May 10, 1949. J. E. SLOAT 2,469,526

CUTTING AND PRINTING MACHINE

Filed Jan. 30, 1945 6 Sheets-Sheet 1

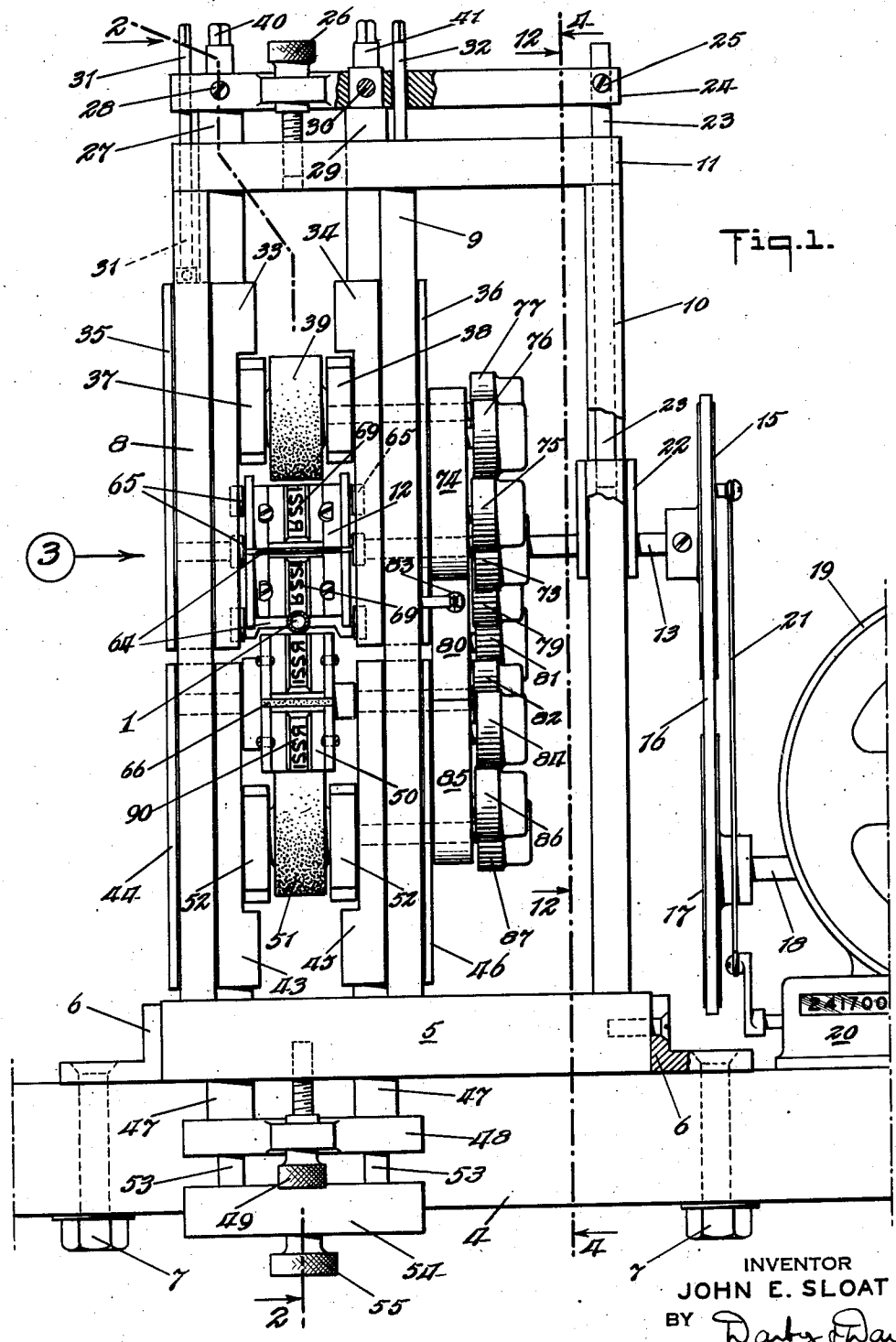

Fig. 1.

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CUTTING AND PRINTING MACHINE

Filed Jan. 30, 1945 6 Sheets-Sheet 2

Fig. 1B.

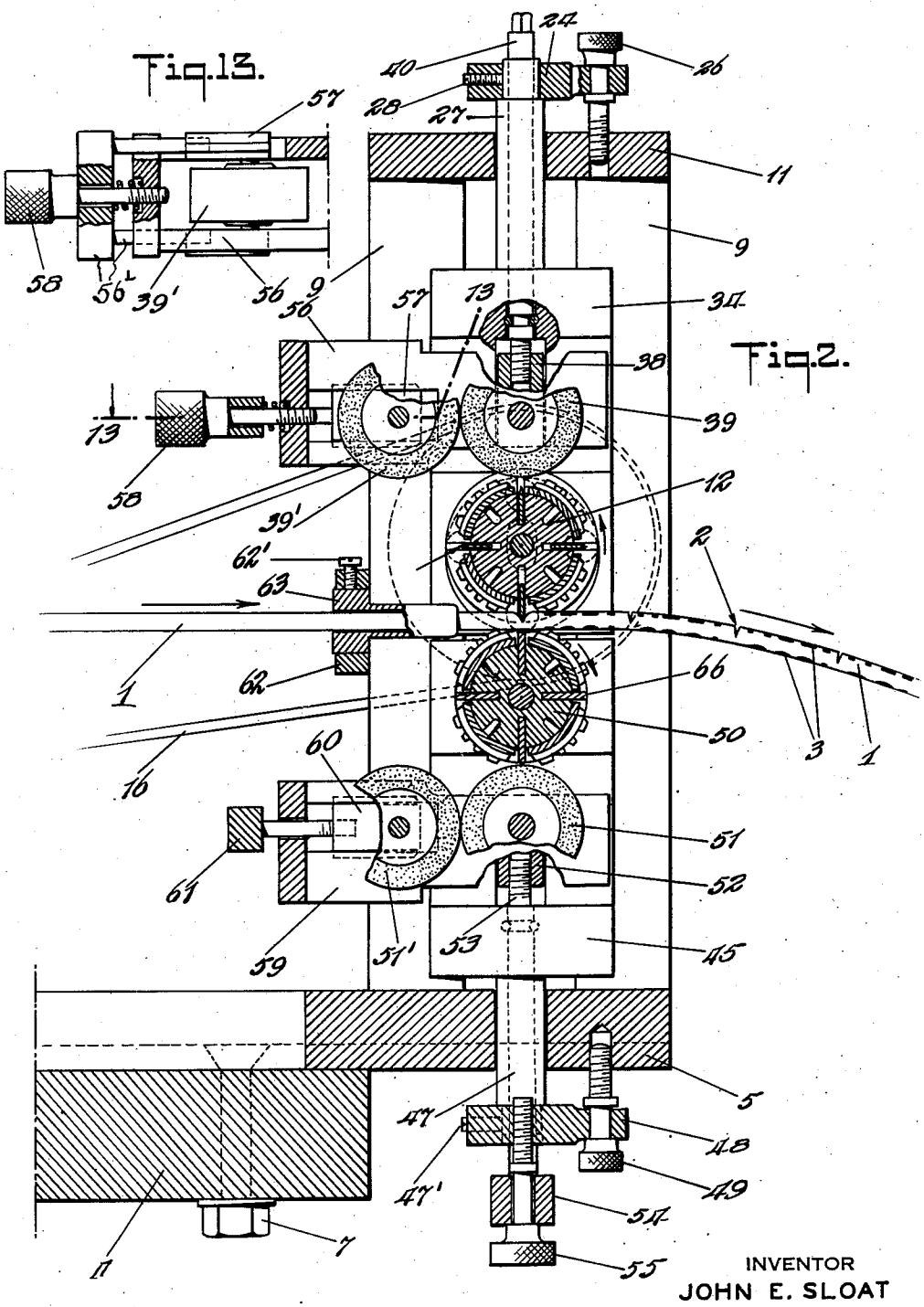

Fig. 2.

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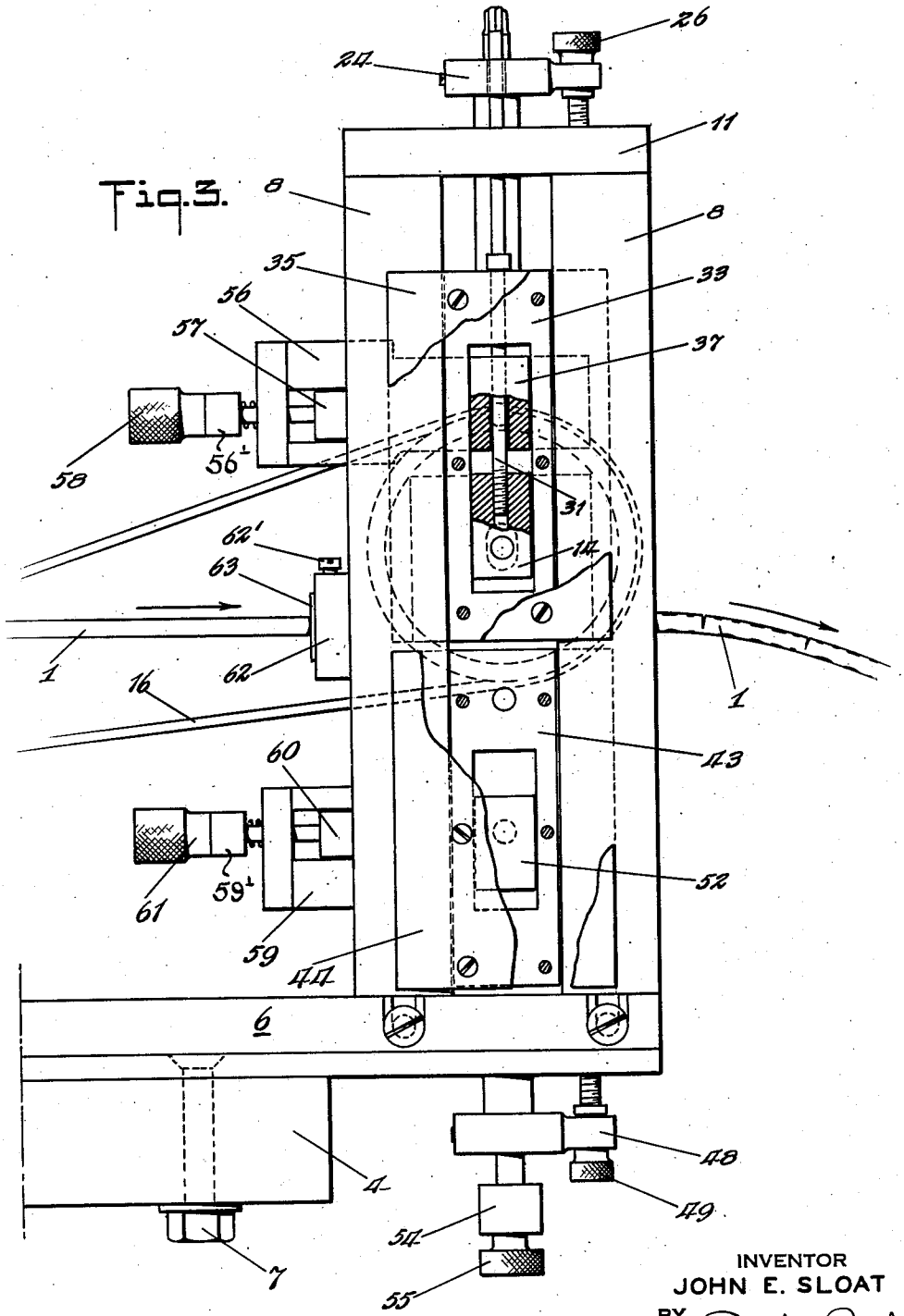
May 10, 1949. J. E. SLOAT 2,469,526

CUTTING AND PRINTING MACHINE

Filed Jan. 30, 1945 6 Sheets-Sheet 3

Fig. 3.



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May 10, 1949. J. E. SLOAT 2,469,526

CUTTING AND PRINTING MACHINE

Filed Jan. 30, 1945 6 Sheets-Sheet 4

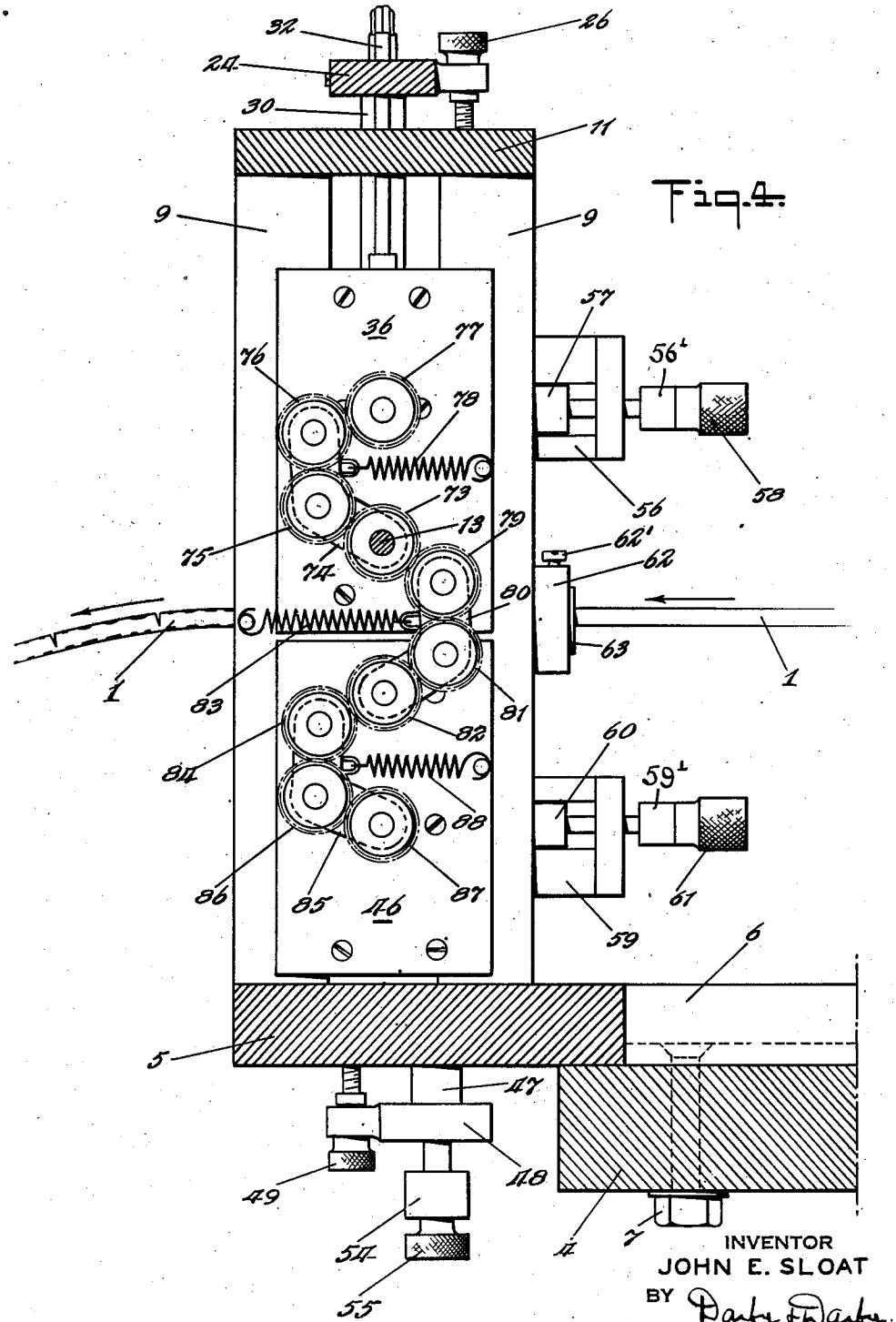

Fig. 4.

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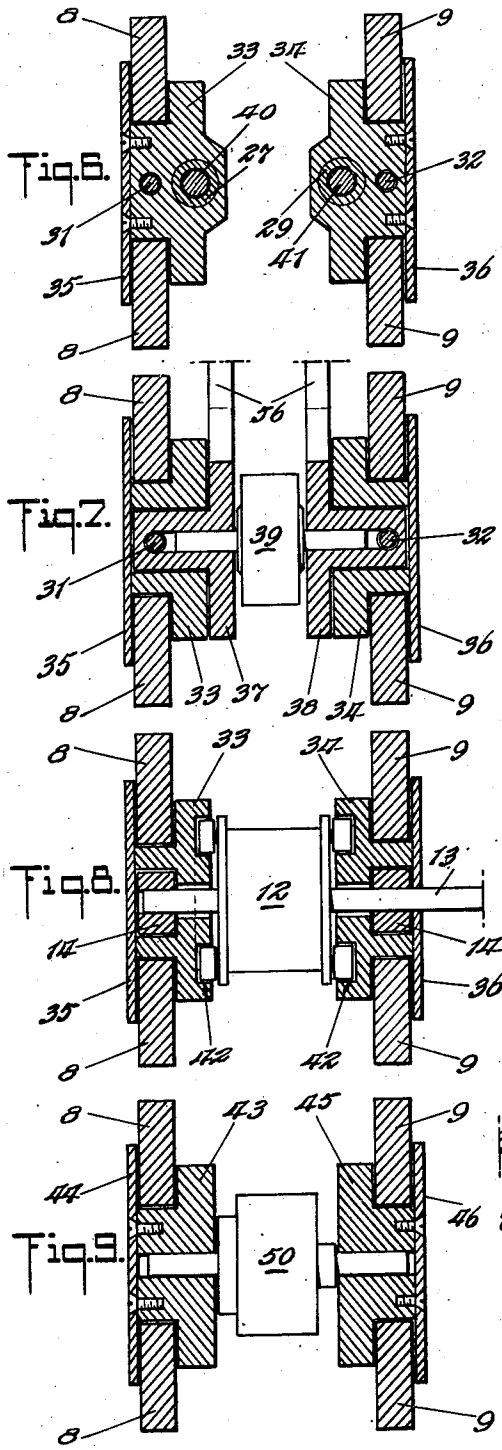
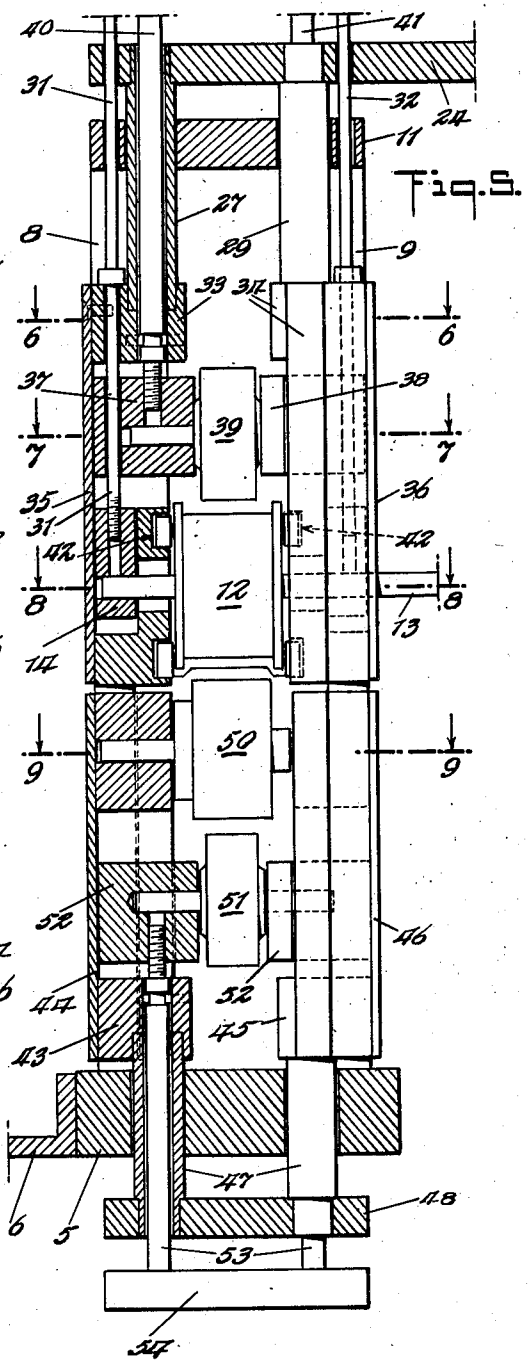
May 10, 1949. J. E. SLOAT 2,469,526

CUTTING AND PRINTING MACHINE

Filed Jan. 30, 1945 6 Sheets-Sheet 5





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May 10, 1949. J. E. SLOAT 2,469,526

CUTTING AND PRINTING MACHINE

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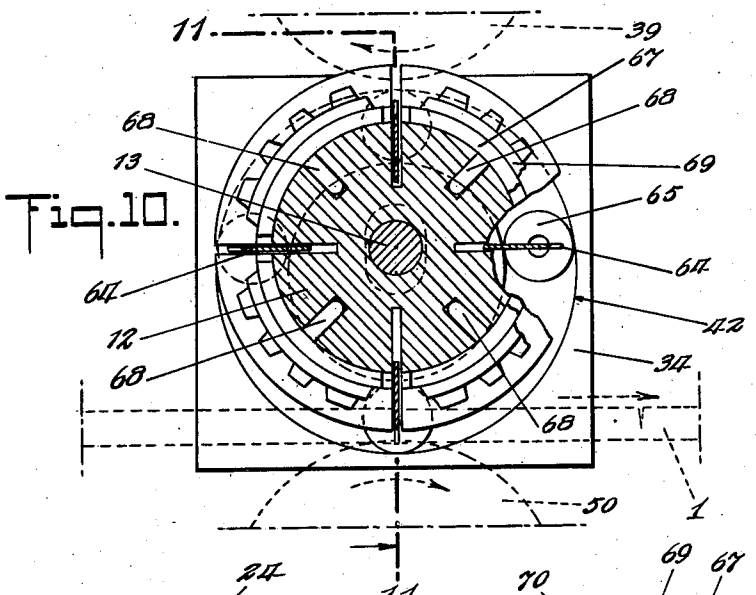

Fig.10.

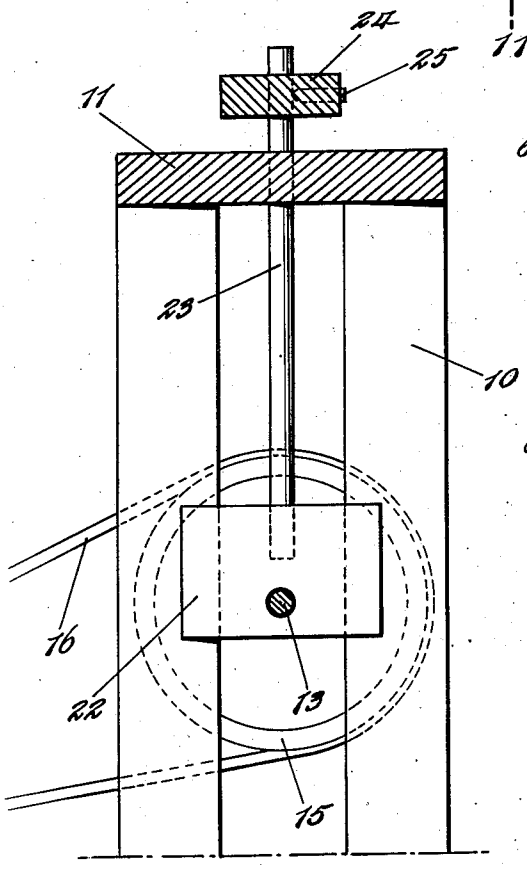

Fig.12.

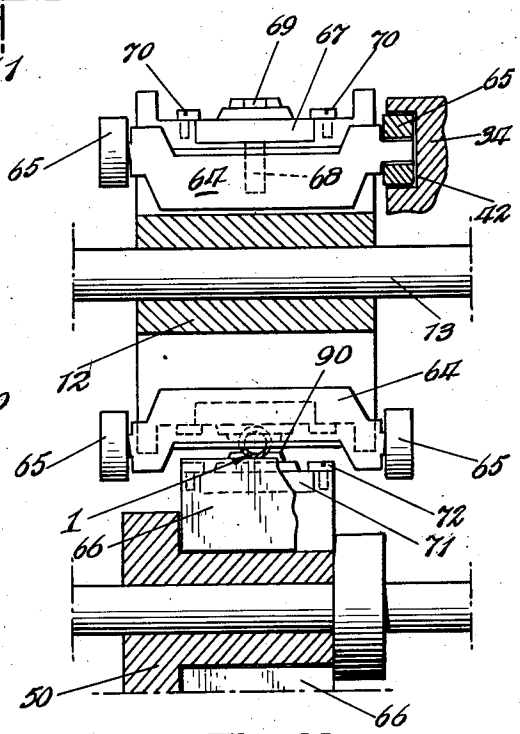

Fig.11.

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Patented May 10, 1949 2,469,526

UNITED STATES PATENT OFFICE

2,469,526

CUTTING AND PRINTING MACHINE

John E. Sloat, Columbia, Conn., assignor to Insulation Products Company, Willimantic, Conn., a partnership

Application January 30, 1945, Serial No. 575,328

4 Claims. (Cl. 101—226)

1

This invention relates to machines for either cutting or printing, or cutting and printing strands, tubes, and the like, and by means of which the strands can be partially or completely severed into desired lengths, or printed at desired intervals on one or both sides thereof, or partially or completely severed and printed on one or both sides thereof.

A general object of the invention is to provide a mechanism of this type by means of which any or all of the above mentioned operations can be performed continuously on strands or tubes of long length.

A more detailed object of the invention is to provide an mechanism of this type provided with universal adjusting features to adapt it to printing and cutting operations on strands of different diameters or thicknesses.

Other and more detailed objects of the invention will be apparent from the following description of the embodiment thereof illustrated in the attached drawings.

This invention resides substantially in the combination, construction, arrangement and relative location of parts as will be described in detail below.

In the accompanying drawings in which the same reference numerals will be used throughout the several views to indicate the same parts—

Figure 1 is a front elevational view of the complete mechanism of this invention with a few parts broken away to show structural details;

Figure 2 is a cross-sectional view taken on the line 2—2 of Figure 1 with a few parts broken away to show structural details;

Figure 3 is a left side elevational view of the machine with some parts broken away to show structural details;

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 1;

Figure 5 is a front elevational view of the left-hand portion of the machine showing some parts in cross-section with some parts omitted;

Figures 6, 7, 8 and 9 are cross-sectional views taken on the lines 6—6, 7—7, 8—8 and 9—9, respectively, of Figure 5;

Figure 10 is a vertical, central, cross-sectional view through the cutting and printing roll;

Figure 11 is a cross-sectional view taken on the line 11—11 of Figure 10;

Figure 12 is a cross-sectional view taken on the line 12—12 of Figure 1; and

Figure 13 is a view partly in section along the line 13—13 of Figure 2.

As illustrated in the drawings, the machine is shown as adapted to partially sever a thin walled flexible tubular strand of insulating material of the type frequently used in the electrical arts and commonly known as "spaghetti." In the drawings this tubular strand is indicated by the reference numeral 1 (see, for example, Figure 2) being operated upon by the machine to be partially severed at regular intervals by transverse cuts 2 to divide it into short tubes of insulating material of uniform length. The mechanism is also illustrated as capable of printing desired data 3 on opposite sides of the tube although it will be amply clear from the following disclosure that the tube may be printed on one side only if desired. Likewise, it will be amply clear that the tube may be completely severed into short lengths or severed to a greater or less degree than that shown in the drawings, as conditions require. Furthermore, it is to be understood that the machine is not limited to operations on tubular members but will be equally effective in partially or completely severing and/or printing solid strands whether they be of circular cross-section or some other geometrical form.

2

There is illustrated in the drawings any suitable type of support 4 for the machine to which it is attached by means of bolts 7 engaging angle irons 6 attached to the sides of the base 5 of the machine. Mounted upon the base 5 are three pairs of uprights or standards 8, 9 and 10 united to form a rigid structure by means of a top plate 11. The pairs of standards provide guides for carriages for bearing members 33 and 34 vertically adjustable upon the standard pairs 8 and 9. Within these carriages, as will be described in greater detail later, are bearing members 14 adjustable longitudinally of the carriages. Journalled in the bearing members 14 on a shaft 13 is a cutting and printing drum 12. The shaft 13 extends through a vertically adjustable bearing member 22 slidably mounted on the standard pair 10 (see Figure 1) and has secured on the end thereof a drive pulley 15. The pulley 15 is driven by means of a belt 16 through a pulley 17 mounted on a shaft 18 which in turn is driven by an electric motor 19 through a suitable gear train, not shown. A well known type of counting device 20 is connected by means of a link 21 to the pulley 15 for the purpose of counting the number of length units that are cut and printed. As will be seen later, each digit indicated on the counter 20 represents 4 lengths of the strand in view of the fact that the cutting and printing roll 12 is provided with four knives and four sets of type. As will be most readily seen from Figure 12, the bearing member 22 for shaft 13 is provided with a vertically extending rod 23 attached thereto and secured in a bar or plate 24 lying above the plate

11 by means of a set screw 25. Also secured to the bar 24 by means of set screws, one of which is shown at 28 and the other at 30, are a pair of tubular members 27 and 29 which are connected at their lower ends to the carriages 33 and 34 (see Figure 5). Thus the carriages 33 and 34 and the bearing member 22 are all secured together for conjoint movement by means of the bar connection 24. This bar is vertically adjustable in a parallel relation to the plate 11 by means of a thumbscrew 26 threaded into the plate 11 and connected to a lug on the side of the bar 24 for rotation thereon while causing movement thereof, as will be clear from Figure 2.

The carriages 33 and 34 slide in the standard pairs 8 and 9 and are generally of T-shaped cross-sectional form as is clear from Figure 6 so that in cooperation with the attached plates 35 and 36, respectively, they are confined to vertical sliding movement on the associated standard pairs. Slidably mounted in the carriages 33 and 34 are a pair of bearing blocks 37 and 38 (see Figures 5 and 7) in which is journalled the inking roll 39. Adjusting rods 40 and 41 are mounted in the carriages 33 and 34 and extend upwardly through the tubular members 27 and 29 so that their wrench receiving ends project above the plate 24 (see Figure 1). The rods 40 and 41 are connected to the carriages 33 and 34 so as to be rotatable without longitudinal movement. As a result their threaded engagement at their lower ends with the bearing members 37 and 38 permits of adjustment of the inking roll 39 with respect to the cutter and type roll 12. Since the bearing blocks 37 and 38 are independently adjustable it will be seen that within limits the axis of rotation of the inking roll 39 can be changed under its relationship with the axis of rotation of drum 12 so as to insure uniform inking of the type plates or platens mounted on the inking drum. In a similar way the bearing members 14 for the drum 12 can be adjusted vertically in the carriages 33 and 34 by means of the rods 31 and 32 whose wrench receiving ends also project above the plate 24 (see Figure 1). The inner lower aligned faces of the carriages 33 and 34 are provided with circular cam tracks 42 (see Figures 5 and 10) the function of which will be described later.

Another pair of carriages 43 and 45 with their respective attached plates 44 and 46 are vertically slidable on the lower portions of the standard pairs 8 and 9 (see Figures 5 and 9 particularly). Secured to the lower ends of the carriages 43 and 45 (see Figure 5) are a pair of tubular members 47 which project downwardly through the base 5 and are attached to a bar 48 by means of set screws 47 (see Figure 2) which bar is provided with a rotatable thumbscrew 49 by means of which the lower carriage can be moved as a unit vertically on the standards in a manner similar to that by means of which the upper carriages 33 and 34 are adjusted.

Journalled in the carriages 43 and 45 is an abutment and type roll 50 which will be described in greater detail later. Slidably mounted in the carriages 43 and 45 are a pair of bearing blocks 52 for the lower inking roll 51 journalled therein. Adjustment of the bearing blocks 52 with respect to these carriages is effected by means of a pair of rods 53 passing through the tubes 47 and the connecting bar 48 and united, as is shown in Figure 5, by means of a crossbar 54 which in turn is adjustable by means of the rotatable thumbscrew 55 (see Figure 2).

As will be seen from Figures 2 and 7, for example, the bearing members 37 and 38 for the inking roll 39 have a pair of lateral projections united at the outer end to form a yoke 56 in which are slidably mounted a pair of bearing blocks 57 for the inking roll 39' which cooperates with the inking roll 39. An adjusting screw 58 acting on the yoke 56' connected to the bearing blocks 57 permits radial adjustment of the inking roll 39' with respect to the inking roll 39 to vary the contact pressure therebetween.

In a similar way the bearing members 52 for the inking roll 51 have an integral yoke member 59 in which are slidably adjustable by means of the thumbscrew 61 a pair of bearing blocks 60 in which is journalled the inking roll 51' which cooperates with the inking roll 51. The bearing blocks 60 are united by a yoke 59', similar to yoke 56'.

As is well seen in Figure 2, a guiding die 63 is provided through which the strand passes to the cutting and printing rolls. The die 63 is secured in a fixture 62 mounted on the standards 8 and 9 by means of a set screw 62'.

The cutting and printing roll 12 mounted on shaft 13 is shown in greater detail in Figures 10 and 11. It consists of a flanged drum having, as shown, four radial slots in which are mounted the knives 64 on the ends of which are rotatably mounted the cam follower wheels 65 which ride in the cam grooves 42. Secured to the circumference of the drum between the knives are the type plates 67 held in place by means of the screws 70 and having positioning pins 68 projecting radially into the drum body. Attached to these type plates are the type pads or printing members 69.

The back-up and printing roll 50 is shown in greater detail in Figures 2 and 11. It consists of a flanged drum having, in the case illustrated, four radial slots in which are mounted four strips 66 of some suitable material such as fiber or the like forming abutments against which the knives press the strand during cutting. Secured to the drum 50 on its circumference between the abutment plates 66 are the type plates 71 secured thereto by means of screw 72 and having mounted thereon the printing members 90. As will be seen from Figure 11 the printing faces of the type project radially beyond the end edges of the abutment member 66 so as to be in a position to engage the strand for printing operation.

The various rolls and drums are rotated by means of gear trains best seen in Figures 1 and 4. It will be recalled that shaft 13 is belted to a motor and driven by it. The gear 73 is secured to this shaft. Pivotally mounted on the shaft is an angle shaped lever 74 on which is rotatably mounted the gear 75 which meshes with the gear 73 and also with a gear 76 also rotatably mounted on this lever. Gear 76 meshes with gear 77 attached to the shaft of the inking roll 39. A tension spring 85 urges the lever 74 in a clockwise direction (Figure 4) to hold this gear train in cooperative engagement.

Another elbow shaped lever 80 is pivotally mounted on the shaft of the abutment and printing roll 50 to which is secured the gear 82. This gear meshes with a gear 81 rotatably mounted on the lever 80 which in turn meshes with a gear 79 rotatably mounted on the same lever and meshing with gear 73. A tension spring 83 urges lever 80 in a counterclockwise direction to maintain this gear train operative. A third elbow shaped lever 85 is pivotally mounted on the shaft of the lower inking roll 51 to which the gear 87

is secured. This gear meshes with the gear 86 rotatably mounted on lever 85 which in turn meshes with a gear 84 rotatably mounted on the same lever and meshing with gear 82. A tension spring 88 urges the lever 85 in a clockwise direction to maintain this gear train operative. It will be seen that by this method of drive the upper and lower carriages can have relative movement with respect to each other and the drum 12 can have relative movement with regard to the carriages 33 and 34.

While the operation of this machine may be apparent from the foregoing description a concise statement of its operation will be helpful in appreciating its adaptability within its range of adjustment. It will be readily understood that the inking rolls 39' and 57' which are saturated with ink can be adjusted radially with respect to the inking rolls 39 and 51, respectively, so as to transfer the proper amount of ink thereto. It will be equally understood that the inking rolls 39 and 51 can be radially adjusted with respect to the printing rolls 12 and 50 for proper transfer of ink by means of the adjusting mechanism provided. Thus the inking roll 39 can be moved up and down in the carriage 33—34 by means of the rods 40 and 41. Likewise the inking roll 51 may be similarly adjusted by means of the rods 53, bar 54 and adjusting screw 55. Carriages 33—34 and 43—45 may be adjusted with respect to each other by means of the adjusting screws 26 and 49, respectively. Any movement of these carriages causes relative positioning of the parts supported thereby, respectively, without changing the relationship of the various parts on the respective carriages. Thus provision may be made for different thicknesses of strands to be passed between the printing rolls. In addition, the position of the printing roll 12 on the carriage 33—34 can be adjusted by means of the rods 31 and 32 so as to change the eccentricity of the cam grooves 42 with respect to the axis of rotation of the drum 12. The result is that the amount of radial movement of the knives 64 with respect to the drum 12, as well as the drum 50, can be adjusted. Likewise the positioning of the abutment and printing roll 50 with respect to the knives in their maximum projected position can be effected to control the depth of cut so that the strands can be partially or completely severed as required.

With the motor 19 in operation, it will be seen that the inking rolls 39 and 51, the cutting and printing roll 12 and the abutment and printing roll 50 are oppositely driven in the proper rotational sense with respect to each other by means of the gear trains provided so that when a strand is fed between the printing rolls through the die 63, it will be caused to advance axially at the same peripheral speed as that of the drums 12 and 50 which are, of course, designed to have the same peripheral speed. As drums 12 and 50 rotate in interlocked relation by means of the gear trains it will be seen that as each knife blade 64 comes into cutting position the strand will be backed up at that point by means of one of the abutment bars or plates 66. Likewise, as the strand passes between the printing rolls the type or printing members 69 and 90, respectively, will print the desired indicia 3 on opposite faces of the strand. It is, of course, apparent that one side only of the strand need be printed in which case the type for the other side would be replaced by smooth pads or plates to hold it while being printed on the other side.

It will be equally clear from the foregoing description that the machine may be easily adjusted for strands of different thickness and that die 63 can be easily be replaced by other dies having a passage of the proper cross-sectional shape to adapt the machine for strands of various cross-sectional forms.

From the above description it will be apparent to those skilled in the art that the subject matter of this invention may be embodied in other physical forms and that the embodiment herein illustrated is capable of many detail variations without departure from the scope of the novel subject matter herein disclosed. I do not, therefore, desire to be limited to the embodiment selected for the purpose of disclosing my invention but rather by the claims granted me when correctly interpreted.

What is claimed is:

1. In a cutting machine the combination comprising a frame, a pair of drums rotatably mounted on said frame on parallel axes, a plurality of axially extending knives radially slidable on one of said drums, means for causing sliding movement of said knives on said drum as it rotates, knife cooperating abutment members on the other of said drums, said means for causing sliding movement of said knives comprising relatively fixed cam members and cooperating cam followers mounted on the knives, and means for adjusting the relatively fixed cam members with respect to the knife drum to vary the amount of sliding movement of the knives on the drum.

2. In a cutting machine the combination comprising a frame, a pair of drums rotatably mounted on said frame on parallel axes, a plurality of axially extending knives radially slidable on one of said drums, means for causing sliding movement of said knives on said drum as it rotates, knife cooperating abutment members on the other of said drums, and movably mounted slide blocks in which said drums are rotated, said means for causing sliding movement of said knives comprising cam blocks movably mounted on the slide blocks in which the knife drum is rotatably mounted.

3. In a cutting machine the combination comprising a frame, a pair of drums rotatably mounted on said frame on parallel axes, a plurality of axially extending knives radially slidable on one of said drums, means for causing sliding movement of said knives on said drum as it rotates, knife cooperating abutment members on the other of said drums, type members mounted on the knife drum, and means for varying the amount of radial sliding movement of said knives on their supporting drum with respect to the printing plane of said type members whereby for a given printing pressure the cutting depth of said knives can be varied.

4. In a cutting machine for partially severing a strand, the combination comprising a frame, a pair of drums rotatably mounted in said frame on parallel axes, a plurality of axially extending knives radially slidable on one of said drums, means for causing sliding movement of said knives on said drum as it rotates, fixed knife cooperating abutment members on the other of said drums radially aligned with said knives during cutting, movably mounted slide blocks in which said drums are rotated and the means for causing sliding movement of said knives comprising cam blocks movably mounted on the slide blocks in which the knife drum is rotatably

mounted, and type members mounted on the knife drum whereby for a given printing pressure the cutting depth of said knives can be varied.

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