April 5, 1960

C. E. ACKLEY

MARKING MACHINES

2,931,292

Filed Aug. 28, 1956

3 Sheets-Sheet 1

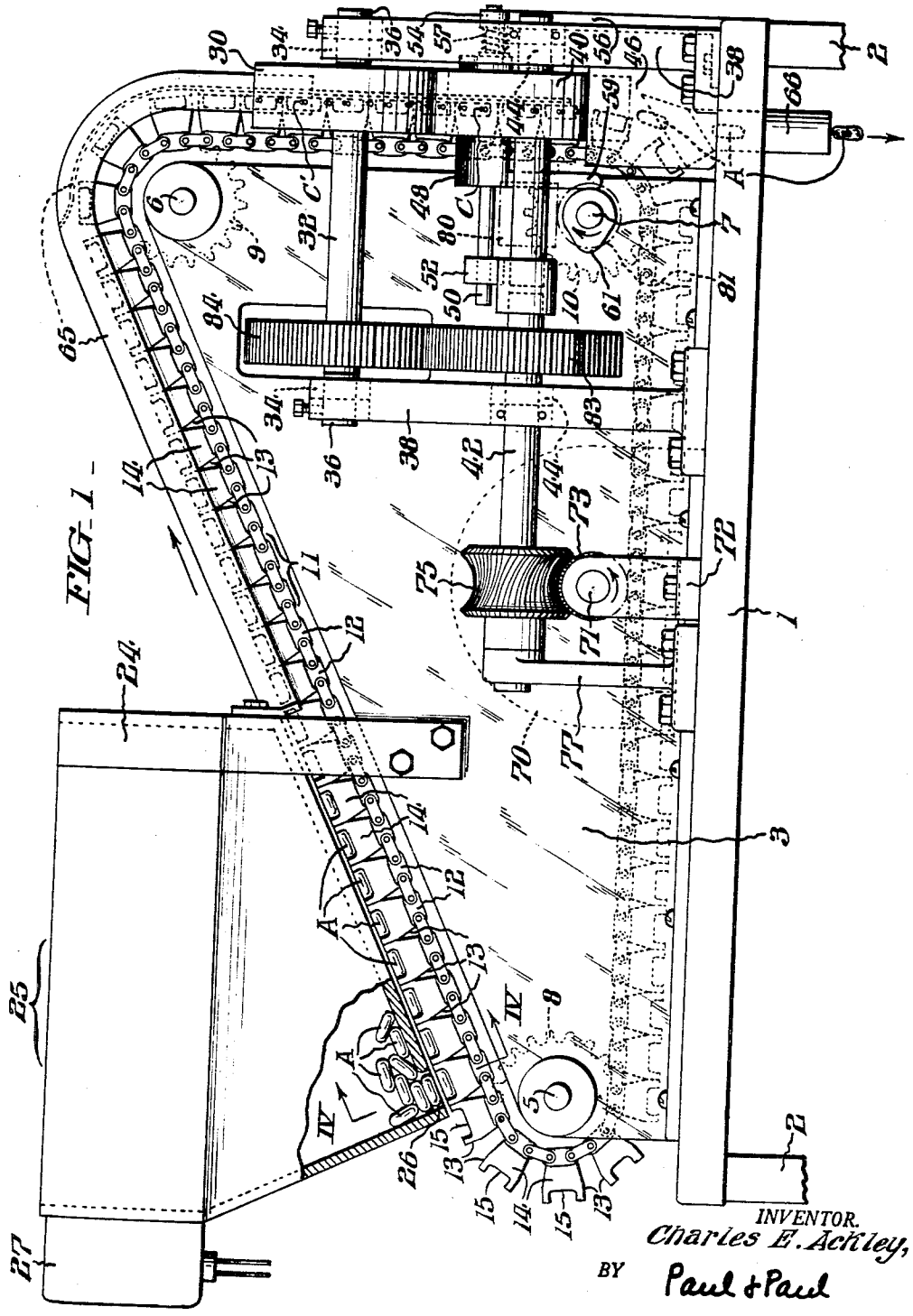


FIG. 1

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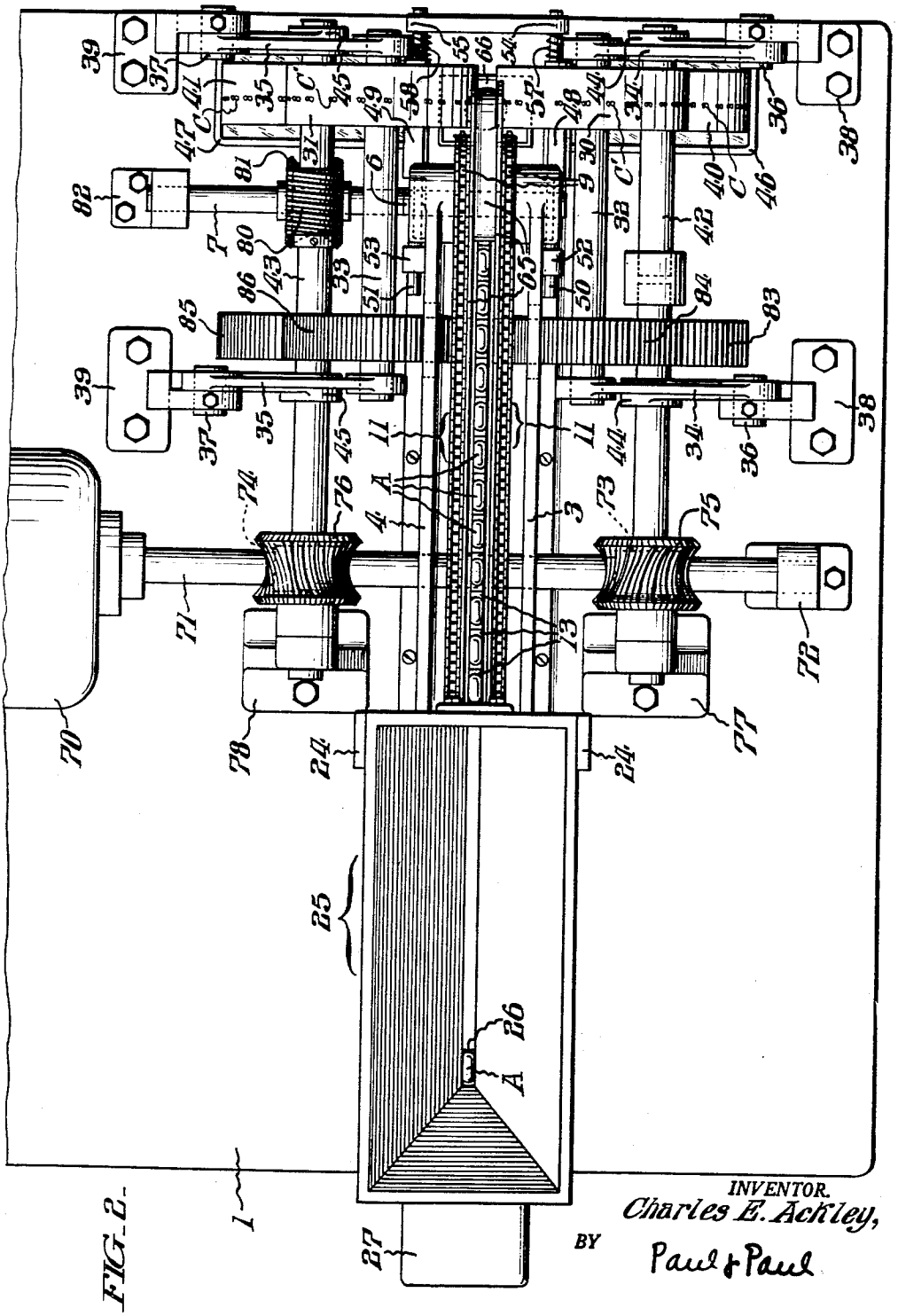


FIG. 2.

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FIG. 3

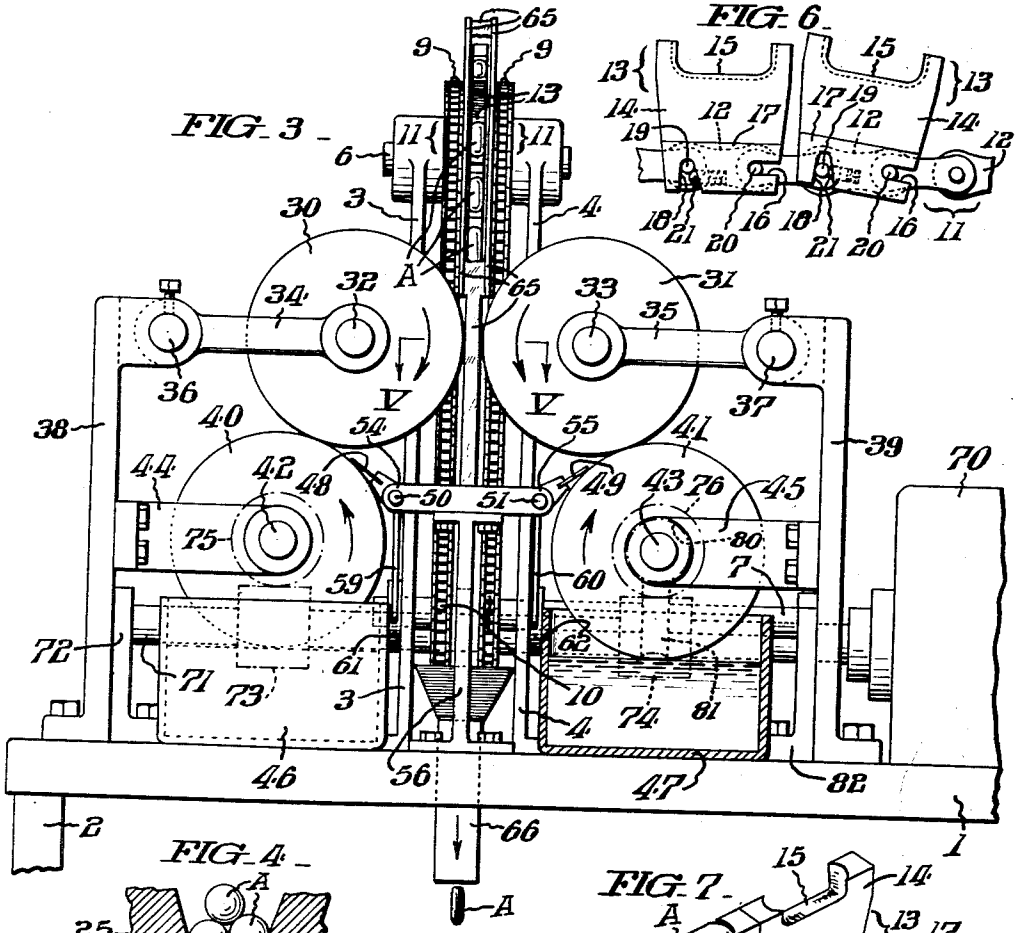


FIG. 6

FIG. 4

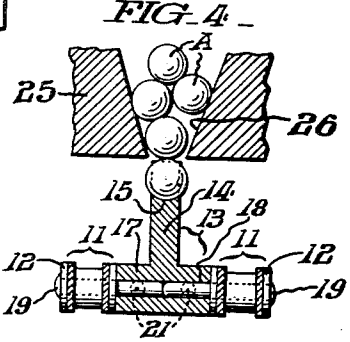


FIG. 5

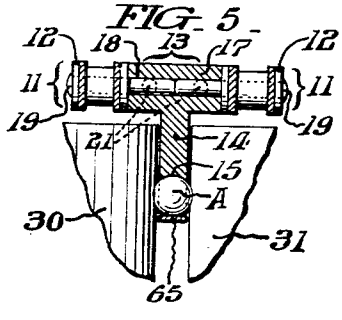


FIG. 7

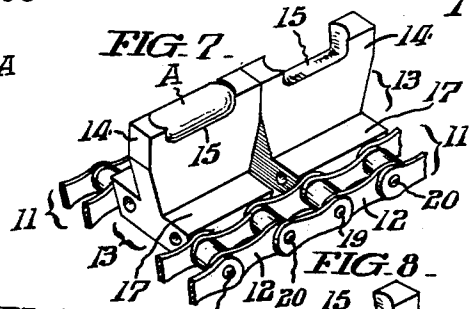


FIG. 8

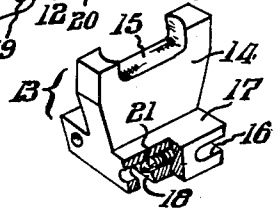
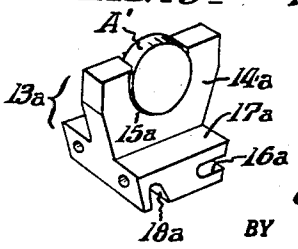


FIG. 9



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2,931,292

MARKING MACHINES

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13 Claims. (Cl. 101—37)

This invention relates to marking machines. More specifically, it is concerned with machines for applying to relatively small articles such for example as pharmaceutic capsules, pellets, pills and the like, markings such as alphabet letters, manufacturer's trade marks or other characterizing symbols for the purposes of ready identification.

The chief aim of my invention is to provide a machine for the above purpose which is simple in construction; which is highly efficient from the standpoint of output; and which can be relied upon to apply sharply defined and therefore legible markings without distorting or otherwise damaging the articles.

In connection with a machine having the aforementioned attributes, it is a further aim of my invention to provide means whereby the machine can be easily and quickly adapted for operation upon articles of one configuration for operation upon articles of a different configuration.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein:

Fig. 1 is a fragmentary view showing in side elevation the improved marking machine of my invention.

Fig. 2 shows the apparatus in top plan.

Fig. 3 is an end elevation of the apparatus as it is seen from the right of Figs. 1 and 2.

Figs. 4 and 5 are fragmentary views in section taken as indicated respectively by the arrows IV—IV and V—V in Figs. 1 and 3, and drawn to a larger scale.

Figs. 6, 7 and 8 are fragmentary detail views of a conveyer embodied in the machine; and

Fig. 9 is a view similar to Fig. 8 showing a modification.

As herein exemplified, my improved marking machine has a base plate 1 which is supported at table height by legs 2. Upstanding from the base 1 are two parallel laterally-spaced triangular side frame members 3 and 4 provided at corners with bearings for shafts 5, 6 and 7 whereto are secured, in the interval between said frames, pairs of spaced sprocket wheels 8, 9 and 10 respectively. Trained for travel in a closed circuit about the sprocket wheels is an endless belt conveyer comprising a pair of chains 11; supported between corresponding alternate links 12 carrier elements 13 for individual articles to be marked. As best shown in Figs. 6–8, the elements 13 are in the form of lugs having outstanding medially-disposed ridge projections 14 with depressions 15 each configured, in this instance to snugly receive an elongated object such as a capsule A, the thickness of the ridges 14, being somewhat less than the diameter of said articles. As further shown, each carrier element 13 has an outwardly-open horizontal notch 16 in one end of its bottom portion 17, and a downwardly-open vertical notch 18 at the opposite end of said portion for respectively engaging inward extensions of the pivot pins 19 and 20 of corresponding alternate links 12 of the two conveyer chains 11. As a consequence of the arrangement just described,

it is possible to easily assemble the carrier elements 13 with the chains 11 or to replace them in a manner which will be readily understood from Fig. 6. In order to insure against accidental detachment of the carrier elements 13 from the chains, each of them is provided at the notch 18, see Figs. 6 and 8, with a pair of spring-loaded balls 21, for engaging beneath the inward extensions of the chain link pivot pins 19 as at the left of Fig. 6.

Supported above the upper inclined run of the conveyer at the left hand or feeding end of the machine by brackets 24 on the side frames 3 and 4 is a supply hopper 25 for the articles A, the bottom of said hopper being sloped to correspond with the inclination of the conveyer. As the conveyer advances beneath the hopper, individual articles A are released to droy by gravity through an opening 26 in the hopper bottom into the recesses 15 of the carrier elements 13 as shown in Figs. 1 and 4. During the operation of the machine, the contents of the hopper 25 are constantly agitated by the action of a vibrator 27 attached to the hopper to insure positive feeding of the articles.

Arranged at opposite sides of the vertical run of the conveyer at the right hand end of the machine beyond the hopper 25 are offset printing rolls 30 and 31 of rubber or other suitable resilient material, the shafts 32 and 33 of said rolls being journalled respectively in the distal end of arms 34 and 35 fulcrumed upon pins 36 and 37 secured in the top ends of standards 38 and 39 on the base plate 1. From Fig. 3 it will be observed that the rolls 30 and 31 run in contact with applicator or transfer rolls 40 and 41 respectively of which the shafts 42 and 43 are rotatively borne in fixed bracket arms 44 and 45 extending inwardly from the standards 38 and 39. Also, from Fig. 3 it will be noted that the transfer rolls 40 and 41 respectively dip into printing fluid contained in underlying reservoirs 46 and 47 supported on the base. The transfer rolls 40 and 41 are of the same diameter as the offset printing rolls 30 and 31, and in practice have etched into or otherwise formed on their peripheral surfaces at circumferential intervals corresponding to the spacing of the carrier elements 13 on the conveyer, characters X (see Fig. 2) with which the articles are to be marked. The printing fluid carried up on the rising sides of the transfer rolls 40 and 41 except that retained in the indentations, is removed by wipers 48 and 49 which are affixed medially to shafts 50 and 51. As shown, these shafts 50 and 51 are supported, with capacity to rock and to be shifted endwise, in guides 52, 53 and 54, 55 respectively on the side frames 3, 4 and at the top of a T bracket 56 rising from the base plate 1. The springs designated 57 and 58 in Figs. 1 and 2 are relied upon to yieldingly maintain pendent fingers 59 and 60 on the wipers in engagement with rotary cams 61 and 62 on the shaft 7 of the sprocket wheels 10.

In transit from the hopper 25 and around the sprocket wheels 9 to the offset printing rolls 30 and 31, the articles A are held to the recesses 15 of the carrier elements 13 by a guard 65 which is secured at one end to the hopper 25 and at the other end to the bracket 56. After the articles have been marked, they drop away from the conveyer as it rounds the sprocket wheels 10 as shown in Fig. 1, and fall through a directing tube 66 for collection into a suitable receiver, not illustrated.

The drive mechanism of the machine includes an electric motor 70 whereof the shaft 71 extends crosswise beneath the shafts 42 and 43 of the rolls 40 and 41 and has rotative support at its distal end in a bearing block 72 on the base plate 1. Affixed to the motor shaft 71 are worms 73 and 74 which mesh respectively with worm wheels 75 and 76 affixed to the shafts 42 and 43 of the rolls 40 and 41, the latter shafts being rotatively sup-

ported at their left hand or outboard ends in other bearings 77 and 78 on the base plate 1. Another worm 80 on the shaft 43 of the roll 41 in the interval between the standards 39 meshes with a worm wheel 81 on the conveyer sprocket shaft 7 which is extended beyond the side frame 4 and rotatively supported at its distal end in still another bearing 82 on the base plate 1. The printing rolls 30 and 31 are driven from the shafts 42 and 43 of the transfer rolls 40 and 41 through intermeshing spur gears 83, 84 and 85, 86 respectively. It is to be understood that the ratios of the various gears of the drive mechanism are such as to determine a peripheral speed of said rolls equal to the linear speed of the conveyer.

Operation

As the inclined run of the conveyer underpasses the hopper 25, individual articles A fall by gravity, as already explained, through the opening 26 into the depressions 15 of the carrier elements 13 as the latter are successively presented. Later, as the conveyer moves downward through the vertical portion of its circuit, the ridges 14 of the carrier elements 13 pass between the offset printing rolls 30 and 31 as in Fig. 5, the ink markings X' (Fig. 2) transferred to said rolls from the rolls 40 and 41 are impressed upon the opposite exposed protruding sides of the articles in said elements. By virtue of being of resilient material, the rolls 30 and 31 yield to present distortion of or injury to the articles as the impressions are made. Upon downward advance of the carrier elements 13 from between the rolls 30 and 31 and beyond the bottom end of the guard 65, the marked articles drop out of said elements, as the conveyer chains 11 round the sprockets 10, into the delivery tube 66 as already understood. All the while, the wipers 48 and 49 are constantly shifted back and forth by the action of the cams 61 and 62 to remove the printing fluid from the rolls 40 and 41, except for that retained in the etched marking characters thereon. If single markings should be desired on the articles, the reservoir 46 is either emptied of the printing fluid or is temporarily removed from the machine, in which case the roll 30 will function simply as a buttressing roll for the articles while the roll 31 does the marking. Obviously, single printing can also be accomplished by either emptying or temporarily removing the reservoir 47. For convenience of access to the transfer rolls 40 and 41, the printing rolls 30 and 31 can be swung bodily upwardly and outwardly out of the way about the axes 36 and 37 of the supporting arms 34 and 35 in a manner readily understood from Fig. 3. Particular attention is directed to the fact that the ridges 14 of the carrier elements 13 are so proportioned that by mutual endwise abutment, the chains 11 are rendered rigid against sagging and against deflection in one direction as they move in the straight portions of their circuit. In the alternative form of carrier element 13*a* illustrated in Fig. 9, the depression 15*a* in the ridge portion 14*a* is semicircular for the the reception of round articles A' in pellet form. As shown, the thickness of the ridge portion 14*a* of the carrier element 13*a* is here also made somewhat less than that of the article for the same reason hereinbefore described in connection with the elements 13. By substituting carrier elements of the type 13*a* for those of the type 13 in the conveyer chains 11, the machine will function in the same manner as previously explained to apply identification characters to the pellets.

It is to be understood that, in accordance with my invention and within the scope of the appended claims, otherwise than herein exemplified as may be necessary to suit the configuration of the particular articles to be marked with identifying characters.

Having thus described my invention, I claim:

1. In a marking machine, an endless belt conveyer; carrier elements in the form of lugs detachably connected at spaced intervals to the conveyer, a hopper for supporting a plurality of said articles in close juxtaposition above said conveyor, means providing an opening in the bottom of said hopper whereby said articles may be deposited onto said conveyor, said elements having grooved ridge projections with laterally open conformative depressions for snug reception and positive retainment against lateral displacement of individual articles such as capsules, pellets, and the like, to be marked, the opposite lateral sides of said articles being exposed and projecting beyond said retaining element; a pair of oppositely rotated marking rolls, driven at a peripheral speed corresponding to the linear speed of the conveyer, between which the ridge projections of the carrier elements are passed and whereby the exposed sides of the articles are marked while in the depressions of the carrier elements.

2. A marking machine according to claim 1, wherein the thickness of the ridges on the carrier elements is somewhat less than the thickness of the articles, and wherein the rolls are of resilient material such as rubber or the like for capacity to yield upon peripheral contact with the protruding sides of the articles in the carrier elements.

3. In a marking machine, an endless belt conveyer comprising a pair of laterally-spaced sprocket chains; pairs of horizontal axis sprocket wheels about which the chains are trained for travel of the conveyer in a closed circuit in part substantially horizontal and in part substantially vertical; a supply hopper for the articles to be marked, supported over the horizontal run of the conveyer and undertraveled by the latter; carrier elements in the form of lugs connected crosswise between the chains, said lugs having outstanding longitudinal ridge projections with laterally-open conformative depressions for snug reception and positive retainment of individual articles such as capsules, pellets, and the like as the conveyer passes beneath the hopper; and means disposed at opposite sides of the vertical run of the conveyer between which the ridge projections of the carrier elements pass after receiving the articles, and by which the exposed opposite sides of the articles are successively marked while in the depressions of the carrier elements before release from the machine.

4. A marking machine according to claim 3, wherein the thickness of the ridge projections of the carrier elements are narrower than the thickness of the articles so that the sides of the articles protrude for presentation to the marking means.

5. A marking machine according to claim 3, wherein the marking means comprises a pair of rolls oppositely driven at a peripheral speed corresponding to the linear speed of the conveyer.

6. A marking machine according to claim 3, wherein the carrier elements are detachable upon the chains and each of them is provided at one end with a horizontally open notch for engaging corresponding inward pivot pin projections of the chains, a downward open notch at the other end for engaging inward extensions of other corresponding pivot pins of the chains, and a spring-loaded keeper ball at the downwardly open notch for underreaching the last mentioned pivot pin projections.

7. A marking machine according to claim 3, wherein the marking means includes a pair of offset printing rolls; a pair of underlying transfer rolls contacted respectively by the printing rolls, the transfer rolls having indented characters spaced at intervals corresponding to the spacing of the carriers on the conveyer; reservoir means containing printing fluid into which the transfer rolls dip; means for constantly wiping the surfaces of the transfer rolls clean of printing fluid except for that retained in the indentations; and drive means whereby the several rolls are positively rotated at a peripheral speed corresponding to the linear speed of the conveyer.

8. A marking machine according to claim 6, wherein the offset printing rolls are journalled in the distal ends of arms fulcrumed about fixed axes so that said rolls can be bodily swung upwardly and outwardly out of the way for convenience of access to the transfer rolls.

9. In a machine for marking fragile articles such as round ended capsules, an endless belt conveyor, a hopper for supporting a plurality of said articles in close juxtaposition above said conveyor, means providing an opening in the bottom of said hopper whereby said articles may be deposited onto said conveyor, a multiplicity of grooved carrier elements connected to said conveyor and having longitudinally spaced conformative depressions for snug reception of said articles from above, said grooved elements positively retaining said articles against lateral displacement with opposite lateral sides of the articles exposed and projecting beyond said retaining elements, a pair of rotatable marking elements having yielding contact surfaces for engaging the exposed projecting lateral sides of the articles while in the depressions of the carrier elements to successively mark the articles, and means for moving said surfaces at the same linear speed as the conveyor.

10. The invention according to claim 9, wherein the marking elements are in the form of rubber covered rolls having marking characters peripherally spaced thereon to correspond with the spacing of the depressions of said carrier elements for impressing upon the exposed projecting lateral sides of the capsules in said depressions.

11. The invention according to claim 9, wherein the marking elements are in the form of rubber covered rolls having marking characters peripherally spaced thereon to correspond with the spacing of said depressions for impressing upon the exposed projecting lateral sides of the capsules in said depressions; and further including a gravity feed hopper having an outlet at the bottom inclined from the horizontal for individual release of the capsules into said depressions as the conveyor underpasses the hopper.

12. The invention according to claim 9, wherein the marking elements are in the form of rubber covered rolls having indented marking characters peripherally spaced thereon to correspond with the spacing of said depressions for impressing upon the exposed projecting lateral sides

of the capsules in said depressions; an applicator roll running in peripheral contact with each marking roll; and a supply reservoir for printing fluid in which the applicator roll runs partly submerged.

13. In a machine for marking fragile articles such as capsules, pellets and the like, an endless sprocket chain conveyor having on its links outstanding grooved lugs respectively for snug reception of said capsules from above, said grooved lugs retaining said individual capsules against lateral displacement, with opposite lateral sides of said capsules projecting and exposed beyond said retaining lugs; horizontal axis guide sprocket wheels about which the chain is trained to travel a closed circuit in part inclined from the horizontal and in part substantially vertical; a gravity feed supply hopper for supporting a plurality of said capsules in close juxtaposition above said conveyor and undertravelled by the inclined run of the conveyor, said hopper having an outlet in its bottom for release of individual capsules into the depressions of the respective chain link lugs; a pair of rubber covered offset printing rolls between which the vertical run of the conveyor passes, for impressing identifying characters or symbols upon the exposed lateral sides of the capsules while in the depressions of the lugs on the chain links; and means for driving the rolls at a peripheral speed corresponding to the linear speed of the conveyor.

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