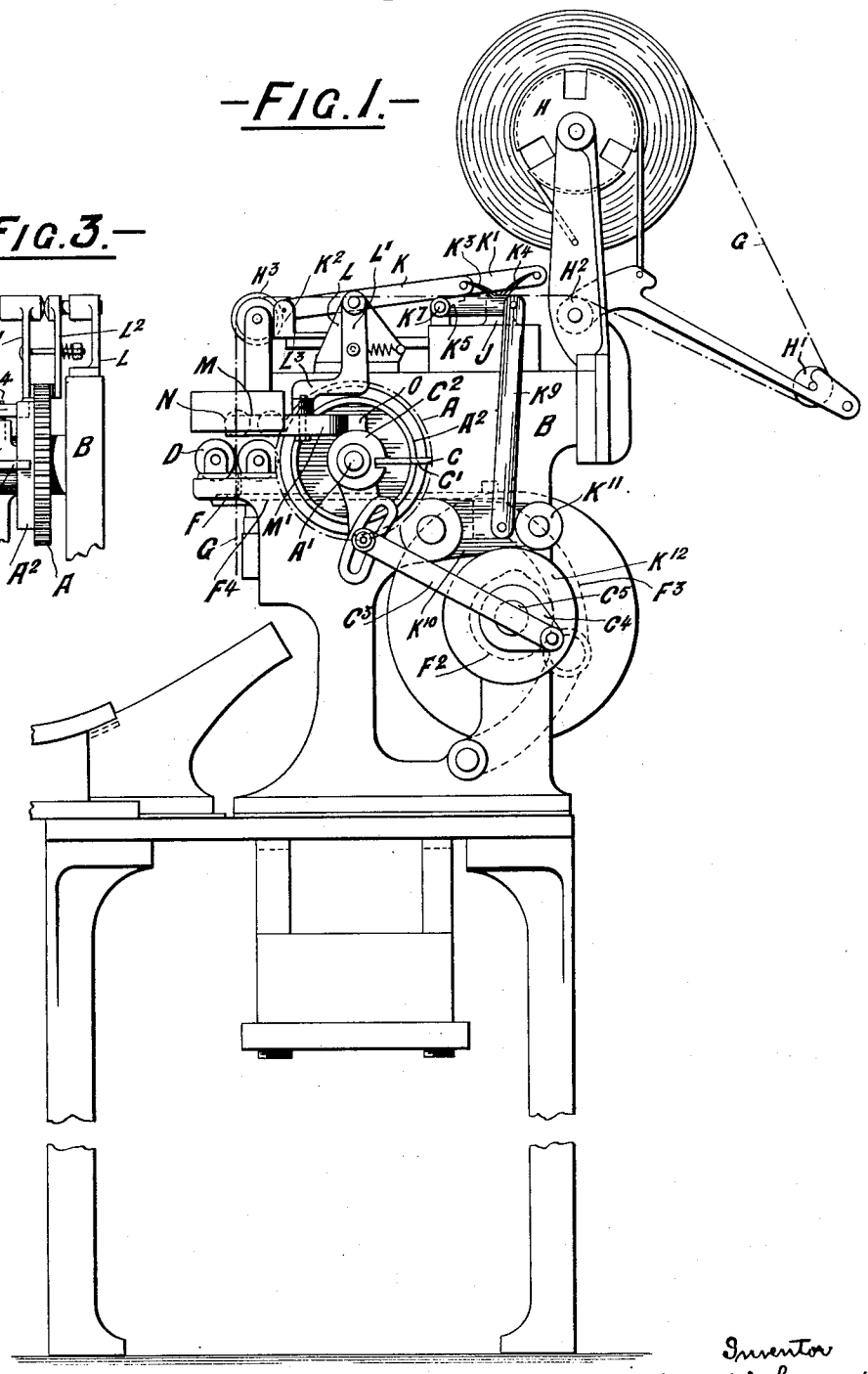
Nov. 16, 1926. 1,607,528

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INTERMITTENT DRIVING MECHANISM FOR FEEDING CONTINUOUS STRIP MATERIAL

Filed August 28, 1925 2 Sheets-Sheet 1

-FIG. 1.-



-FIG. 3.-

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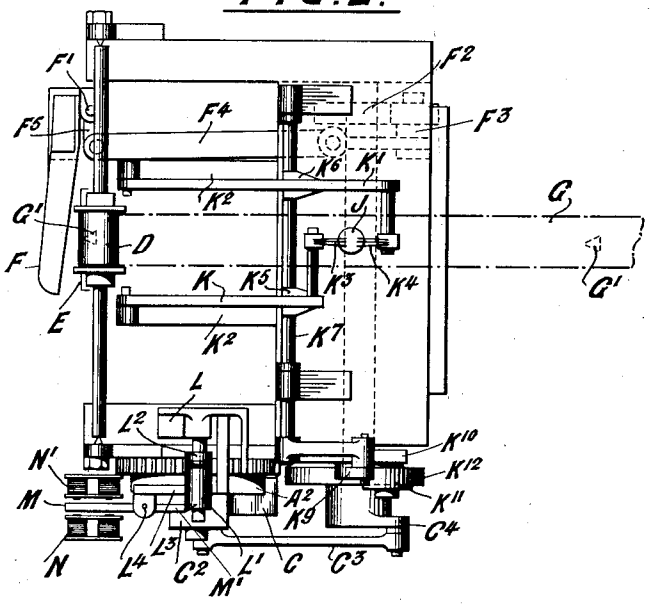
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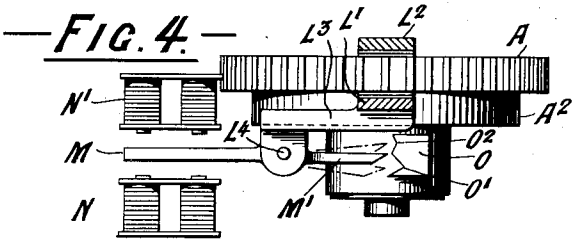
INTERMITTENT DRIVING MECHANISM FOR FEEDING CONTINUOUS STRIP MATERIAL

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—FIG. 2.—



—FIG. 4.—



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UNITED STATES PATENT OFFICE.

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INTERMITTENT DRIVING MECHANISM FOR FEEDING CONTINUOUS-STRIP MATERIAL.

Application filed August 28, 1925, Serial No. 53,004, and in Great Britain December 1, 1924.

In wrapping machines where a continuous strip of thin metal or paper is fed intermittently to a severing device for being delivered in divided lengths to the mechanism for wrapping up articles separately, it is unimportant whether each cut-off length be slightly over or slightly under the predetermined length, except where the strip has been previously printed or decorated for the separate wrappers. When thus printed, however, it becomes essential to cut off each length to the predetermined position between the printed matter, otherwise a slight error in each division accumulates until the printed matter becomes mutilated by the division taking place through the printed impressions instead of between them.

It is not possible to so accurately define the distance between the impressions, that no error will occur or accumulate in the position where the strips will be cut. It is therefore necessary to correct the feed to correspond with the impressions, in order to ensure that the knife will cut the strip at the correct position.

The present invention relates to means for correcting the distance of feed of the strip by the use of means for selecting one of two lengths of feed, the true average length of the strip to be severed lying between the lengths of such long and short feeds. The choice of which length of feed shall be selected at each operation, is effected by an electrically moved part, which is moved when free into one of two positions, where it may intercept some moving part of the mechanism and cause the said mechanism to deliver the long length of strip or the short length of strip according to the position the intercepting part is moved to.

The electric means for completing the circuit through the electromagnets operates either in conjunction with perforations, or is controlled by insulation or conductivity of the printing ink used in printing the devices on the wrapper or printing specially registering marks on the wrapper adjacent or between the devices. When the wrapper consists of conductive fabric, then the ink will have insulating properties, and conversely when the fabric is non-conductive the ink will have conductive properties.

The invention will be further described with reference to the accompanying drawings, which illustrate an example of electrically controlled feed regulating mechanism constructed according to the present invention, applied to a strip feeding machine which has a draw-back or reverse motion given to the strip being fed, and wherein the strip to be divided is perforated at intervals corresponding in relation to the impressions printed on the continuous roll of strip to be divided.

Fig. 1 is a side elevation of a strip feeding machine in which a draw-back is given to the strip before each forward feed, and Fig. 2 is a partial plan view of the same machine. Fig. 3 is an elevation taken at right angles to Fig. 1 showing mechanism hereafter referred to. Fig. 4 is an enlarged detail view showing the means for increasing or decreasing the amount of reverse motion to be given to the strip.

The intermittent driving mechanism shown in the drawings for feeding the strip of material comprises a spur wheel A mounted on a stud axle A^1 carried by the frame B of the machine. The face of the wheel A is formed with an outstanding annular flange A^2 which is engaged by a radially arranged pawl C having an angular recess C^1 in one of its edges. The pawl C is carried by a boss C^2 loosely mounted on the axle A^1, the boss C^2 being connected by a link C^3 with a crank C^4 on the main driving shaft C^5.

Referring to Figs. 1 to 4, the intermittent rotary motion given to the spur wheel A by the pawl C is transmitted through gearing to a pair of feed rollers D between which the strip of material to be cut passes. Coacting with a fixed knife E is a reciprocating knife F pivoted at F^1, between which knives the strip G passes after leaving the feed rollers D. The reciprocating knife F is operated by a cam F^2 through a bowl-carrying arm F^3, link F^4, and lever F^5.

The strip G to be severed, is perforated at intervals along its length, as indicated at G^1 (see Fig. 2), corresponding in relative position with printed impressions not shown in the drawing, and the said strip is carried on a reel H and passes over and around guide rollers H^1, H^2, H^3 to the feed rollers D. Between the guide rollers H^2 and H^3 the strip passes over an upstanding stud J (see Fig. 2), and two independently pivoted arms K, K^1 carried by brackets K^2 attached

to the main frame, extend parallel with the edges of the strip G. At the free ends of these arms inwardly projecting studs carry conducting fingers or brushes K^3, K^4.

The arms K, K^1 are raised above the strip G during its traverse, and when the strip is stationary the arms K, K^1 are lowered so that the brushes K^3, K^4 contact with the strip while it is stationary. The raising and lowering of the arms K, K^1 is effected by fingers K^5, K^6 fixed to a rock shaft K^7, which receives rocking movement through the medium of an arm K^8 and a link K^9 pivotally attached to an arm K^{10} carrying a bowl K^{11} running on a cam K^{12} on the main driving shaft C^5.

Carried from a bracket L are two pendent arms L^1, L^2 (Fig. 3), the free ends of which embrace the front and rear faces of the spur wheel A and are held in frictional contact therewith by means of a spring tension device. The pendent arm L^1 is formed with an extension L^3 carrying a pivot pin L^4 for a two-armed lever, one arm M of which extends between electromagnets N, N^1, and the other arm M^1 projects into the path of a member O carried on the boss C^2. The member O is formed on one of its faces with two notches O^1, O^2 of unequal depth, and the two-armed lever is rocked upon its pivot by the energizing of one or other of the magnets N or N^1 bringing the end of the arm M^1 of the lever into position to enter one or other of the notches O^1, O^2, when the member is approached towards the arm by the reciprocating motion of the boss C^2. This action takes place towards the end of the backward movement of the pawl C, during which movement the wheel A is held from backward rotation by the frictional contact of the arms L^1, L^2, but upon one of the notches O^1, O^2 engaging the arm M^1 of the lever, the arms L^1, L^2 are rocked on their pivots and the wheel A is given an anti-clockwise movement greater or less according to the notch engaging the arm M^1.

In the mechanism above described, the correction of the distance of feed of the strip is effected by giving a greater or less reverse motion to the feed rollers D, and the amount of such reverse motion is controlled by completing one or other of two electric circuits. The brushes K^3, K^4 are electrically connected respectively with the magnets N, N^1, and when the arms K, K^1 with the brushes K^3, K^4 are lowered onto the strip G, if one of the brushes, for instance K^3, is within the area of one of the perforations G^1, the brush will contact with the stud J and complete one of the electric circuits and energize the magnet N. The second brush K^4 will at this time rest upon the strip and be insulated from the stud J.

The magnet N being energized will attract the arm M and rock the arm M^1 into position to enter the notch O^2 when the member O approaches during the backward movement of the pawl C. The two-armed lever will be pushed by the member O, and will rock the arm L^1 which is in frictional contact with the face of the spur wheel A. By this means the spur wheel will be moved in a backward direction to the maximum amount possible by the equal throw of the member O and this will draw back the strip also to the maximum amount, whereby at the next forward movement of the feed rollers the strip will be fed forward past the knife to a length which is shorter than the length of the forward feed by the length of drawback given to the strip by this maximum draw-back action.

When the brushes are again lowered onto the strip, should the brush K^4 pass through one of the perforations G^1, the second electric circuit will be completed and the magnet N^1 be energized, while the brush K^3 will rest upon the strip G and be insulated from the stud J. The two-armed lever will then be rocked into position to enter the notch O^1 when the member O moves forward and a shorter draw-back will be given to the strip G owing to the member O pushing the arm M^1 a shorter distance.

The greater or less draw-back movement of the strip corrects the length of feed of the strip at the cutting point by increasing or decreasing the amount of strip fed according to whether the length required is longer or shorter than the average length. This draw-back movement also has the effect of effectively freeing the leading edge of the strip from the knife to which it may be liable to adhere.

The action in one position of the two-armed lever M, M^1 reduces the feed below the estimated length required for each wrapper, whilst in its other position it lengthens the feed to exceed the length estimated for each wrapper. Thus, the length of each wrapper is corrected with each operation of the machine.

The example shown of the application of this invention illustrates that the means employed consist of approaching contacts to the strip, where if they complete an electric circuit, cause a movable part of the machine to be moved so as to intercept a portion of the feed mechanism and thus utilize the power of the machine itself to change the length of feed. It is immaterial what metallic part is touched by the feelers to complete the circuit so long as the position of the strip relatively to the impressions on the strip decides whether an electric circuit be or be not made. The strip if of metal will complete the circuit, and in this case there must either be insulation on the foil, or perforations which expose a non-conducting surface, whilst if the strip is non-conducting then there must either be conducting ink on the strip or perforations exposing a conducting base.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In apparatus for feeding lengths of strip material to register with impressions on the strip, in which alternative mechanism is provided, one to feed a greater length than the distance between the impressions and the other to feed a lesser length than the distance between the impressions; the combination with feed mechanism for feeding said strip, of metal feelers located adjacent to said strip, means for approaching said feelers to bear on metallic contact surfaces during a dwell in the travel of said strip, intercepting means adjustable in two positions, electro-magnets for adjusting said intercepting means, means for energizing said magnets when said metal feelers contact with said contact surfaces, and means for feeding said strip a greater or less distance according to whether said means engage steps of greater or less depths.

2. In apparatus for feeding lengths of strip material to register with impressions on the strip, in which alternative mechanism is provided, one to feed a greater length than the distance between the impressions and the other to feed a lesser length than the distance between the impressions; the combination with feed mechanism for feeding said strip, of metal feelers located adjacent to said strip, pivoted arms to carry said metal feelers, means for rocking said pivoted arms for approaching said feelers to bear on metallic contact surfaces during a dwell in the travel of said strip, intercepting means adjustable in two positions, electro-magnets for adjusting said intercepting means, means for energizing said magnets when said metal feelers contact with said contact surfaces, and means for feeding said strip a greater or less distance according to whether said means engage on steps of greater or less depth.

3. In apparatus for feeding lengths of strip material to register with impressions on the strip, in which alternative mechanism is provided, one to feed a greater length than the distance between the impressions and the other to feed a lesser length than the distance between the impressions; the combination with feed mechanism for feeding said strip, of metal feelers located adjacent to said strip, pivoted arms to carry said metal feelers, means for rocking said pivoted arms for approaching said feelers to bear on metallic contact surfaces during a dwell in the travel of said strip, intercepting means comprising a pivoted lever adjustable in two positions, electro-magnets for adjusting said pivoted lever, means for energizing said magnets when said metal feelers contact with said contact surfaces, and means for feeding said strip a greater or less distance according to whether said means engage on steps of greater or less depth.

4. In apparatus for feeding lengths of strip material to register with impressions on the strip, in which alternative mechanism is provided, one to feed a greater length than the distance between the impressions and the other to feed a lesser length than the distance between the impressions; the combination with feed mechanism for feeding said strip, of metal feelers located adjacent to said strip, pivoted arms to carry said metal feelers, means for rocking said pivoted arms for approaching said feelers to bear on said metallic contact surfaces during a dwell in the travel of said strip, intercepting means comprising a pivoted lever adjustable in two positions, electro-magnets for adjusting said pivoted lever, means for energizing said magnets when said metal feelers contact with said contact surfaces, and means for feeding said strip one constant distance when said pivoted lever engages a shallow step in such feed mechanism and another constant distance when said intercepting means engages deeper step in such feed mechanism.

5. In apparatus for feeding lengths of strip material to register with impressions on the strip, in which alternative mechanism is provided, one to feed a greater length than the distance between the impressions and the other to feed a lesser length than the distance between the impressions; the combination with feed mechanism for feeding said strip, of metal feelers located adjacent to said strip, pivoted arms to carry said metal feelers, means for rocking said pivoted arms for approaching said feelers to bear on metallic contact surfaces during a dwell in the travel of said strip, intercepting means comprising a pivoted lever adjustable in two positions, electro-magnets for adjusting said pivoted lever, means for energizing said magnets when said metal feelers contact with said contact surfaces, means for feeding said strip a constant distance, and means for drawing back the strip a greater or less distance according to whether said intercepting means engages the shallow or the deeper step in such draw-back mechanism.

In witness whereof I have hereunto set my hand.

FREDERICK GROVER.