18** is then provided as a cylindrical sleeve member **32** having an outwardly flared portion **33** at one end circumscribed by a traction ring **34** of rubber, or the like. The sleeve member is coaxially disposed upon the enlarged journal portion **28** of the shaft and is splined thereto. More particularly, the sleeve member is provided with opposed inwardly projecting longitudinally extending splines **36** which slidably engage longitudinal grooves **37** formed in the journal portion **28** to extend towards the knob from the stepped transition between the journal and central portions of the shaft. The shaft is thus translatable relative to the sleeve member of the feed roll assembly and yet the sleeve member is continuously keyed to the shaft. As a result, the roll assembly may be disposed in fixed transverse position with the traction ring **34** extending upwardly between the guide plates **14**. The shaft may be shifted transversely of the body member **11** and the shaft and roll assembly will rotate as a unit.

With the above described splined connection between the sleeve member and shaft, the ratchet wheels **26, 27** are preferably provided as a unitary element **38** which is also splined to the sleeve member. The plural ratchet wheel element is formed with a hub **39** on one side of the ratchet wheels, and a bore **41** extends coaxially through the element. The bore receives the central portion **29** of the shaft and radially inwardly projecting fingers **42** of the element engage an annular groove **43** formed in the shaft at the transition between the central portion and reduced journal portion **31**. The hub **39** extends coaxially into the sleeve member and grooves **44** formed in the hub are engaged by the splines **36**. The plural ratchet wheel element is thus fixedly secured to the shaft and splined to the sleeve.

In order to lock the shaft in its various transverse positions wherein the respective ratchet wheels **26, 27** are operatively disposed with respect to the feed pawl and detent, a leaf spring **46**, or equivalent resilient restraining member, is preferably secured at one end within a groove **47** formed in journal portion **28**. The spring is inclined from the base of the groove and its free end projects beyond the journal portion of the shaft. The free end of the spring is formed with a reentrant bend so as to define a knuckle **48** which resiliently bears against the interior of the sleeve. The sleeve is formed with a detent **49** projecting into its interior substantially centrally thereof. In one position of the shaft wherein, for example, ratchet wheel **26** is operatively positioned, as indicated in full line in FIGURE 3, the knuckle **48** resiliently bears against the sleeve interior on one side of the detent **49**. Moreover, upon movement of the shaft toward the phantom line position depicted in FIGURE 3, wherein ratchet wheel **27** is operatively positioned, the knuckle engages the detent. The foregoing prevents unintentional movement of the shaft from its full line to its phantom line position. The shaft is thus in effect locked in its full line position wherein ratchet wheel **26** is engaged with the feed pawl **24** and feed detent **23**. It will be appreciated, however, that the shaft may be intentionally forcefully urged toward its phantom line position whereupon the spring **46** yields as the knuckle engages the detent. The knuckle rides over the detent and resiliently bears against the sleeve interior on the opposite side of the detent from that illustrated in FIGURE 3, when the shaft

is in its phantom line position and the ratchet wheel **27** is engaged by the feed pawl and feed detent. The shaft is now in effect locked in such position by virtue of the knuckle bearing against the sleeve interior and being engageable with the detent **49** to prevent unintentional movement of the shaft out of the phantom line position. The shaft may of course be intentionally forcefully urged into its original position inasmuch as the spring will yield to permit the knuckle to ride over the detent.

In some instances the ratchet wheels of the plural ratchet wheel element are such that difficulty may be experienced in shifting the element from one ratchet wheel to another by virtue of teeth of the respective wheels being somewhat offset with respect to each other and tending to obstruct to some extent the free passage of the pawl **24** and detent **23** between notches of the respective wheels without some rotary manipulation of the overall variable spacer arrangement. In this regard it is to be noted that the plural ratchet wheel element **38** described hereinbefore is formed with an annular groove **51** between the teeth of the adjacent ratchet wheels **26, 27**. Thus in the course of shifting between one ratchet wheel and the other, the pawl **24** and detent **23** are disposed in the groove **51** prior to entering the notches of the other wheel. Thus if teeth of the latter wheel obstruct passage of the pawl and detent into the notches thereof, the shaft **19** may be slightly rotated during the transverse shifting thereof to in turn rotate the ratchet wheel element and appropriately position the latter ratchet wheel for free entry of the pawl and detent into the notches thereof.

Advantages are of course to be gained where shifting between the ratchet wheels can be accomplished in such a manner that the pawl **24** and detent **23** will automatically engage the notches of the ratchet wheels upon transverse shifting of the plural ratchet wheel element without rotary manipulation to compensate for the offset of the teeth of the respective wheels. To this end, the plural ratchet wheel element may be modified as shown in FIGURES 6–9, wherein the numeral **38'** designates the modified element. In basic respects the plural ratchet wheel element **38'** is similar to the element **38** previously described, the element **38'** being secured to the shaft **19** and operatively associated with the sleeve member **32** of the roll assembly **18** in a similar manner. However, the plural ratchet wheel element **38'** is formed with an annular peripheral rib **52** coaxially between the ratchet wheels **26', 27'**. The sides of the rib are oppositely inclined from the bases of the notches **53, 54** between the teeth **56, 57** of the ratchet wheels **26', 27'** to a pointed circular edge **58** coextensive with the tips of the teeth. The rib, as thus provided, functions as a cam which guides the pawl **24** and detent **23** upwardly from notches of one wheel into positions engageable with notches of the other wheel. More particularly, assume the pawl **24** is engaged in a notch **53** of ratchet wheel **26'** as illustrated in FIGURE 6. Upon shifting the knob **22** and shaft **19**, and therefore the element **38'** to the left as viewed in FIGURE 6, the pawl rides up the adjacent inclined surface of the cam rib **52** and over the edge **58** thereof as illustrated in FIGURE 7. Further, movement of the element **38'** in most instances results in movement of the pawl down the other inclined surface of the rib into a notch **54** of the wheel **27'** as illustrated in FIGURE 8. In other instances, the pawl is not meshed with a notch of the ratchet wheel **27'**, but yet is disposed in an engageable position such that upon actuation of the pawl it falls into mesh with a notch of the wheel and effects the desired strip advancing function. The cam rib **52** thus facilitates unobstructed shifting of the element **38'** between positions wherein the ratchet wheels **26', 27'** are respectively engageable by the pawl **24**, as well as the detent **23**.

There is thus provided by the present invention a readily manipulatable variable spacer arrangement for embossing tools. The spacing between indicia embossed upon the strip **13** may be varied to suit different sizes thereof as may be provided for example by the dies of different interchangeable indicia selector discs **17**, merely by shifting the shaft **19** and feed knob **22** in or out with respect to the body member **11**. As previously described, this effects positioning of a suitable one of a plurality of ratchet wheels respectively having different numbers of teeth in operative engagement with the feed pawl **24** and feed detent **23**. The feed of the strip **13** is thus rendered variable to provide whatever spacing between indicia is desired.

What is claimed is:

1. In a tool for embossing a continuous strip of material having a body member and die means on said body member operable to emboss said strip, the combination with said tool of variable spacer means comprising a shaft transversely journalled on said body member rearwardly of said die means and movable transversely of said body member between a plurality of transverse positions, a strip feed roll mounted upon said shaft for rotation therewith and relative transverse movement thereon, said feed roll being adapted to engage said strip and advance same a predetermined distance towards said die means upon rotation of said shaft, a plurality of juxtaposed ratchet wheels fixedly secured to said shaft, said ratchet wheels each having a different number of teeth, a feed pawl disposed within said body member to engage different ones of said ratchet wheels in different ones of said transverse positions of said shaft, and drive means for actuating said pawl upon each actuation of said die means, said ratchet wheels being coaxially juxtaposed portions of a unitary plural ratchet wheel element, said element having means coaxially positioned between said portions and engageable with said feed pawl upon movement of said element between said positions for guiding the pawl into engagement with the notches on the respective portions.

2. A tool as set forth in claim **1** in which said last named means includes an annular cam rib.

3. A tool as set forth in claim **2** in which said rib has sides inclined towards each other and extending from the bases of said notches of each adjacent set of ratchet wheel portions to a pointed circular edge coextensive with the tips of the teeth thereof.

4. A variable spacing embossing tool comprising a body member, die means on said body member for embossing a strip of material, a pair of transversely spaced longitudinal guides mounted in said body member rearwardly of said die means for guiding said strip thereto, a shaft having an enlarged journal portion inwardly stepped to a central portion in turn inwardly stepped to a reduced journal portion, said shaft having a feed knob adjacent said enlarged journal portion, said shaft transversely disposed in said body member subjacent said guides with said journal portions rotatably and slidably disposed in apertures in opposite side walls of said body member, said enlarged journal portion having grooves extending thereinto at diametrically opposed points thereof, a plural ratchet wheel element fixedly secured upon said central portion of said shaft adjacent said reduced journal portion thereof, said element defining a plurality of juxtaposed ratchet wheels each having a different number of teeth, a sleeve having an outwardly flared portion adjacent one end and at the other end coaxially engaging said enlarged journal portion of said shaft, said sleeve having inwardly projecting splines extending longitudinally thereof and engaging said grooves in said enlarged journal portion, said sleeve having a radially inwardly projecting detent substantially centrally thereof, said outwardly flared portion of said sleeve extending between said guides, a traction ring circumscribing said outwardly flared portion of said sleeve, a leaf spring recessed in said enlarged journal portion and secured at one end thereto, said spring having its free end projecting beyond the stepped transition between said enlarged journal portion and said central portion of said shaft, said free end of said spring reentrantly bent to define a knuckle engaging the interior of

said sleeve adjacent said detent, a feed pawl extending into said body member, and a feed detent secured to said body member, said pawl and feed detent disposed adjacent said plural ratchet wheel element to engage respective ones of the ratchet wheels thereof in response to transverse movement of said shaft.

5. A tool as set forth by claim 4, further defined by said plural ratchet wheel element having a hub projecting coaxially from the ratchet wheel defining portions thereof, said hub coaxially engaging said sleeve and having grooves longitudinally thereof engaging said splines.

6. A tool as set forth by claim 5, further defined by said plural ratchet wheel element having an annular peripheral groove coaxially interposed between the teeth of adjacent ones of said ratchet wheels.

7. A tool as set forth by claim 5, further defined by said plural ratchet wheel element having an annular cam rib coaxially interposed between the notches of adjacent ones of said ratchet wheels, said rib having sides inclined towards each other and extending from the bases of said notches on the respective wheels to a pointed circular edge coextensive with the tips of said teeth of said adjacent ratchet wheels.

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