

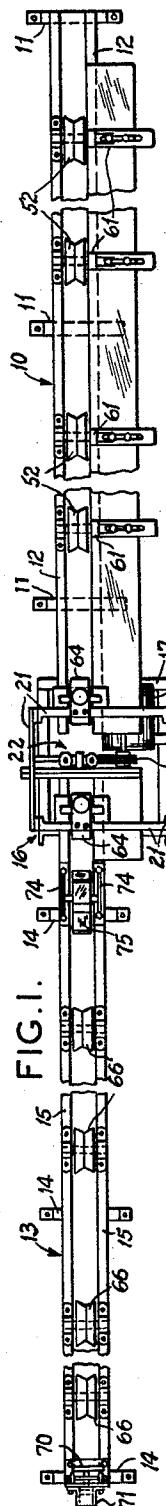
March 26, 1963

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3,082,686

TUBE MARKING MACHINE

Filed June 19, 1959



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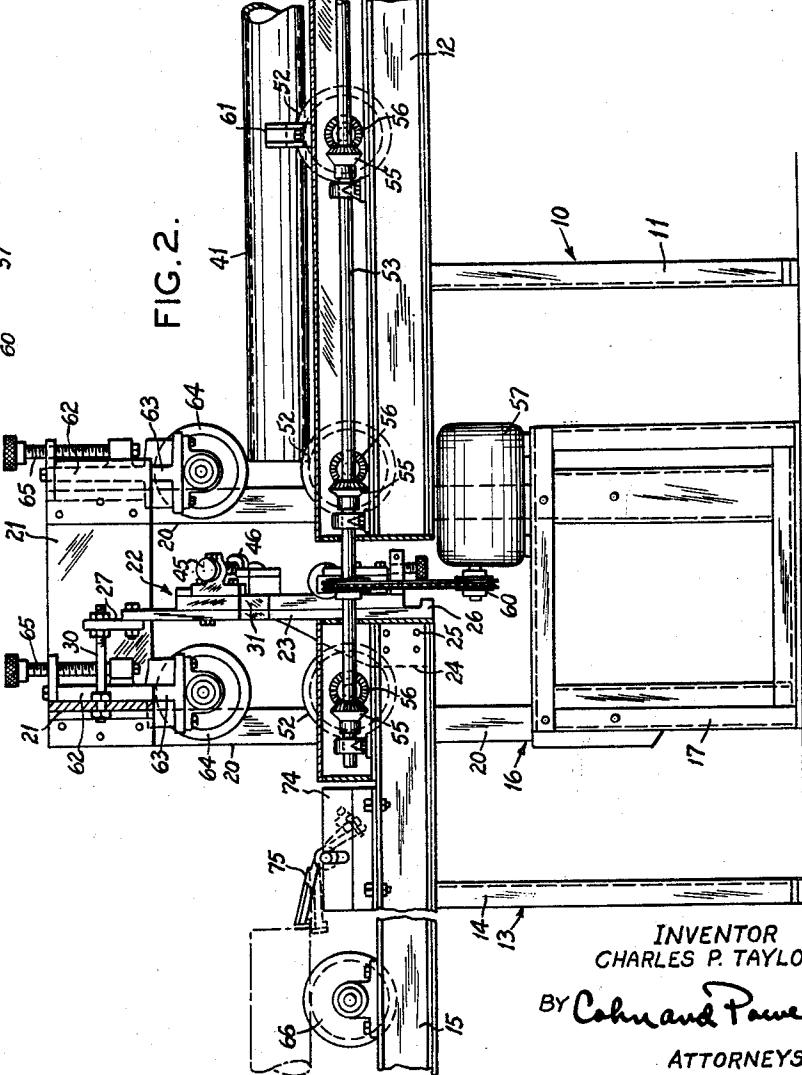


FIG 2

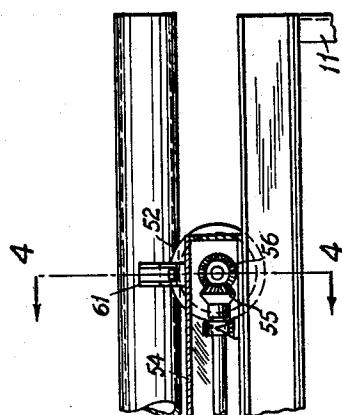
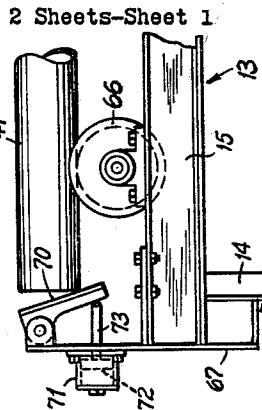


FIG. 3.



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FIG. 4.

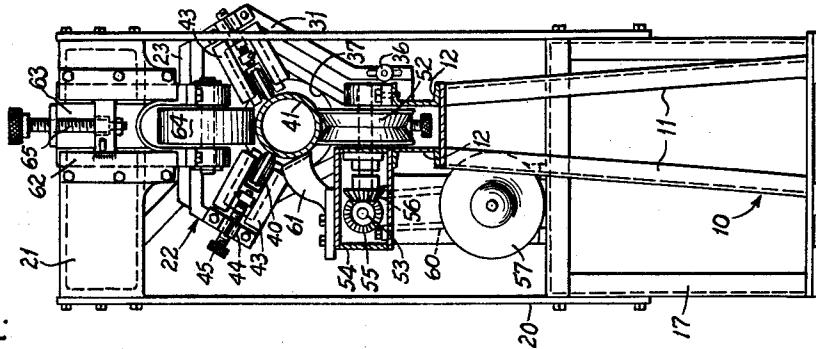


FIG. 5.

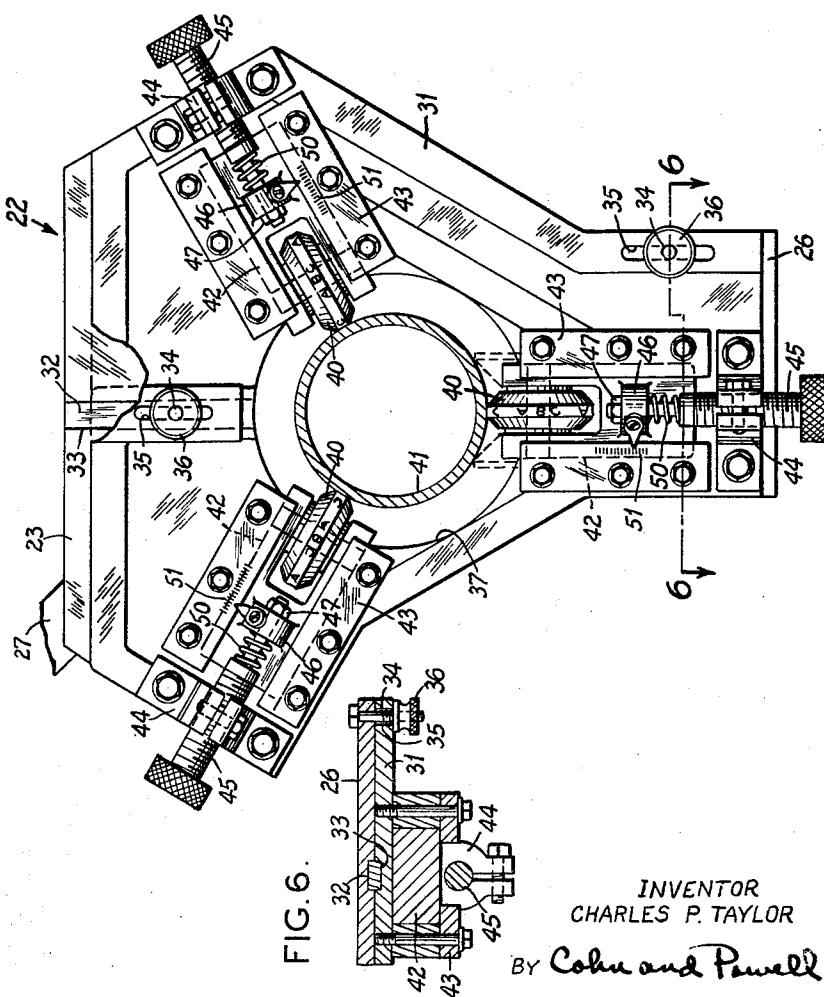


FIG. 6.

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TUBE MARKING MACHINE

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5 Claims. (Cl. 101—37)

This invention relates generally to improvements in a marking machine, and more particularly to an improved 10 device of this type adapted to mark automatically an elongate article such as a tube.

It is an important object of the present invention to provide a tube marking device that is capable of marking automatically a great number of tubes in consecutive 15 order quickly and easily.

An important object is achieved by the provision of an adjustable connection between the plate mounting the marking wheels which enables selective adjustment of the position of the marking zone defined by such wheels 20 and adjustment of an opening through the plate so as to align the zone with the path of travel of the article to be marked as the article is supported and driven by feed rollers.

Another important object is realized by a drive means operatively interconnecting the feed rollers at one side of the marking zone with at least one roller adjacent the opposite discharge side of the marking zone, the drive means causing certain rollers to push an elongate article such as a tube through the marking zone while causing the roller on the discharge side of the marking zone to pull the article through such zone.

Yet another important objective is provided by the provision of a pressure roll at each side of the marking zone in the above described structural arrangement, each pressure roll being disposed above a drive roll immediately adjacent the marking zone and mounted for adjustment toward and away from its coacting drive roller so as to engage the tube therebetween with a predetermined pressure.

Still another important object is afforded by the provision of a plurality of marking wheels, preferably three in the embodiment disclosed, extending equidistantly about the plate opening and extending inwardly to engage the tube as it passes therebetween, the marking wheels providing a definite and confined zone of marking. Other advantages are realized in placing a resilient liner, made of material such as neoprene, on the feed rollers at one side of the marking zone, the liner serving to compensate for any surface irregularities or unevenness in contour of the tube as the tube engages the marking wheels in passing through the marking zone.

Another important object is achieved by mounting the marking wheels on the plate so that the wheels are adjustable into and out of the plate opening so as to adapt the marking zone for tubes of different diameters.

Another important object is realized by the detachable mounting of the marking assembly plate to a fixed positioning member which enables selective substitution of different marking assemblies for various marking purposes.

Other important advantages are realized by the provision of stop means on the discharge side of the marking zone adapted to engage the forward tube end as it is forced out of such zone and adapted to cause seating of the discharged tube on the supporting rollers. A kickback member is mounted on the frame on the discharge side of the marking zone and is adapted to engage the rear tube end after the tube has been discharged from the marking zone and after the forward end has struck the above mentioned stop means, the kickback

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member precluding the tube from reentering the marking zone and hence assuring that the tube will seat on the supporting rollers.

Another important objective is achieved by providing 5 an automatic marking machine that is simple and durable in construction, economical to manufacture, efficient in operation, and which is capable of marking a large quantity of tubes consecutively in a very short period of time.

The foregoing and numerous other objects and advantages of the invention will more clearly appear from the following detailed description of a preferred embodiment, particularly when considered in connection with the accompanying drawings, in which:

FIG. 1 is a top plan view, partially broken away, of the marking machine;

FIG. 2 is a fragmentary, enlarged side elevational view, partially broken away, of the marking machine shown in FIG. 1;

FIG. 3 is an enlarged, fragmentary side elevational view of the left hand end of the machine illustrated in FIG. 1;

FIG. 4 is a view, partially in cross-section, as seen along line 4—4 in FIG. 2;

FIG. 5 is a front elevational view of the marking assembly utilized in the marking machine, and

FIG. 6 is a cross-sectional view of the marking assembly as seen along line 6—6 of FIG. 5.

Referring now by characters of reference to the drawings, it is seen that the marking machine includes a feed support frame generally indicated at 10 having upwardly convergent legs 11 supporting a pair of longitudinal channels 12 arranged in back-to-back parallel relation.

35 A similar type of discharge support frame generally indicated at 13 is aligned end-wise with the feed support frame 10. This discharge support frame 13 includes legs 14 adapted to seat on a supporting subjacent surface such as a floor and adapted to support another pair of longitudinal channels 15 in back-to-back parallel relation similar to the previously mentioned channels 12.

Another frame, generally indicated at 16, is located intermediate the feed support frame 10 and the discharge support frame 13. This so-called pressure frame 45 16 includes a base portion 17 formed substantially as a square box configuration which underlies the adjacent ends of the elongate support frames 10 and 13. It will be noted that the adjacent ends of channels 12 and 15 are spaced apart a short distance, as is best seen in FIG. 2. Further, the pressure frame 16 includes upstanding frame arms 20 interconnected at the top by side braces 21.

55 A marking assembly, generally referred to at 22, is mounted on the pressure frame 16 and located between the support frames 10 and 13. The details of the marking assembly and its mounting is perhaps best shown in FIGS. 2 and 5. It is seen that a position-plate 23 is located between the support frames 10 and 13, the plate 23 including flanges 24 that interfit between and are directly attached to channels 15 by bolts 25. The bottom 60 margin of position-plate 23 is provided with an inturned ledge 26. The position-plate 23 extends upwardly in a vertical position as is best seen in FIG. 2. An arm 27 is attached to the top of position-plate 23 and is connected by bolt 30 to one of the top braces 21 of the pressure frame 16.

65 A marking wheel mounting plate 31 is located contiguous to the position-plate 23. In assembling the mounting plate 31, a vertical key 32 forming a part of the position-plate 23 is located in a conforming keyway slot 33 formed in the rear face of the mounting plate 31. Then, the mounting plate 31 is lowered to seat on the ledge 26.

A pair of bolts 34, best shown in FIG. 5, are carried by the position-plate 23 and extend through vertical slots 35 formed in the mounting plate 31. Knurled nuts 36 are threadedly attached to the bolts 34 and are adapted to secure the mounting plate 31 to position-plate 23. It is seen that the vertical position of the mounting plate can be adjusted vertically as permitted by the movement of key 32 in keyway 33 and by movement of connecting bolts 34 in vertical slots 35.

The mounting plate 31 is provided with a circular opening 37 aligned with a similar type of opening formed in position-plate 23 through which the article to be marked, such as an elongate tube or pipe, is transported and discharged. As will be apparent upon later description of parts, the marking plate 31 with its opening 37 constitutes a marking zone.

Disposed equidistantly about opening 37 are a plurality of marking wheels 40 that extend into the opening 37 so as to engage the periphery of the pipe 41 as the pipe is transported through the marking zone. In the embodiment disclosed, there are three marking wheels 40 arranged in 120 degrees spaced relationship about the opening 37 and the pipe 41.

Each of the marking wheels 40 is rotatively mounted on a carrier block 42 slidably mounted in guideways 43. A threaded split collar 44 is attached to the peripheral margin of mounting plate 31 adjacent each of the guideways 43, the collar 44 being adapted to receive a threaded adjustment bolt 45. The bolt 45 is journaled in a bearing 46 formed as an integral part of slide block 42, and is secured to the bearing 46 by a nut 47. A spring 50 is located about bolt 45 with one end engaging the bearing 46 and the opposite end engaging a shoulder on bolt 45, the spring 50 tending to hold the slide block 42 in its outermost position relative to the bolt 45 yet permitting relative movement under spring loading.

With the above described assembly, each of the marking wheels 40 can be individually adjusted to determine its extension into the opening 37 and to determine its position relative to the other such marking wheels 40. For example, each marking wheel 40 can be moved into and out of the opening 37 by turning the adjustment bolt 45 in one direction or the other. The amount of extension into the opening 37 can be determined visually by the calibrated scale and pointer arrangement 51 provided on each unit. The spacing of marking wheels 40 is selectively adjusted to accommodate a particular size pipe to be fed through the marking zone. The springs 50 of each unit enable the marking wheels 40 to engage the periphery of the pipe moving through the marking zone with a predetermined marking pressure, and in addition, to compensate for any surface irregularity on such pipe 41.

Rotatively mounted on the feed support frame 10 between the channels 15 are a plurality of drive rollers 52 arranged in aligned position longitudinally of such frame. It will be particularly noted that one such drive roller 52 is located on each side of the marking zone. This means that one of the drive rollers 52 is rotatively mounted on the discharge support frame 13 between channels 15. The drive rollers 52 have a V-shape periphery and are provided with a resilient liner about the periphery such liner being composed of a material such as neoprene.

The drive means for the drive rollers 52 includes a drive shaft 53 extending longitudinally along one side of rollers 52 and enclosed by housing 54. As is best seen in FIG. 2, the drive shaft 53 extends across the marking zone to a position adjacent the drive roller 52 on the discharge side of the marking zone. A plurality of bevel gears 55 are drivingly attached to the drive shaft 53, one of such bevel gears 55 engaging a cooperating bevel gear 56 fixed to the rotative shaft of each drive roller 52.

Mounted on the base frame portion 17 is a motor 57 operatively connected to the drive shaft 53 by a sprocket-

chain connection 60. Upon operation of motor 57, the sprocket-chain connection 60 rotates the drive shaft 53 that in turn rotates the drive rollers 52 through the meshing gears 55 and 56.

5 A plurality of positioning arms 61 are bolted to the top of housing 54 and arranged in longitudinally spaced relation along one side of the drive rollers 52. The arms 61 are adapted to engage the elongate tube 41 to assist in retaining it on the rollers 52 and assist in guiding such tube 41 along its path of travel to the marking zone.

10 Secured to the top braces 21 at each end of the pressure frame 16 is a guide structure 62, each of which is adapted to receive a slidable cross-head 63 on which is 15 mounted a rotative pressure roll 64. Attached to each cross-head 63 and threadedly attached to its cooperating guiding means is a screw shaft 65 that can be utilized to adjust the vertical position of the pressure roll 64.

15 As is best seen in FIGS. 1 and 2, one of the vertically 20 adjustable pressure rolls 64 is located immediately above each of the drive rolls 52 located adjacent opposite sides of the marking assembly 22. Upon adjustment of the pressure rolls 64, the distance between such rolls 64 and their coaxing drive rollers 52 can be selectively varied 25 in order to provide a positive drive between each coaxing pair of rollers 52 and roll 64 with the elongate tube 41 moving therebetween. In addition, adjustment of the vertical position of pressure rolls 64 relative to the coaxing drive rollers 52 enables a predetermined frictional 30 pressure with the tube 41.

35 Thus it is seen that the pressure roll 64 and its coaxing drive roller 52 on the feed side of the marking assembly 22, together with the remaining drive rollers 52 on the feed support frame, cause the elongate tube 41 to be driven or pushed into the marking zone defined by plate opening 37, and more particularly by the space 40 between the marking wheels 40. Furthermore, the pressure roll 64 and its coaxing drive roller 52 located on the discharge side of the marking assembly 22 engages the tube 41 and pulls such tube through the marking zone and delivers it onto the discharge support frame.

45 A plurality of idler rollers 66 are rotatively mounted in aligned longitudinal position along the discharge support frame between the spaced channels 15. These rollers 66 are adapted to receive and support the tube 41 as it is discharged from the marking zone. In order to better hold the tube 41, the idler rollers 66 are provided with a V-shape periphery.

50 A stop means is located at the end of the discharge 55 support frame 13, and is best shown in FIG. 3. The stop means include a plate 67 fastened to the legs 14 and to channels 15, the plate extending upwardly above the idler rollers 66. A bumper element 70 is pivotally mounted to the top of plate 67 and is adapted to engage 55 the end of the tube 41 as it is discharged from the marking zone and moved along the idler rollers 66.

56 Mounted on the back of plate 67 is hydraulic cylinder 71 in which a piston 72 is operatively received. A rod 73 attached to the piston 72 extends outwardly through 60 the cylinder 71 and extends through the plate 67 to engage the rear side of bumper plate 70. It is seen that when tube 41 engages the bumper plate 70, movement of the tube 41 is halted. To provide a cushioning action, the piston rod 73 is moved rearwardly under the hydraulic 65 loading of piston 72 in cylinder 71.

66 After the tube 41 is halted upon engagement with the bumper plate 70, check means is provided to preclude re-entry of the opposite end of the tube 41 into the marking zone. This check means includes a bracket 74 secured 70 to channels 15 just beyond the drive roller 52 on the discharge side of the marking assembly 22. Pivotally mounted on bracket 74 is a check arm 75 that has one portion adapted to engage the end of the tube 41 after the tube has passed over the arm and engaged the end bumper plate 70. Another part of arm 75 operates as a counter-

balance tending to move the arm about its pivotal connections so that the other previously mentioned portion is disposed in its operative checking position as illustrated in full lines in FIG. 2.

As the tube 41 moves through the marking zone and onto the idler rollers 66, the tube 41 engages the check arm 75 and pivots it to the lower inoperative position illustrated by broken lines in FIG. 2. After engagement with the bumper plate 70 and after passing over the arm 75, the check arm 75 pivots upwardly to the position illustrated in full lines automatically to abut the tube end and hence prevent rearward movement of the tube back into the marking zone.

It is thought that the operation and functional advantages of the marking machine has become fully apparent from the foregoing detailed description of parts, but for completeness of disclosure it will be noted that the marking wheel mounting plate 31 can be adjusted vertically on position-plate 23 in the manner previously described so as to align the marking zone defined by the space between the marking wheels 40 accurately with the path of travel of the tube 41. In addition, the relative position of the marking wheels 40 is adjusted individually to adapt the marking zone for a particular size tube 41. Then, the relative position of the pressure rolls 64 is adjusted relative to their coating drive rollers 52 in order to provide a positive driving force with the tube 41 moving therebetween.

As the tube 41 moves along the drive rollers 52 it is pushed into the marking zone between marking wheels 40, such wheels rotating to impress indicia onto the surface of the tube 41.

It is seen that the marking wheels 40 provide a relatively restrictive zone through which the tube 41 moves. If there are any surface irregularities or unevenness in contour in pipe 41, there will be a tendency of the marking rollers 40 to move the tube 41 in a direction out of the path defined by the drive rollers 52. However, in view of the resilient liners provided on the drive rollers 52, this tendency is overcome. It is seen that the resilient neoprene liners on the drive rollers 52 will compress to permit such movement of tube 41 within allowable limits.

As the tube 41 moves through the marking zone, the tube is engaged by the pressure roll 64 and its cooperating drive roller 52 located on the discharge side of the marking assembly 22, such structure operating to pull the tube through the marking zone. After marking, the tube 41 is delivered onto the idler rollers 66. The tube 41 engages the bumper plate 70 to halt its movement. Rearward movement of the tube 41 caused by any reaction with the bumper plate 70 is precluded by engagement of the opposite end of the tube with the check arm 75, thus preventing re-entry into the marking zone.

Although the invention has been described by making detailed reference to a single preferred embodiment, such detail is to be understood in an instructive, rather than in any restrictive sense, many variants being possible within the scope of the claims hereunto appended.

I claim as my invention:

1. In a marking machine, an elongate feed support frame, an elongate discharge support frame aligned longitudinally with the feed support frame, a pressure frame intermediate said support frames, a positioning plate attached to the frames and extending upright between said support frames, said positioning plate being provided with an aperture, a marking assembly plate mounted on said positioning plate, a slidable connection between said assembly plate and said positioning plate enabling vertical adjustment of said assembly plate, the plate having an opening therethrough aligned with the said aperture, a plurality of marking wheels mounted on said plate and arranged equidistantly about said opening so as to engage an article moving therethrough, means providing an adjustable mounting for said wheels enabling the distance

between said wheels to be adjusted, a plurality of rollers mounted on each support frame and aligned longitudinally on each side of said assembly plate supporting the article in alignment with said plate opening, a drive shaft extending along the rollers on the feed support frame and extending across the assembly plate to the first roller on the discharge support frame, a drive connection between each of the last said rollers and said drive shaft, power means for rotating said drive shaft, a pressure roll adjustably mounted on said pressure frame on each side of said assembly plate, each pressure roll being movable toward and away from a drive support roller adjacent the assembly plate so as to engage the article therebetween, a resilient liner on each of the drive rollers compensating for surface irregularities in the article upon engagement of the article with the marking wheels, a stop means resiliently mounted on the discharge support frame above the rollers on such frame, said stop means being adapted to engage the forward end of the article as it is discharged through the plate opening and along the wheels on the discharge support frame, and a check member pivotally mounted on the discharge support frame, said check member being pivotally moved out of the path of said article upon engagement with said article as the article passes through the plate opening, said check member being pivotally moved upward to engage the rear end of said article as the article is discharged from the plate opening and strikes the said stop means, said check member precluding re-entry of the article into the plate opening.

2. In a marking machine, an elongate feed support frame, an elongate discharge support frame aligned longitudinally with said feed support frame, a pressure frame intermediate said support frames, a positioning member attached to one of said frames and extending transversely of said support frames in a substantially upright position between said support frames, a plate detachably mounted to said positioning member and extending transversely of said frames, said plate having a center opening therethrough, a plurality of marking wheels mounted on said plate and arranged about said opening so as to engage an article moving therethrough, said wheels providing a restricted zone through which the article moves, a plurality of rollers mounted on each support frame and aligned longitudinally on each side of said plate to support the article in alignment with said opening, means for driving said rollers on the feed support frame so as to feed the article through the opening, and an adjustable connection between said positioning member and said wheel mounting plate adapted to permit adjustment of said center opening in said plate relative to the alignment of said rollers so as to adapt the marking assembly for articles of different sizes.

3. The combination and arrangement of elements as recited above in claim 2 is characterized in that the said marking wheels are spaced equidistantly about said plate opening, and by the provision of means adjustably mounting said wheels on the plate so as to vary the spacing between said wheels adapting the machine for articles of different sizes, and a resilient liner on the drive rollers adapted to laterally embrace and support the article and thereby compensate for surface irregularity in the article upon engagement with the marking wheels in the said restricted zone.

4. In a marking machine, an elongate feed support frame, an elongate discharge support frame aligned longitudinally with the feed support frame, a pressure frame intermediate said support frames, a positioning member attached to one of said frames and extending upright between and transversely of said support frames, a plate detachably mounted to said positioning member and extending transversely of said support frames, said plate having an opening therethrough, a plurality of marking wheels mounted on said plate and arranged about said opening so as to engage an article moving therethrough, a plurality of marking wheels

75 so as to engage an article moving therethrough, a plurality

of rollers mounted on each support frame and aligned longitudinally on each side of said plate to support the article in alignment with said opening, the detachable connection between said plate and said positioning member including a slide connection enabling relative slidable movement of the plate to said positioning member and relative movement to the rollers on the feed support frame, whereby to enable adjustment of the plate opening incident to the alignment of such opening with the last said rollers, and means for driving the rollers on the feed support frame so as to feed the article through the opening.

5. In a marking machine, an elongate feed support frame, an elongate discharge support frame aligned longitudinally with the feed support frame, a pressure frame intermediate said support frames, a positioning plate attached to the frames and extending upright between and transversely of said support frames, said positioning plate being provided with an aperture, a marking assembly plate mounted on said positioning plate, a slide connection between said assembly plate and said positioning plate enabling selective vertical adjustment of said assembly plate, the assembly plate having an opening therethrough aligned with the said aperture, a plurality of marking wheels mounted on said assembly plate and arranged equidistantly about said opening so as to provide a relatively restricted zone through which the article moves and to engage an article moving therethrough, means providing an adjustable mounting for said wheels enabling the distance between said wheels to be adjusted, a plurality of rollers mounted on each support frame and aligned longitudinally on each side of said assembly plate supporting the article in alignment with said plate opening, a drive shaft extending along the rollers on the feed support frame and extending across the assembly plate to the first roller

10 5 on the discharge support frame, a drive connection between each of the last said rollers and said drive shaft, power means rotating said drive shaft, a pressure roll adjustably mounted on said pressure frame on each side of said assembly plate, each pressure roll being movable toward and away from a drive support roller adjacent the assembly plate so as to engage the article therebetween, and a resilient liner on each of the drive rollers adapted to laterally embrace the article and adapted to compensate for surface irregularities in the article upon engagement of the article with the marking wheels which have a tendency to move the article out of the path defined by said drive rollers.

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