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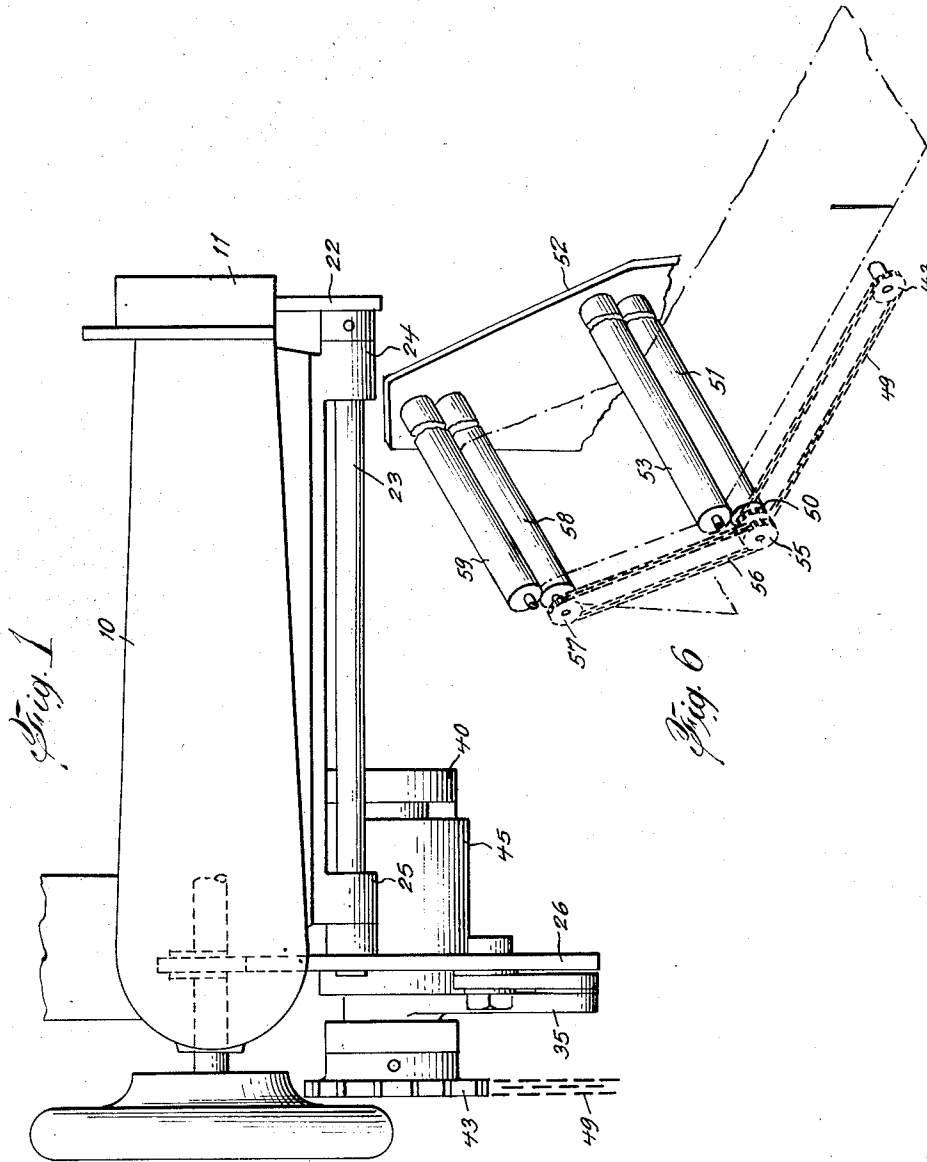
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2,520,002

SEWING MACHINE FEED MECHANISM

Filed Sept. 25, 1947

2 Sheets-Sheet 1



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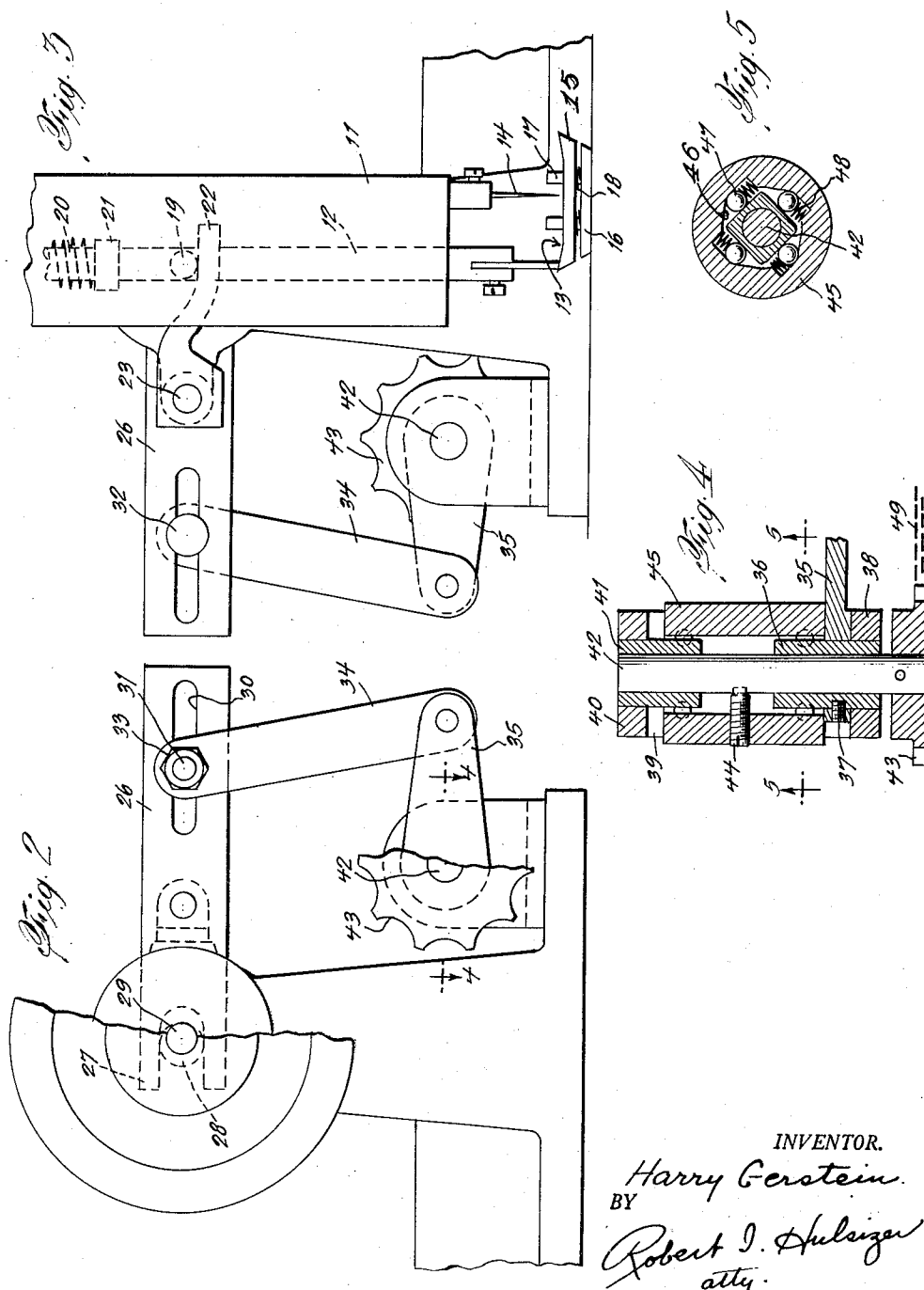
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,520,002

SEWING MACHINE FEED MECHANISM

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3 Claims. (Cl. 112—203)

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This invention relates to new and useful improvements in machines for joining sheet material and has especial reference to machines in which sheet material is transformed to a tube which may later be run through a cutting machine to become bias-cut material such as tape.

An object of the invention is to provide a simple, durable, efficient, high-speed machine formed of a combination of elements which can be employed to achieve the end result with a minimum expenditure of time and effort on the part of the operator and requiring of him the least skill in manipulating the machine.

A further object is to employ a sewing machine which sews without the use of a lower feed dog and employs instead a floating flexible foot which permits more rapid operation of the machine and keeps the material under constant control as to the pressure placed thereon during the entire operation.

A still further object is to provide a pull-away device disposed on the far side of the joining or sewing point which is operated in synchronism with the joining means to continuously pull the material when it is free of the needle but to exert no pull thereon while the needle is passing through the goods.

Yet another object is to provide a novel intermittent feed device associated with the joining means, such as the needle operating mechanism, so that the material is fed intermittently at high speed so that it is at rest when the needle is engaging the material so that the material is under constant regulated tension and the tearing of the goods by the needle or the breaking of the needle by the movement of the goods is entirely avoided.

Further and more specific objects, features, and advantages will more clearly appear from the detailed specification hereinafter set forth especially when taken in connection with the accompanying drawings which illustrate a present preferred form which the invention may assume and which form part of the specification.

In brief and general terms, the invention comprises the combination, essentially, of a floating or flexible foot operated by the joining device and resting on the goods at all times with varying pressure, eliminating the use of a lower feed dog; a pull-away device beyond the joining point; means to shape and flatten the material beyond the joining point and before the pull-away device so that the tubular material thus is flattened out before passing through the pull-away rollers to be later wound up or otherwise

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disposed of; means operated by the joining device, such as the sewing machine, intermittently to operate the pull-away rollers or device in synchronism with the operation of the flexible foot so that when the needle is passing through the goods, the flexible foot is holding the material tightly against movement and the intermittent feed device is not exerting any pull on the goods, whereas, when the needle is not passing through the goods the flexible foot is exerting much less pressure on the goods so that the intermittent feed device which is then working may pull the material past the joining point. This sequence of operations takes place at high speed so that the flow of goods though intermittent is practically continuous, the goods are flattened out and passed through the pull-away rollers, the needle is not broken or the goods torn, and only one pressure foot is employed, which simplifies the mechanism.

The pressure or flexible foot is of the type shown in U. S. Patent No. 2,381,817, issued August 7, 1945 to Percy Gardner et al.

The intermittent feed, with novel adaptations, is of the type shown in U. S. patent application Ser. No. 612,447, filed August 24, 1945.

The means for shaping the sheet material into somewhat tubular form, joining it, and the pull-away mechanism generally is shown in U. S. Patent No. 2,347,901 issued May 2, 1944.

The combinations of these known elements, with certain modifications, results in a novel combination of elements which enables high speed production with a minimum of effort and time on the part of the operator and with minimum damage to the parts running at high speed, and with a much simpler form of mechanism than has heretofore been used.

The present preferred form which the invention may assume is illustrated in the drawings, of which,

Fig. 1 is a plan view of a sewing machine with the invention applied thereto;

Fig. 2 is a partial side elevation, with portions broken away, looking from the left in Fig. 1;

Fig. 3 is a similar view looking from the right in Fig. 1;

Fig. 4 is a horizontal section taken on the line 4—4 of Fig. 2;

Fig. 5 is a vertical section taken on the line 5—5 of Fig. 4; and,

Fig. 6 is a somewhat schematic view of the entire apparatus including the pull-away mechanism which forms part of the combination.

Referring now merely to the specific form of

the invention shown in the drawings, it is clear that the device includes a sewing or joining machine having the usual horizontal arm 10 with a dependent leg 11 in which reciprocates the usual shaft 12 on the lower end of which is a flexible presser foot generally indicated at 13 and associated in operation with the needle 14 operated in the usual manner. This presser is of the type and construction shown in the patent mentioned above. It is used with the sewing of goods and its use does not require a lower feed dog below the needle as is usually the case. It generally comprises an upper plate 15 supported from the shaft 12 and a lower plate 16 disposed freely below the upper plate 15 and guided thereon by means of pins 17 and springs 18 as more in detail described in the above mentioned patent. When the shaft 12 is down the pressure of the plate on the goods beneath is a maximum and when the shaft is up the pressure is a minimum so that the goods may be advanced under the plate or foot without lifting the foot entirely therefrom. Thus the synchronism of the foot is such that when the needle 14 is passing through the goods, the pressure of the foot holds the goods firmly in place and when the needle is withdrawn the pressure is released to permit the movement of the goods under the influence of the pull-away mechanism to be described.

The reciprocation of the vertical shaft 12 is effected by a pin 19 thereon in conjunction with a spring 20 surrounding the shaft and bearing against a collar 21 thereon to tend to force the shaft down at all times. The pin is engaged by an arm 22 fixed to the end of a horizontal shaft 23 which extends parallel to the arm 10 and is supported in spaced bracket members 24 and 25 connected to the arm 10. The other end of shaft 23 is fixed to an oscillatable lever 26 which in its oscillations also oscillates the shaft 23 and therefore the arm 22 previously mentioned. The lever 26 at its inner end has a forked shape 27 embracing a cam 28 on the main drive shaft 29 which latter is driven by any suitable source of power in the manner usual to machines of this type. As the main shaft 29 rotates it rotates the cam 28 and this will, it is obvious, cause the oscillation of the lever 26, the shaft 23, and the arm 22.

The outer end of the lever 26 is provided with an elongated slot 30 in which is slidable a bolt 31 having at one end a head 32 and at the other end a nut 33 which is adjustable on the bolt. The bolt 31 passes through an opening in the upper end of a link 34 and this position of this upper end of the link is determined by the position of the bolt in the slot 30. The tightening of the nut 33 will fix the bolt in the desired position. The distance of the upper end of link 34 from the oscillation axis of the lever 26, which is the axis of the shaft 23, determines the amount of throw given to the link 34 by the oscillation of the lever 26. The link 34 at its lower end is pivotally connected to an arm 35 at one end thereof. As seen in Fig. 4, the arm 35 is bored to receive a hollow sleeve 36 relatively square in cross section and is connected thereto by a set screw 37. The sleeve is journaled in a bracket plate 38 fastened to a base plate 39 resting on the base plate of the machine and connected thereto in any suitable manner. At the other end of this base plate 39 is disposed another vertical bracket plate 40 in which is fixed another sleeve 41 similar to the previously mentioned sleeve 36. Journaled in the sleeves 36 and 41 is a shaft 42 on one end of

which is carried a sprocket gear 43. This shaft 42 is connected by a set screw 44 to another larger sleeve 45 the inner surface of which is provided with sloping ball-ways 46 to house balls 47 backed by springs 48. These ball-ways 46 are disposed in the surface of the sleeve 45 adjacent the outer surfaces of the sleeves 36 and 41 previously mentioned. This general construction is a well known form. It is clear that when the arm 35 is moved or oscillated in one direction, there can be movement of sleeve 45 and shaft 42 relative to the sleeves 36 and 41, but that when the oscillation of arm 35 is in the other direction, the sleeves 36, 41, and 45 are locked together and therefore the shaft 42 will move with the arm 35 and thus the sprocket gear 43 is turned intermittently as is desired.

In Fig. 6 a schematic view of the entire apparatus is shown and it is clear that the chain 49 attached to the sprocket gear 43 is in turn connected to a gear 50 connected to a roller 51 on a frame 52 over which roller the goods passes after being sewed and flattened out. A pressure roller 53 rests upon the roller 51 and is either weighted or pressed thereupon by a spring to create the proper tension between the rollers. There is another gear 55 associated with the roller 51 over which passes a chain 56 connecting to a roller gear 57 on a top roller 58 which is thereby driven. A pressure roller 59 rests upon the roller 58 under proper tension, the same as the roller 53 rests upon the roller 51. The goods passes up between the rollers 58 and 59 and thereafter is allowed to drop down into a suitable receptacle for storage or any other purpose, which may involve passage to a machine to be cut on the bias. Thus as the material is being sewed it is intermittently pulled away from the sewing point as the flexible foot releases the goods intermittently. The pull-away action of the intermittent feed device shown in Fig. 4 is synchronized with the releasing action of the flexible foot shown in Fig. 3 so that the material moves smoothly and evenly and is never distorted or torn.

It is thus seen that by the combination of the flexible foot, the intermittent feed device, and the pull-away mechanism, with the simple effective and durable mechanism for operating the foot and the intermittent feed in absolute synchronism with absolutely no possibility of them getting out of synchronism, there has been created a combination of elements which are separately known but which when combined in this fashion produce an apparatus which is highly effective and not in known use today to produce tubular goods at a high rate of speed and with greater accuracy and economy. This result is obtained without any material modification of the basic structure of the joining machine and is achieved by the addition thereto of a few simple elements at low cost and which are extremely rugged in operation.

While the invention has been described in detail and with respect to a present preferred form which the invention may assume, it is not to be limited to such details and forms since many changes and modifications may be made in the invention without departing from the spirit and scope of the invention in its broadest aspects. Hence it is desired to cover any and all forms and modifications of the invention which may come within the language or scope of any one or more of the appended claims.

What I claim as my invention, is:

1. In a device of the class described, a sewing

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machine having a main power shaft, a cam on said shaft, a reciprocatory shaft, a flexible foot supported on said reciprocatory shaft, a pivoted lever, a fork on said lever engaging said cam, said lever having a slot in its other end, a link adjustable at one end with respect to said slot, an arm pivoted to the other end of said link, a ball-bearing unidirectional feed mechanism connected to said arm, a pull away roller, a sprocket thereon, a sprocket on said feed mechanism, a chain connecting said sprockets whereby said feed mechanism intermittently operates said rollers, a shaft oscillated by said lever, an arm on said oscillated shaft, and a pin on said reciprocatably shaft to be engaged by said last mentioned arm to reciprocate said reciprocatably shaft in synchronism with the oscillation of said lever.

2. In a device of the class described, a sewing machine having a main power shaft, a cam on said shaft, a pivoted lever, a fork on said lever engaging said cam, said lever having a slot in its other end, a link adjustable at one end with respect to said slot, an arm pivoted to the other end of said link, a ball-bearing unidirectional feed mechanism connected to said arm, a reciprocating shaft having a flexible foot supported thereon, an abutment formed on said reciprocating shaft, an oscillatable shaft having

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an arm thereon for engagement with said abutment, said oscillatable shaft being connected to said lever whereby said single cam operates the flexible foot and feed mechanism in absolute synchronism.

3. In a device of the class described, a sewing machine having a main power shaft, a cam on said shaft, a pivoted lever, a fork on said lever engaging said cam, an intermittent feed device, means adjustably connecting said intermittent feed device to said lever, a reciprocating shaft having a flexible foot supported thereon, an abutment formed on said reciprocating shaft, an oscillatable shaft having an arm thereon for engagement with said abutment, said oscillatable shaft being connected to said lever whereby said single cam operates the flexible foot and intermittent feed device in absolute synchronism.

HARRY GERSTEIN.

REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
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