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R. G. SCHMITT

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METALLIC RIBBON IMPRINTING APPARATUS FOR BOOK MATCHES

Filed March 25, 1949

2 Sheets-Sheet 1

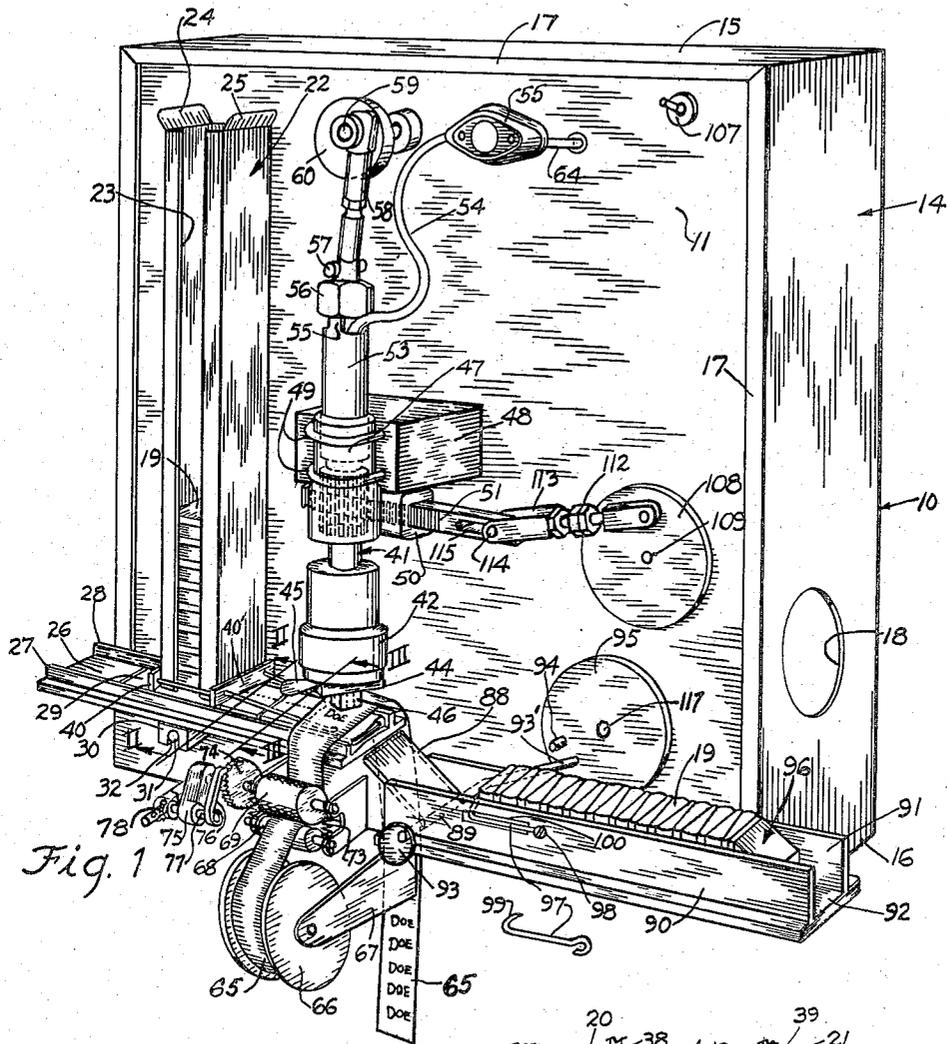


Fig. 1

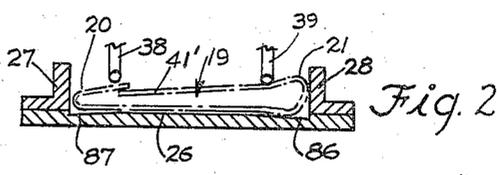


Fig. 2

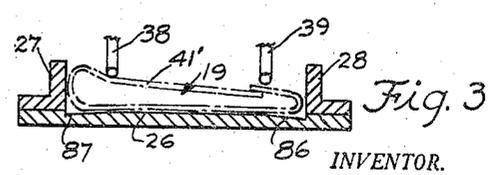


Fig. 3

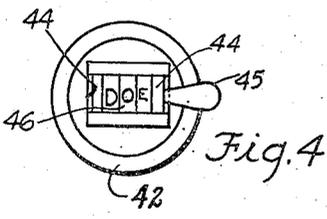


Fig. 4

INVENTOR.  
ROLAND G. SCHMITT  
BY *Harry C. Schmitt*  
ATTORNEY

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2 Sheets-Sheet 2

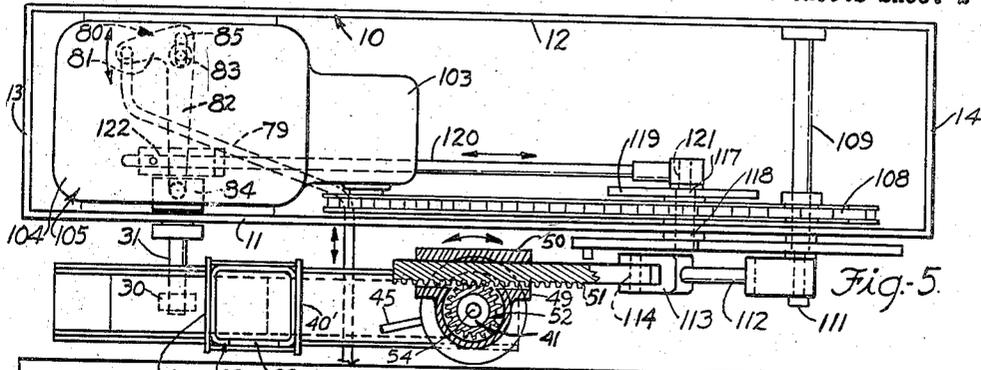


Fig. 5

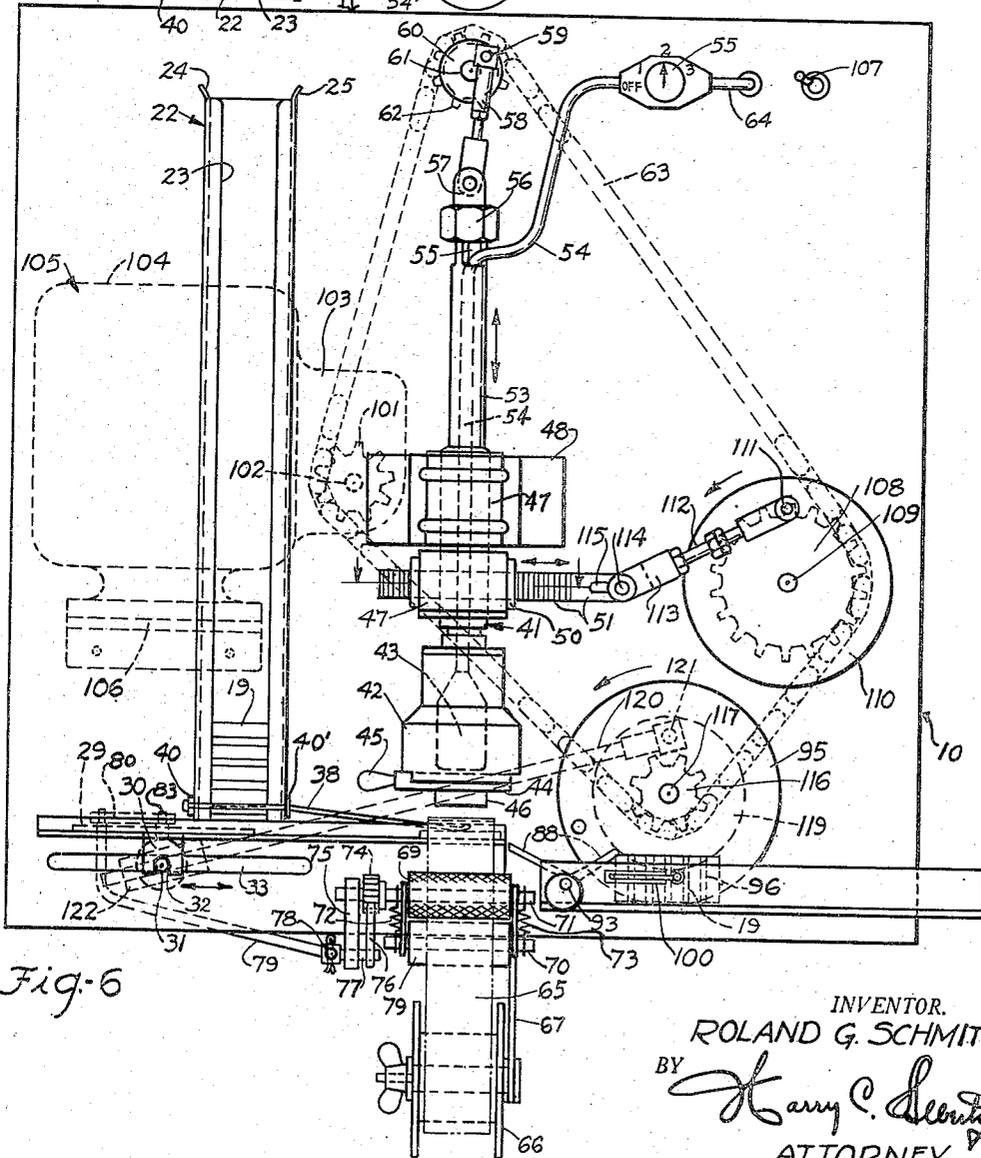


Fig. 6

INVENTOR.  
ROLAND G. SCHMITT  
BY *Harry C. Schmitt*  
ATTORNEY

# UNITED STATES PATENT OFFICE

2,547,602

## METALLIC RIBBON IMPRINTING APPARATUS FOR BOOK MATCHES

Roland G. Schmitt, Chicago, Ill., assignor to Art Lines, Inc., Detroit, Mich., a corporation of Michigan

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17 Claims. (Cl. 41—1)

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This invention relates to imprinting machines and more particularly to heated imprinting devices for metallic printing of small run specialties, although certain features thereof may be employed with equal advantage for other purposes.

It contemplates more especially the provision of simplified instrumentalities for automatically feeding and imprinting small quantities of specialized articles without requiring any appreciable set-up or entailing much time for personalizing or individualizing the imprints or embossings thereon.

Numerous types of printing machines and special equipment have heretofore been proposed, but these are comparatively intricate devices for large quantity production which require extensive set-ups for each run and are otherwise not adaptable to small quantity imprinting of special articles such as match books, napkins, cards, small containers and the like. Such articles are often imprinted, embossed, or otherwise personalized or individualized to render them more attractive or in greater demand by individuals, establishments, and institutions.

One object of the present invention is to simplify the construction and improve the operation of devices of the character mentioned.

Another object is to provide a simple metallic imprinter which handles small runs of special articles for automatic feeding, imprinting, and restacking with individualized or personalized imprints thereon.

Still another object is to provide simple article feeding and discharging means in conjunction with an alternately reversible imprinting mechanism for articles that are reversibly disposed in stacked relation.

A further object is to provide simple and effective imprinting means which can be readily adapted to imprint small runs of initially stacked articles such as book matches, small cartons, and the like, without entailing any appreciable set-up or time loss in the change-over for different imprints.

A still further object is to provide simple, compact, and very flexible set-up imprinters for small run metallic imprinting of specialized articles without entailing any appreciable manual labor or intervention in the processing thereof.

Still a further object is to provide a reversing imprinter die holder which alternates its position between each imprinting stroke for special articles such as reversely stacked book matches and the like.

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Other objects and advantages will appear from the following description of an illustrated embodiment of the present invention.

In the drawings:

Figure 1 is a perspective view of a book match imprinting machine embodying features of the present invention.

Figure 2 is a sectional view in elevation of the article support and guide taken substantially along line II—II of Figure 1.

Figure 3 is a sectional view in elevation of the article support and guide taken substantially along line III—III of Figure 1.

Figure 4 is a bottom plan view of the imprinting die holder shown in Figure 1.

Figure 5 is a top plan view of the device shown in Figure 1, parts thereof being shown in section to clarify the illustration.

Figure 6 is a front view in elevation of the device shown in Figures 1 and 5.

The structure selected for illustration is not intended to serve as a limitation upon the scope or teachings of the invention, but is merely illustrative thereof. There may be considerable variations and adaptations of all or part of the teachings depending upon the dictates of commercial practice.

The present embodiment comprises a substantially rectangular housing 10 wherein parallel vertical plates 11—12 are maintained in spaced relation by vertical end plates 13—14. Top and bottom plates 15—16 join the end plates 13—14, and these are preferably provided with edge flanges 17 (Figure 1) to rigidify the housing 10.

The housing 10 serves to support and confine the actuating instrumentalities as will appear more fully hereinafter. An enlarged opening 18 is preferably provided in the end wall 14 (Figure 1) to permit access to the interior of the housing 10 for lubricating the moving parts and to afford inspection without removal of a housing wall or walls 11—12 or 15—16 or 13—14.

In the imprinting of book matches 19, for instance, the variation between the thin edge 20 and the comparatively thicker edge 21 (Figures 1 to 3) renders it necessary to alternate and oppositely dispose the adjacent match books 19 to provide a compact and commercially acceptable package thereof. To this end, a vertical chute 22 sized to receive a full stack of alternately disposed book matches 19 as they are removed from a standard package, is attached to the housing wall 11 proximate to the end wall 13 thereof.

The chute 22 has a front opening 23 along the length thereof to afford full vision of the interior

and to permit the ready placement of a stack of match books 19 therein while being fully supported with both hands of the attendant. The upper end of the chute 22 has upwardly diverging flanges 24—25 to assure the convenient insertion of stacks of book matches 19 therein. The bottom of the chute 22 is open and communicates with a horizontal trough 26 which has upstanding parallel flanges 27—28 complementary to and to freely guide individual match books 19 that are displaced in alternate positions therealong.

The chute 22 terminates at its lower end short of the bottom of the trough 26 for a distance slightly greater than the greatest thickness of the match book end 21 so that the latter will slide thereunder and along the trough 26 without permitting more than one book match 19 to be displaced from the lower end of the book match stack confined in the chute 22. The lowermost book match 19 is displaced from the stack by means of a slide plate 29 attached to a bracket 30 disposed beneath the trough 26 for reciprocation by a rod 31. The rod 31 is disposed in a groove 32 provided in the bottom of the bracket 30 for engagement therewith in effecting the reciprocation of the slide plate 29 within the limits of a horizontal slot 33 (Figure 6) that is provided in the housing wall 11 to accommodate the rod 31.

The book matches 19 that are displaced along the trough 26 which extends for a distance somewhat beyond the imprinting station to be hereinafter described, are held in single tier adjacent relation against accidental or free movement except for positive feeding displacement by the succeeding book match 19 which is ejected by the reciprocative slide 29, by spaced wire springs 38—39 (Figures 1 to 3). The springs 38—39 are mounted in chute side wall engaging plates 40—40' for extension in the path of the chute ejected match books 19 along the trough 26 toward the imprinting station to be presently described.

The personalized imprinting on the cover 40 of match books 19 in the same directional position, is accomplished by a vertical reciprocally mounted and rotatable pitman 41. The pitman 41 comprises, in this instance, a cylindrical member 42 wherein is confined an electric heating element 43 (Figure 6) disposed proximate to the lower extremity thereof. The lower pitman extremity terminates in a type clamp 44 which has a manual screw operated adjusting member 45 which renders it possible to quickly set and reset different type bars 46, in this instance three, representing the initials of an individual.

The elongated round rod-like pitman 41 is complementary to and freely slides within a suitably bored guide shank 47 which is attached to a bracket 48 fixed to the housing wall 11. Suitable clamps 49 anchor the guide shank 47 to the bracket block 48 so that a portion thereof is disposed therebeneath to provide for a rack guide 50 formed integral with the guide shank 47.

A rack bar 51 reciprocates in the guide 50 to mesh with a pinion 52 (Figures 1 and 5) provided on the pitman 41 within the guide shank 47. The pinion 52 rotates with the pitman 41 and is slidable longitudinally thereof to permit its reciprocation alternately with its rotation or oscillation. Consequently, the horizontal reciprocation of the rack bar 51 will rotate or oscillate the pitman 41 for one-half a revolution while the latter is vertically at rest, and the rack bar 51 is at rest while the pitman 41 is reciprocated by

instrumentalities which will be hereinafter described. As shown, the pitman 41 terminates upwardly in a tubular reduced extension 53 which receives the heating element electric wires 54 therethrough to emerge at its upper extremity proximate to the solid flat end 55 thereof (Figures 1 and 6).

An attaching knuckle 56 terminating in a bifurcated pivotal joint 57 connecting with an adjustable connecting rod 58, is fitted to the flat end 55 of the pitman extension 53 so that reciprocative movement will be imparted to the pitman 41. This is effected by means of a crank pin 59 eccentrically mounted to a disc 60 carried by a stud shaft 61. The stud shaft 61 is horizontally journaled in the housing wall 11 and carries a sprocket 62 on the interior side thereof for rotation by a meshing drive chain 63 common to other sprockets as will appear more fully hereinafter for actuating the various instrumentalities in timed relation.

As shown, the electric wires 54 lead to a thermostat 55 of standard construction which, in turn, is connected in series with an electric power source (not shown) through lead wires 64 to maintain the heating element 43 at the required temperature for heating the type bars 46. The thermostat 55 has three heat control positions and an "off" position. It controls the heating element 43 so that the type bars 46 will be maintained at a proper temperature to transfer the metal foil such as aluminum from its wax base roll strip 65 to, in this instance, the contacted covers 41' of the match boxes 19 for adherence thereon. Such heat imprints of metal foil will adhere to almost any type of surface—even waxed cartons such as ice cream containers are effectively imprinted with the flavor or variety imprint thereon after such cartons are otherwise completed, printed and waxed.

The metal foil roll strip 65 is mounted on a spool 66 journaled on a bracket 67 fixed to the housing 11 in any suitable position. The roll strip 65 extends between confronting feed rollers 68—69 fixed to shafts 70—71 that are spring-urged as at 72—73 to frictionally grasp the foil strip 65 therebetween and to effect the feeding thereof. To this end, the upper roller 69 has a knurled surface for positive feeding of the strip 65. The intermittent feeding of the strip 65 is effected by intermittently rotating the upper roller 69, and this is accomplished through the medium of a ratchet wheel 74 on the shaft 71 inside of its supporting bracket 75. A pawl 76 is fixed to a stud shaft 77 journaled in the lower end of the bracket 75, for connection as at 75 with a rod 79.

The rod 79 extends to a bell crank lever 80 having angularly offset arms 81—82 between which a mount 83 extends to serve as a support thereof. The longer lever arm 82 is pivotally connected to a block 84 (Figure 5) that is an extension of the rod 31 for oscillation responsive to the reciprocation of the latter. To this end, the lever mount 83 is disposed in an elongated slot 85 to compensate for the change in position of the bell crank 80 as the reciprocatory movement of the rod 31 is translated into oscillatory movement of the bell crank 80.

The oscillatory movement of the bell crank 80 actuates the rod 79 to impart oscillatory movement to the pivoted bracket 75 and the pawl 76 which is mounted to intermittently rotate the ratchet wheel 74 and thus impart corresponding intermittent rotation of the feed roller 69 to

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advance the metallic foil strip 65 across the upstanding flanges or trough rails 27—28 (Figure 1) and beneath the type bars 46 at the imprinting station. The metallic foil strip 65 extends over the trough rail 27—28 for free suspension between the housing wall 11 and the trough 26 (Figure 1). While the illustrated foil strip feeding mechanism shows the strip 65 being displaced across the trough 26, it should be observed that such may be arranged so the strip 65 is tensioned and pulled across the trough 26, depending upon the dictates of commercial practice. Other imprinting expedients may be employed as a substitute for the metal foil strip 65.

It should be noted that the trough 26 in the region of the imprinting station where a match book 19 is held against movement by the extremities of the wire springs 38—39, is provided with bottom undercuts 36—37 (Figures 2 and 3) which incline downwardly from the central region of the trough 26 toward the inside walls of the trough flanges or rails 27—28 to compensate for the enlarged thickness of the match book cover hinge edge 21 and to accommodate the spring action and yield thereof during the imprinting operation. Consequently, the match book covers 40 will be in a substantially horizontal position after the type bars 46 impact thereagainst. This insures the uniform application of the metallic imprint represented by the type bars 46 which, owing to their elevated temperature, transfers its corresponding counterpart from the metallic foil strip 65 to the cover 40 of the match books 19 for adherence thereon.

It should be observed that with this arrangement of parts, the instrumentalities are timed so that the match books 19 and the metallic foil strip 65 are at rest momentarily while the pitman 41 moves downwardly against the metallic strip 65 and the cover 40 of the match book 19 positioned thereunder. As the match book feeder slide plate 23 advances, the pitman 41 ascends with the type bars 46, their clamp 45, and holder member 42. During the ascent of the pitman 41, it rotates one hundred and eighty degrees from its previous rotary position, thereby placing the instrumentalities in position to effect a corresponding imprint on a succeeding oppositely positioned match book which are alternately reversed so that the pitman 41 is alternately oscillated from the previous setting to correspond with the alternation of succeeding match books 19.

As the slide 29 feeds succeeding alternately disposed match books 19 from the trough 26 after each imprint, the imprinted match books 19 are displaced onto a pivotal slide 38. The slide 38 is fixed to a rod 39 that is pivotally mounted between upstanding walls or side rails 30—31 of a trough 92 comprising a horizontal stacking member from which the edge supported and alternately disposed match books 19 are manually removed for replacement in units of twenty-five or fifty (more or less) into the original carton from which they were removed. There are usually fifty match books to a carton in two tiers or stacks for initial placement in the feeding chute 22, which will accommodate a full carton of standard book matches, although the apparatus may be designed for a lesser or greater number, depending upon the dictates of commercial practice. The match books 19 are displaced from the imprinting trough 26 to the stacking trough 92 by the oscillation of the slide 38 with its mounting rod 39. The rod 39 has a weight 33 on one end thereof to normally posi-

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tion the slide 38 in its extreme counterclockwise position (viewed from Figure 6).

The other extremity of the rod 39 has an offset arm 93' which is disposed in the path of a trip 94 eccentrically mounted on a disc 95. The disc 95 is rotated as will appear more fully hereinafter, so that the trip 94 will engage the slide rod arm 93 at timed intervals to flip the slide 38 in a clockwise direction (see dotted outline in Figure 6) to displace match books 19 in edgewise relation on the stacking trough 92. To this end, the stacking trough 92 is provided with a slidable stop 96 against which the imprinted book matches are displaced. A hooked rod 97 is mounted as at 98 to the stacking trough wall 99 so that the hook end 99 thereof will project into the interior of the stacking trough 92. To this end, the hooked end 99 projects through an elongated slot 100 provided in the trough wall 99. Consequently, the hook end 99 is disposed in the path of the imprinted match book ends so that it will hold the first match book 19 in a predetermined position. Thereafter succeeding imprinted match books 19 will displace the previous match book 19 past the hook end 99 to provide for advancement against the block 96 which is initially placed in line with the end 99 of the hook 97 serving as a spring clip or trip.

The instrumentalities thus far described are actuated in synchronized timed relation by the endless chain 63 which is driven by a sprocket pinion 101 fixed to a shaft 102 operatively connected by a train of gears (not shown) which are confined within a reduction gear housing 103. The reduction gear housing 103 is formed integral with the housing 104 of an electric motor 105. The electric motor 105 is fixed to a base 106 suitably supported within the frame housing 10. The electric motor is controlled by a switch 107 connected to a source of electric power (not shown).

The power rotated pinion 101 drives the chain 63 which meshes with the sprocket wheel 60 which reciprocates the pitman 41. The endless chain 63 extends over another sprocket 108 fixed to a shaft 109 which is supported between the frame housing walls 11—12 (Figure 5) to carry a disc wheel 110 for rotation therewith. An eccentrically positioned pin 111 on the disc wheel 110 has an adjustable crank arm 112 connected thereto to provide a furcated bracket 113 for pivotal and slidable connection as a pin 114 moves in an elongated slot 115 provided in the pitman oscillating rack 51 which is reciprocated responsive to the rotation of the disc wheel 110 driven by the chain 63. This movement serves to oscillate the pinion 52 which, in turn, rotatively oscillates the pitman 41 during its up movement to alternately reverse the position of the type bars 46. In the present embodiment, there is a ratio of two-to-one (2:1) between the sprocket 108 and the sprockets 60—109—110, the latter being on a one-to-one (1:1) ratio with each other, although this ratio may vary within a wide range depending upon the articles to be imprinted and the dictates of commercial practice.

The chain 63 also extends over a sprocket 116 carried by a stub shaft 117 journaled in a bearing 118 mounted in the frame housing wall 11. The shaft 117 carries the disc wheel 95 with its trip pin 94 on the outside of the frame wall 11, and a smaller disc 119 is secured fast to the shaft 117 on the inside of the frame wall 11. The discs 95—119 are fixed to the stub shaft 117 for rotation therewith responsive to the movement of the motor driven chain 63. The trip pin 94 is fixed

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to the larger disc wheel 95 for rotation in the path of the shaft offset 93 which actuates and flips the match book slide 88 that transfers the imprinted match book 19 from the imprinting station to the stacking trough 92 as described supra.

The smaller disc wheel 119 has a crank rod 120 connected thereto by means of a crank pin 121 so that rotation of the disc 119 will oscillate the crank rod 120 which is connected at its other 10 extremity to the slide plate connecting pin 31 through a swivel connector block 122 (Figures 5 and 6). This results in the reciprocation of the pin 31 within the elongated horizontal slot 33 to guide and determine the reciprocation of the slide plate 29 which successively feeds the match books 19 from the vertical chute 22 along the trough 26. It will be apparent, therefore, that the endless chain 63 is in continuous meshing engagement with the driven sprockets 60, 108, 116, and 15 driver sprocket 101.

With the arrangement of parts above described, substantially the same instrumentalities can be utilized for imprinting collapsed ice cream cartons and similar stacked sheets. While the type 25 bar reversing mechanism is desirable, such need not be utilized with articles other than book matches and the like that are packed alternately for compactness and convenience. Whenever the articles to be imprinted are not alternately disposed, the rotary oscillation of the type bars 40 is rendered unnecessary and this may be optionally dispensed with by removing the rack 51 from operative meshing engagement with the pinion 52. This simple apparatus is adaptable to small runs of personalized and varietized imprints without 30 entailing any appreciable manual labor or time in set-up or change from one run to another.

While I have illustrated and described a preferred embodiment of this invention, it must be understood that the invention is capable of considerable variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

I claim:

1. In an imprinting machine, the combination with means for maintaining substantially flat articles in vertical stacked relation; of means for feeding said articles singly from said stack along a predetermined rectilinear path; reciprocative imprinting means operating relative to said rectilinear path for imprinting impact against the articles; means for heating said imprinting means; feeding means for disposing a metallic foil ribbon beneath said imprinting means; and means for operating said article feeding, reciprocative imprinting, and metallic foil feeding means in synchronized timed relation.

2. In an imprinting machine, the combination with means for maintaining substantially flat articles in vertical stacked relation; of means for intermittently feeding said articles singly from said stack along a predetermined rectilinear path; reciprocative imprinting means operating intermittently relative to said rectilinear path for imprinting impact against the articles; means for heating said imprinting means; feeding means for disposing a metallic foil ribbon beneath said imprinting means; and means for intermittently operating said article feeding, reciprocative imprinting, and metallic foil feeding means in synchronized timed relation.

3. In an imprinting machine, the combination with means for maintaining substantially flat articles in vertical stacked relation; of means for feeding said articles singly from said stack along a predetermined rectilinear path; reciprocative imprinting means operating relative to said rectilinear path for imprinting impact against the articles; means for heating said imprinting means; feeding means for disposing a metallic foil ribbon beneath said imprinting means; means for operating said article feeding, reciprocative imprinting, and metallic foil feeding means in synchronized timed relation, and means for re-stacking said imprinted articles to conform with said initial vertical stacking thereof.

4. In an imprinting machine, the combination with means for maintaining substantially flat articles in vertical stacked relation; of means for feeding said articles singly from said stack along a predetermined rectilinear path; reciprocative imprinting means operating relative to said rectilinear path for imprinting impact against the articles; means for heating said imprinting means; feeding means for disposing a metallic foil ribbon beneath said imprinting means; means for operating said article feeding, reciprocative imprinting, and metallic foil feeding means in synchronized timed relation, and pivotal means in said path for re-stacking said imprinted articles to conform with said initial vertical stacking thereof.

5. In an imprinting machine, the combination with means for maintaining substantially flat articles in vertical stacked relation; of means for feeding said articles singly from said stack along a predetermined rectilinear path; reciprocative imprinting means operating relative to said rectilinear path for imprinting impact against the articles; means for reversing the position of said imprinting means alternately with each reciprocation thereof; means for heating said imprinting means; feeding means for disposing a metallic foil ribbon beneath said imprinting means; and means for operating said article feeding, reciprocative imprinting, and metallic foil feeding means in synchronized timed relation.

6. In an imprinting machine, the combination with means for maintaining substantially flat articles in vertical stacked relation; of means for intermittently feeding said articles singly from said stack along a predetermined rectilinear path; reciprocative imprinting means operating intermittently relative to said rectilinear path for imprinting impact against the articles; means for reversing the position of said imprinting means alternately with each reciprocation thereof; means for heating said imprinting means; feeding means for disposing a metallic foil ribbon beneath said imprinting means; and means for intermittently operating said article feeding, reciprocative imprinting, and metallic foil feeding means in synchronized timed relation.

7. In an imprinting machine, the combination with means for maintaining substantially flat articles in vertical stacked relation; of means for feeding said articles singly from said stack along a predetermined rectilinear path; reciprocative imprinting means operating relative to said rectilinear path for imprinting impact against the articles; means for reversing the position of said imprinting means alternately with each reciprocation thereof; means for heating said imprinting means; feeding means for disposing a metallic foil ribbon beneath said imprinting means; means for operating said article 75 printing means; means for operating said article

feeding, reciprocative imprinting, and metallic foil feeding means in synchronized timed relation, and means for re-stacking said imprinted articles to conform with said initial vertical stacking thereof.

8. In an imprinting machine, the combination with means for maintaining substantially flat articles in vertical stacked relation; of means for feeding said articles singly from said stack along a predetermined rectilinear path; reciprocative imprinting means operating relative to said rectilinear path for imprinting impact against the articles; means for reversing the position of said imprinting means alternately with each reciprocation thereof; means for heating said imprinting means; feeding means for disposing a metallic foil ribbon beneath said imprinting means; means for operating said article feeding, reciprocative imprinting, and metallic foil feeding means in synchronized timed relation, and pivotal means in said path for re-stacking said imprinted articles to conform with said initial vertical stacking thereof.

9. In a device of the character described, the combination with article stacking, feeding, imprinting, and restacking means; of means for reversing the position of said imprinting means after each imprinting operation thereof; means for restacking the imprinted articles; and means for intermittently operating all of said means in synchronous timed relation.

10. In a device of the character described, the combination with article stacking, reciprocative feeding, reciprocative imprinting and restacking means; of oscillating means for reversing the position of said imprinting means after each imprinting operation thereof; means for restacking the imprinted articles; and means for intermittently operating all of said means in synchronous timed relation.

11. In a device of the character described, the combination with article stacking, reciprocative feeding, reciprocative imprinting and restacking means; of oscillating means for reversing the position of said imprinting means after each imprinting operation thereof; pivotal means for restacking the imprinted articles; and means for intermittently operating all of said means in synchronous timed relation.

12. In a device of the character described, the combination with article stacking, reciprocative feeding, reciprocative imprinting and restacking means; of oscillating means for reversing the position of said imprinting means after each imprinting operation thereof; metallic foil unreeling means for disposing foil beneath said imprinting means; pivotal means for restacking the imprinted articles; and means for intermittently operating all of said means in synchronous timed relation.

13. In an imprinting machine for book matches, the combination with imprinting means, of means for oscillating said imprinting means alternatively of each imprinting thereof, and means for intermittently unreeling metal foil beneath said imprinting means.

14. In an imprinting machine for book matches, the combination with reciprocative imprinting means, of means for rotarily oscillating said imprinting means alternatively of each imprinting reciprocation thereof, and means for intermittently unreeling metal foil beneath said imprinting means.

15. In an imprinting machine for book matches, the combination with reciprocative imprinting means, of means for rotarily oscillating said imprinting means alternatively of each imprinting reciprocation thereof, means for intermittently unreeling metal foil beneath said imprinting means, and means for stacking said imprinted book matches in aligned relation.

16. In a device of the character described, the combination with article stacking means for match books, of a trough disposed beneath said stacking means for receiving match books therefrom, feeding means cooperating with said stacking means and said trough to intermittently displace match books therealong, and reciprocative imprinting means disposed above said trough to intermittently impress said match books, there being complementary configuration irregularities in said trough beneath said imprinting means to compensate for the irregularities in match books to assume a substantially horizontal imprinted position with said imprinting thereagainst.

17. In a device of the character described, the combination with article stacking means for match books, of a trough disposed beneath said stacking means for receiving match books therefrom, feeding means cooperating with said stacking means and said trough to intermittently displace match books therealong, reciprocative imprinting means disposed above said trough to intermittently impress said match books, there being complementary configuration irregularities in said trough beneath said imprinting means to compensate for the irregularities in match books to assume a substantially horizontal imprinted position with said imprinting thereagainst, and means for reversing the position of said imprinting means with each reciprocation thereof to correspond with the alternative stacking relation of the match books.

ROLAND G. SCHMITT.

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