Feb. 6, 1968 A. M. BRIDELL 3,367,321

INK HANDLING AND METERING DEVICE

Filed Jan. 3, 1966 3 Sheets-Sheet 1

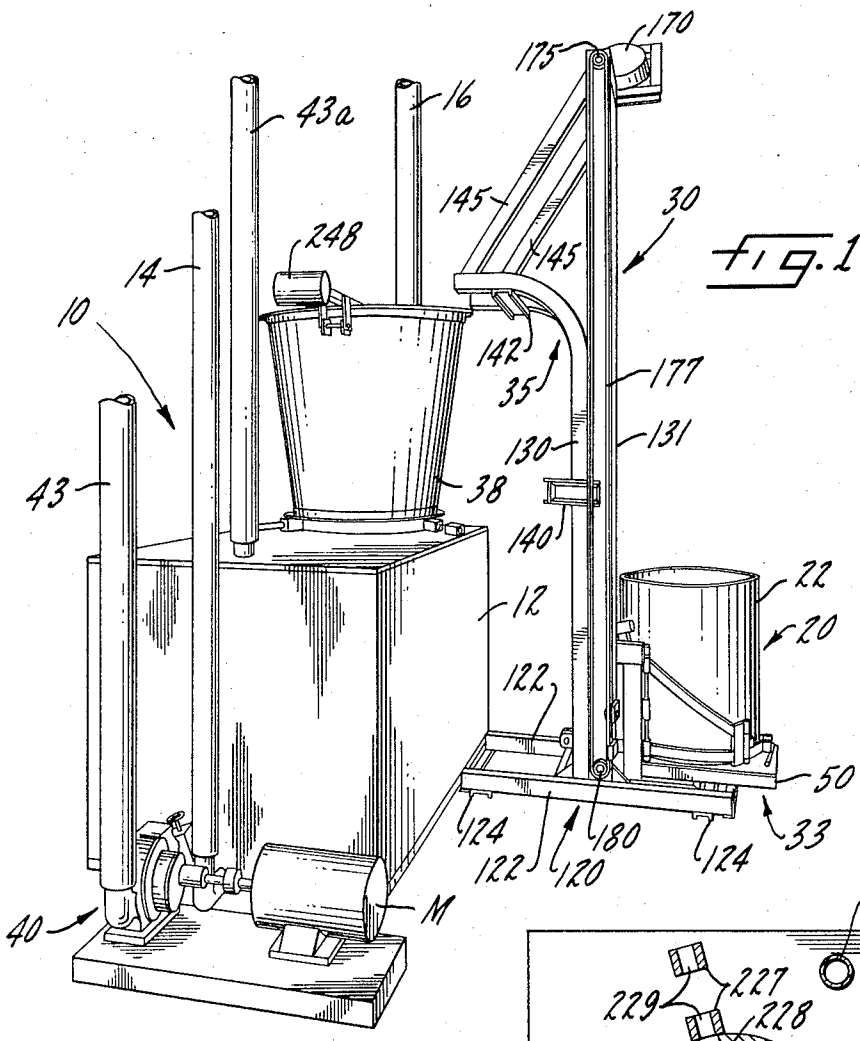

Fig. 1.

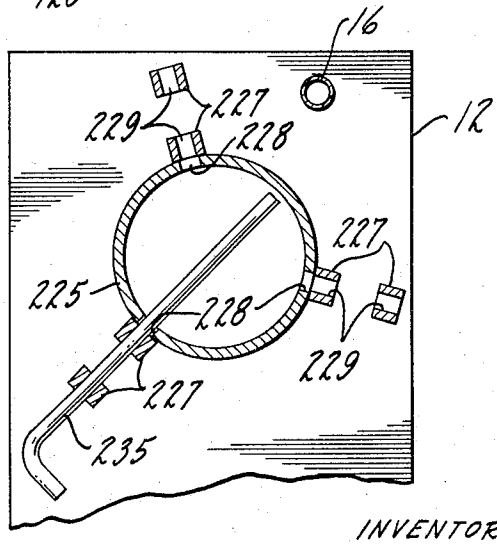

Fig. 3.

INVENTOR.
Albert M. Bridell,
BY
Mann, Brown & McWilliams
ATTORNEYS.

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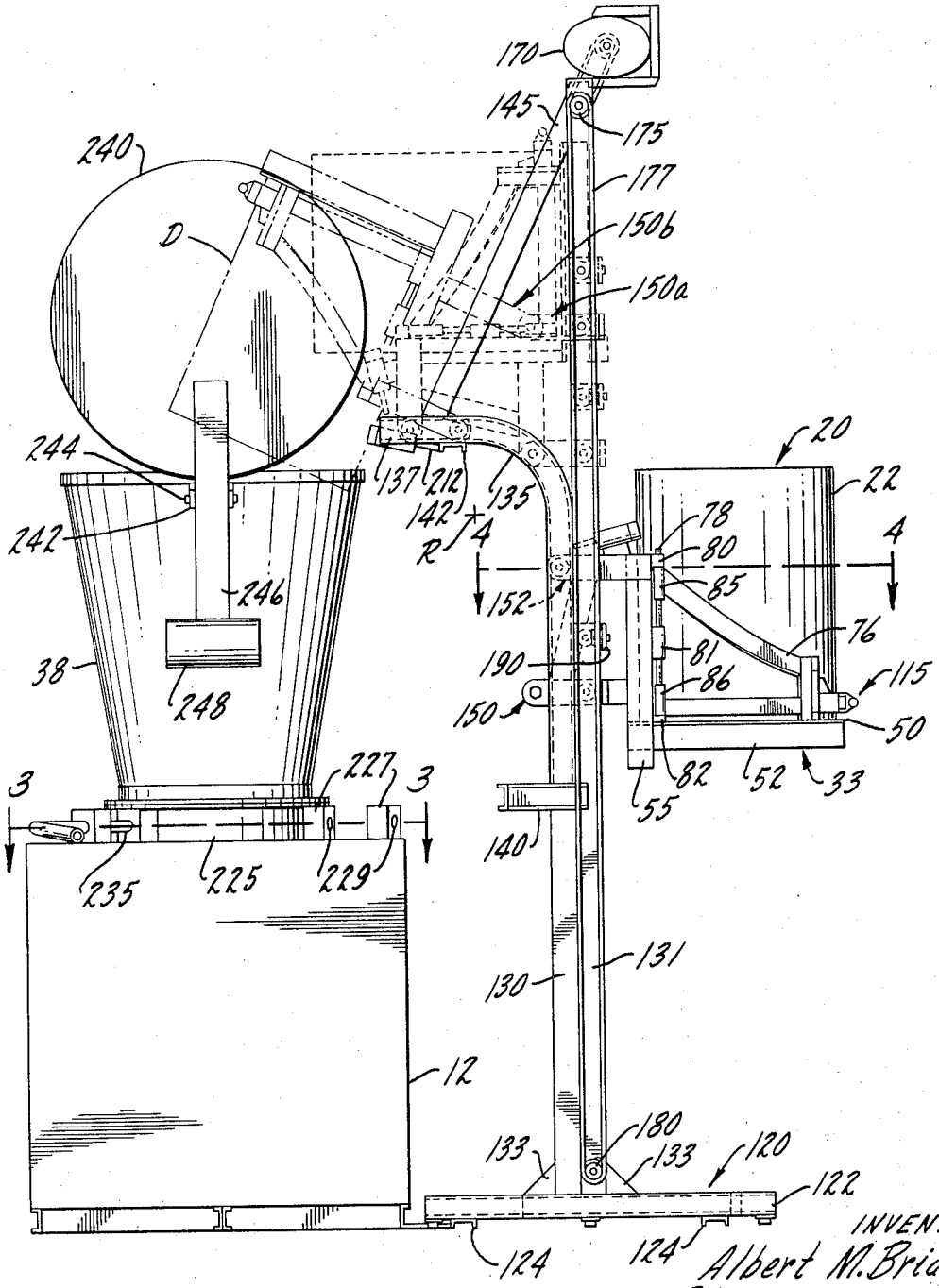

Fig. 2.

INVENTOR.
Albert M. Bridell,
BY
Mann, Brown & McWilliams
ATTORNEYS.

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INK HANDLING AND METERING DEVICE

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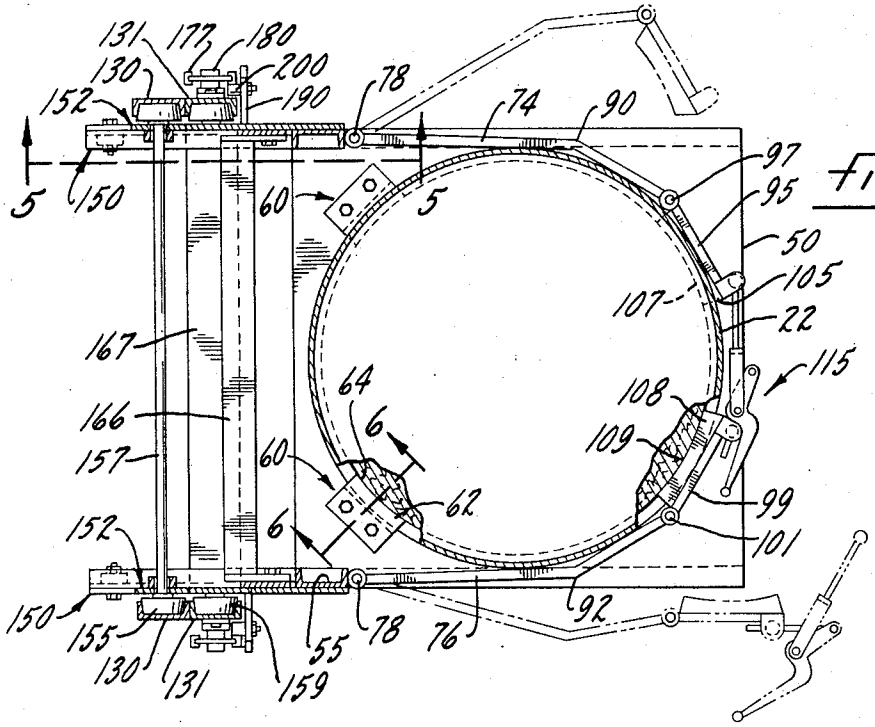

Fig. 4.

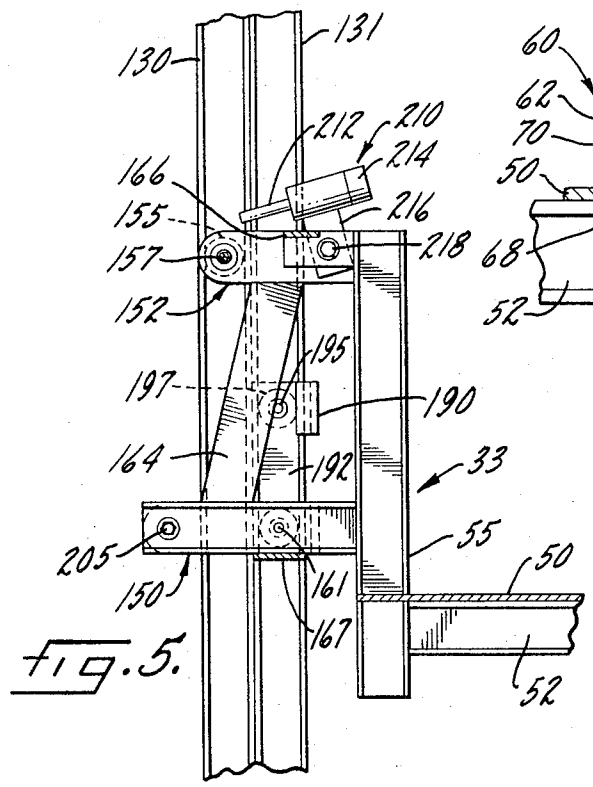

Fig. 5.

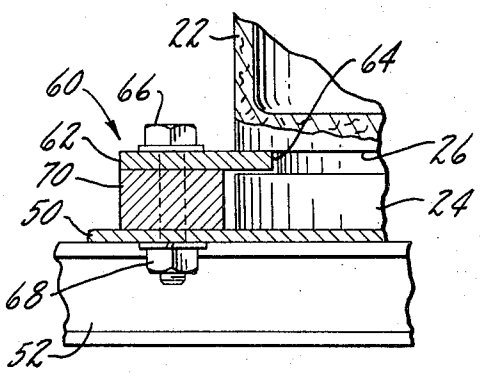

Fig. 6.

INVENTOR.
Albert M. Bridell,
BY
Mann, Brown & McWilliams
ATTORNEYS.

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3,367,321

INK HANDLING AND METERING DEVICE

Albert M. Bridell, 1313 W. Lake St.,
Chicago, Ill. 60607

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7 Claims. (Cl. 126—343.5)

ABSTRACT OF THE DISCLOSURE

A container of solidified material, such as ink, is elevated and dumped into a melting pot by handling mechanism. The material is liquefied in the melting pot and distributed therefrom by a conduit.

The present invention relates to improved apparatus for handling large quantities of ink, or like substance.

Many commercial inks used for printing, or for the preparation of carbon papers and carbonized papers are solid at room temperature, and are necessarily liquified prior to being printed on the backing material desired. In manufacturing the ink, the formula is prepared in a heated pot, and when ready, the ink is poured in liquid form, either into barrels, usually fibrous, or formed into smaller ingots. A typical barrel may be 24 inches in diameter and 3 feet high and would weigh in excess of 300 pounds. Accordingly, it would be very difficult for one man to handle a barrel, and both awkward and difficult for two men to handle. For this reason, the smaller, more easily handled ingots are used.

The solidified ink must be liquified prior to its being used. Accordingly, the press operator, or his assistant, has a steam kettle or the like adjacent his press, and he places chunks of ink in the kettle to be melted down. If ingots are used, whole ingots may be dumped into the kettle, but if a barrel is used, it is necessary to remove the solidified cylinder of ink from the barrel and then break the ink cylinder down into pieces which are small enough to be lifted into the kettle, and accepted thereby, for melting. Even though the workmen may be protected by aprons and gloves, handling of chunks of solidified ink, whether in ingot form or random pieces broken from a cylinder, is a dirty job. Large amounts of waxy dirt are created which adheres to the workmen, machinery, floor and walls of the plant. Such dirt is difficult to clean up, and therefore has a substantial effect on the appearance and efficiency of the plant, and its workmen.

It is, therefore, an objective of the present invention to provide an apparatus for handling large quantities of solidified ink, liquifying the same, and dispensing the same to the presses, in a clean and dirt-free manner. It is another objective of the invention, related to the foregoing, to permit handling of significantly larger quantities of ink, in a man hour, with the ink to be stored, once formulated, in the larger barrels. By permitting storage and handling of ink in the larger barrels, rather than ingots, an additional advantage is achieved in that cost of the ink is reduced by less costly cooling and packaging.

It is still another objective of the present invention to provide apparatus for handling, liquifying, and dispensing inks to the various presses of a multi-press shop so that ink, in liquid form, is immediately available at each press, to maintain uninterrupted press operation and to further permit the elimination of the individual small steam kettles previously required to maintain the ink supply.

These and other objects and advantages of the present invention will appear from the following detailed disclosure, taken in conjunction with the drawings, wherein:

FIG. 1 is a perspective, illustrating the barrel hoist arrangement of the machine;

FIG. 2 is an elevation of the machine of the present invention showing various operative positions;

FIG. 3 is a section on the line 3—3 of FIG. 2 through the throat of the melting pot loading orifice, showing a type of baffle arrangement employed to prevent the splash when the heavy ink cylinder is dumped into the melting pot;

FIG. 4 is a section plan view through FIG. 2 of the barrel clamping arrangement of the present invention, taken along lines 4—4;

FIG. 5 is a section through FIG. 4 taken along lines 5—5; and

FIG. 6 is a section through one of the clamping shoes of the barrel hoist clamp of FIG. 4, taken along lines 6—6 thereof.

While the invention is susceptible of various modifications and alternative constructions, certain illustrative embodiments have been shown in the drawings and will be described below in considerable detail. It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but, on the contrary, the intention is to cover all modifications, alternative constructions and equivalents falling within the spirit and scope of the invention as expressed in the appended claims.

Reference will first be made to FIGURE 1 wherein the apparatus as a whole, is illustrated. Accordingly, the apparatus has been identified by the character **10**, and comprises a melting pot **12**, of any suitable capacity, which is here shown as a generally rectangular box-like structure. It will be understood, however, that the specific shape of the melting pot is significant only in terms of the space available for such a device, and therefore, any suitable construction will be usable without departure from the invention.

The melting pot or kettle **12** is heated by any suitable heat source, and therefore well insulated from the rest of the room in which it is placed, both for the sake of efficiency, and for the comfort of the men who must work in proximity to it. Because steam is readily available in many plants which work with ink or like products, the kettle **12** may be steam jacketed or steam coiled, and live steam from a boiler (not shown) may be fed directly into the pot **12** through an asbestos covered pipe **14**. At this point, it will be understood that steam is not fed directly into the chamber containing the ink solids, but about the same. It is the character of the ink that, upon heating, it will liquify without the addition of water or other solutions. Accordingly, live steam, through pipe **14**, is fed beneath the pot, and is returned to the boiler through a return line **16**.

The problem of handling the relatively heavy ink solids is, in keeping with the invention, obviated, and, as stated, ink may be readily handled in the larger barrels, rather than the smaller ingots. A typical barrel **20** is shown, such as those used in the industry, and comprises a cylinder **22** of fibrous material. The base of the barrel, as may be seen in FIGURE 6, has a metal ring **24** thereabout to maintain the bottom of the barrel in place with the cylindrical side walls **22**. Manufacture of the ring and placement thereof results in the provision of a recess ring **26** near the bottom thereof, and the present invention takes advantage of the presence of this ring, as will hereinafter be described.

Again referring to FIGURE 1, a novel powered barrel hoist indicated generally at **30** is provided, having a carriage **33** driven on a track indicated generally at **35** between the position seen in FIGURE 1, and a dump position as illustrated in FIGURE 2.

The top of the hoist is disposed adjacent a funnel **38** extending upwardly about the opening into the melting

pot **12**. Ink from the barrel is discharged into the funnel **38**, and thence to the melting pot where it is liquified.

Distribution of the liquified ink from the pot **12**, is efficiently handled by a suitable pump **40** driven by a motor M. The pump draws liquified ink from the pot **12**, and feeds the same through a manifold pipe **43**, having a suitable insulation jacket thereon, to maintain the ink in a liquid state, to the various presses (not shown) being operated. While presses have not been specifically shown, it will be readily apparent that ink from the distribution manifold could be piped directly to the pan containing the ink on the press, and could even be automatically dispensed by using a suitable float valve arrangement which would maintain the level of the ink in the pan automatically. The excess ink pumped through the manifold **43** circulates past the presses and returns to pot **12** through manifold **43A**. This provides an agitating benefit to such inks as require it.

HANDLING OF INK SOLIDS—SECURING THE BARREL TO THE CARRIAGE

The specifics of the construction of the barrel **20** have been set out hereinabove, and because of the weight of the barrel when full of ink solids, actual manual handling of the barrel is, in accordance with the present invention, minimized. Accordingly, the carriage **33** includes a platform **50** which is disposed sufficiently close to the ground or floor of the shop that a barrel **20** may be readily rolled onto it with a minimum of manual effort, and by one man. The platform **50** may be of wood or metal, and is sufficiently large to receive the barrel, as indicated in FIGURE 4. Struts **52** of I-beam construction support the floor **50** with respect to the carriage frame member **55**, in the exemplary device shown.

Since the ink was poured into the barrel in liquid form, it assumes the shape and volume of the barrel. Accordingly, if the barrels are to be quickly emptied, without breaking up the solidified ink first, the barrel can not be gripped about the waist, for by doing so, sufficient squeeze pressure will be applied to the fibrous barrel, to inhibit sliding of the solid ink cylinder from the barrel when the same is tipped upside down as seen in FIGURE 2. Accordingly, a bottom clamping arrangement, which takes advantage of the bottom construction of the barrel itself, is employed.

Referring to FIGURES 5 and 6, a pair of positioning feet indicated generally at **60** are provided towards the rear of the platform and are disposed at a radial distance from the center, or some other convenient point on the platform, approximating the radius of the barrel used. Each foot comprises a toe plate **62** having an arcuate barrel engaging face **64** (FIGURE 4). The toe plate is fastened to the floor **50** of the platform by means of bolts **66** passing through apertures in the toe plates, and aligned apertures in the floor. A nut **68** is tightened on the threaded end of the bolt to secure the same. A spacer **70** is provided to raise the toe plate to the height of the recess **26** in the barrel rim **24**. Thus, when the barrel is rolled onto the platform **50**, it may readily be moved against the two rear locating feet and the toe plate will engage the recess and secure the rear of the barrel to the platform.

The remainder of the barrel is secured by means of a pair of elongated clamping arms, thus seen in FIGURES 2 and 4, indicated at **74** and **76**, which encircle the lower rim of the barrel to secure the same completely to the platform.

The clamping arms are hinged on vertically disposed hinge pins **78** which are housed in bosses **80**, **81** and **82** extending outwardly from the vertical carriage frame member **55** on either side of the carriage platform. Each arm is formed with hinged sections **85** and **86** which receive the hinge pins **78** to secure the clamp arms thereto.

In order that the clamp arms might fit snugly about the circular barrel, the arms are each bent as at **90** on the arm **74** and **92** on the arm **76**. For the same purpose, the arms are sectioned, arms **74** having a section **95** which is hinged by means of pin **97** to the forward end of the arm, and the arm **76** is sectioned, providing a clamp section **99** hinged by means of pin **101** to the forward end of the clamp arm **76**.

Further in keeping with the invention, each of the sections **95** and **99** are formed with a radially inwardly extending toe plate. The toe plate **105** on section **95** is formed with an arcuate forward edge **107**, and in a like manner, the toe plate **108** on the section **99** has an arcuate face **109**.

Where the clamping sections encircle the barrel, the toe plates extend into and engage the recess **26** in the rim **24** of the barrel to hold the same in position.

The specific clamp lock arrangement, may be of any suitable type, and that illustrated is but one of the various arrangements which has been found to be satisfactory. Therefore, a clamp lock arrangement is designated generally at **115**, and will not be described in detail. It is only necessary, in preservation of the objectives of the invention, that the clamp lock arrangement barrel holding and toe plate arrangement be easily manipulated and be sufficiently strong to maintain tight clamping engagement of the rim of the barrel.

HOISTING AND DUMPING OF THE INK CYLINDER

Having thus provided for the securing of the barrel to the platform, the hoist **30** in accordance with the invention, elevates the carriage and guides the same smoothly to the dump position directly above the funnel **38**. The hoist and associated carriage are supported on a base **120** which may comprise a suitable number of rigid steel beams **122** and cross supports **124**. It will be understood that casters may be placed on the cross supports or members **122** to permit the hoist arrangement to be moved from one melting pot to another or for any other purpose. To exemplify the invention, however, such mobility is not specifically provided for.

For the purposes of guiding the carriage through the necessary dumping motion, a pair of elongated channel members **130** and **131** extend upwardly from the base **120**, where they are secured by suitable braces **133**. The members **130** and **131** may be readily fabricated from a pair of channel beams having the desired width between flanges thereof. Alternatively, a single member having an intermediate wall to define a pair of channels would be operable.

The channel members **130** and **131** define guideways for the elevator or carriage **33**. In order that the proper dumping motion of the carriage may be accomplished with the greatest possible facility, one of the channel members, in this case, the channel member **131** extends vertically upwardly to a height conveniently above the top of the funnel **38**. The second channel member, which is immediately adjacent the channel **131** is formed with a smooth curved section **135**, having any suitable radius described from a point R, in this instance located just below the top of the funnel **38** so that at the end of the curved section, there is a short straight terminal section **137** extending toward the funnel at a height conveniently above the top thereof.

Suitable cross supports provide rigidity between the channel members on either side of the hoist. A cross member **140** extends inwardly from the channel members to provide for clearance of the carriage as it moves upwardly. The cross member **142** on the other hand extends directly across the short straight section **137** and a pair of buttress arms **145** (FIGURE 1) extend between the terminal ends of the channel guide members **130** and the top of the channel guide members **131**.

Referring particularly to FIGURES 4 and 5, the carriage frame members or posts **55**, are each formed with a pair of inwardly extending radius arms **150** and **152**. These radius arms engage the tracks or guide channels

130 and 131 so that movement of the carriage is confined to the desired movement along the tracks provided.

Since, in accordance with the present invention, the barrel is to be dumped upside down to expel the contents thereof into the funnel 38, the leading edge of the carriage or elevator is brought into close proximity with the opened edge of the funnel whereas the bottom portion of the carriage, which clamps to the bottom rim of the barrel, is raised well above the funnel with the consequent tipping and inverting of the barrel above the funnel opening. To this end, the leading or top edge of the carriage adjacent the open end of the barrel is engaged, by means of the radius arm 152, with the inner, curved track 130. This is accomplished by means of suitable cam guide rollers (see FIG. 4) 155 mounted in bearing relation on an axle 157 which, in this instance, extends between the radius arms 152 on either side of the hoist.

In a like manner, the lower radius arms 150 engage the track 131 by means of rollers 159 mounted on a stub axle 161 secured in the radius arm. In order to maintain greatest possible rigidity between the radius arms 150 and 152 on either side of the hoist a brace 164 is provided between the two. Additional lateral support is provided by a pair of transverse braces 166 and 167 between the parallel upper and lower radius arms respectively. It is presumed that adequate bracing in accordance with the anticipated load be handled by the elevator may be readily applied by those skilled in the art.

The hoist, in this exemplary case, is powered by any suitable motor such as electric motor 170, disposed, for convenience, at the top of the vertical track 131 on a cross member which connects the track elements. The motor rotates a drive gear 175 through an appropriate reduction transmission, and an elongated chain 177 extends between the gear 175 and an idler gear 180 at the bottom of the channel support. Again it will be appreciated that drive gears 175 are disposed on either side of the hoist so as to provide even force to the carriage. The carriage in accordance with the invention, is connected directly to a link of the drive chain means of an L-shaped bracket 190.

The bracket 190 is disposed above the radius arm 150 and is connected thereto by a link 192. The bracket carries an axle 195 which also mounts a roller 197 to provide additional guiding support for the bracket 190. This bracket extends about the free edge of the channel member 131 where it engages, by means of a rigid link 200, the chain 177.

Further in keeping with the invention, in order to provide the necessary freedom to the carriage to move through the various positions shown in FIGURE 2, the radius arm 150 is of two part construction. This is best seen in FIGURE 2 with the barrel in the dump position. Thus, the outer, shorter link 150*a* directly engages the axle 161, and at the end thereof closest to the melting pot, is pivotally engaged to the longer link 150*b* by means of a suitable bolt 205. This arrangement permits limited movement of the link 150*b*, which is attached directly to the vertical frame member 155, so as to permit the platform to be tipped into the position shown in phantom in FIGURE 2.

Again referring to FIGURE 2, once a filled barrel is clamped on the platform 50, the motor 170 is actuated to lift the platform. Accordingly, the platform rises, guided on the channel members, and as the leading radius arm 152 reaches the curved section 135, the rollers 155 cause it to follow the curvature. At the same time, the radius link 150*a* is guided vertically in the channel 131. As a consequence, the link 150*b* is caused to rotate about the pivot pin 205 and the platform swings upwardly about the axle 157. As power is continued to be applied, the link 150*a* continues upwardly because it is driven directly by the chain. When the lead radius arm 152, on the other hand, reaches a point approximating that shown with the barrel in the position D as indicated in FIGURE 2, it receives substantially no force urging it along the channel, and the action of the barrel is then almost entirely pivotal motion about the axle 157.

Further in keeping with the invention, and referring specifically to FIGURES 2 and 5, there is provided a stop element indicated generally at 210 comprising a stop pin 212 mounted in an adjustable collar 214. The stop is secured in the desired position by means of a clamp element 216 which is bolted as at 218 to the cross memebr 166 extending between the parallel radius arms 152.

As seen in FIGURE 2, when the barrel is in the position D as indicated, the stop pin 212 abuts the cross support 142.

By connecting a circuit breaker switch into the collar 214, and connecting the same to the motor control, the pin 212 may be used to trip the switch thereby shutting off power or reversing power or both when the barrel reaches the dump position as indicated. The switch is then by-passed to reverse the process and lower the barrel to the position shown in FIGURE 1. Alternatively, stop pins on the chains may be used, or a combination of both is possible.

As mentioned, because the barrel is gripped at the bottom, the ink will, after removing any existing impediment at the top thereof, slide from the barrel as a cylinder and into the hopper or funnel 38. Because, however, the ink is extremely heavy, and because the hopper is necessarily open when the ink is received, there is provided, in accordance with the present invention, an inhibitor or baffle arrangement which is effective to prevent the heavy ink cylinder from splashing into the partially filled melting pot. The absence of such a baffle might well cause liquid ink to be splattered in a wide radius about the machine.

Accordingly, in referring to FIGURE 3, there is provided an intermediate collar 225 to which the funnel 38 is mounted, and which, itself, is disposed upon the top of the melting pot, about the opening therein. The pot is provided with a plurality of bosses 227 adjacent a hole 228 in the collar, and having an aperture 229 in each.

In order to inhibit splash of the solid ink cylinder into the melting pot, a relatively heavy rod 235 is inserted through the apertures 228, spanning the opening in the collar, so that the ink cylinder will crash against, and rest on the rod 235, in its path. The ink cylinder is thus held above the rod and in the funnel area. The size of the cylinder is such, with respect to the opening in the funnel, that any small pieces of solid ink falling into the pot will not cause an appreciable amount of splash, and the danger of dirtying the immediate area of the melting pot is eliminated.

Because the funnel or hopper 38 is sufficiently deep to encompass all of the ink cylinder, the top portion or lid 240 which is pivotally mounted to a bracket 242 by means of a pivot pin 244, may be closed. It will be noted that an elongated stem 246 is provided on the cover, and a counterweight 248 is disposed at the end of the stem. This facilitates opening of the hopper or funnel from a position within the reach of the operator. Once the lid is closed, the rod is removed to permit entry of the ink cylinder into the pot.

The present invention has been described in considerable detail with respect to utility in the field of ink handling. It is contemplated, however, that the handling of products having comparable physical characteristics might be accomplished without departure from the invention.

I claim as my invention:

1. A hoist for dumping the contents of a container into an elevated opening comprising a pair of vertically disposed parallel guides, each of said guides comprising a pair of guideway sections, one of said guideway sections being curved near the upper end thereof and toward said opening, a carriage for the container, comprising a platform and a support therefor, said platform having means thereon for securing the base of the container thereto,

upper and lower guide arms extending from said support, each being slidably engaged in one of said guideways, said upper guide arm being engaged with said guideway having the curved portion at the top thereof, said lower guide arm comprising a pair of links, one said link being attached to said support and said second link being pivotally engaged with said first link, and an end thereof being slidably engaged with the other said guideway, so that as said carriage is raised said platform is inverted at a predetermined position on said guideways above the elevated opening.

2. The apparatus as set forth in claim 1 wherein the said link attached to said support extends outwardly beyond said guideways, and said second link is slidably engaged with a guideway which extends vertically above the curved portion of said other guideway.

3. A hoist as set forth in claim 1 wherein said tracks comprise adjacent channel members, rollers mounted on said guide arms and disposed for movement in said guideways, an endless chain extending the length of one of said straight guides, a motor for driving said chain, and said lower arm being connected with said chain.

4. A hoist as set forth in claim 1 wherein said carriage has a clamp thereon for gripping the container at the bottom thereof, said clamp comprising a pair of arms adapted to encircle said container, said arms and clamp having inwardly extending toes for engaging the base of said container, and a toe plate fixed to said platform adapted to engage the base of said container and position the same on said platform.

5. Apparatus for handling and liquifying quantities of solidified ink or the like stored in barrels comprising a hoist, said hoist having a platform and a pair of parallel guides for guiding the movement thereof, the barrel being

clamped to said platform, upper and lower guide arms extending from said platform and engaged in said guides, the lower of said guide arms comprising a pair of links, one of said links being rigidly connected with said platform, and the other being slidably engaged in one of said guides, said links being pivotally attached to each other, a melting pot adjacent said hoist, having an opening therein, drive means for raising said platform on said track and inverting the same at the opening of said pot, for dumping the solidified contents of said barrel into said melting pot, and conduit for distributing the contents of said melting pot.

6. Apparatus as set forth in claim 5 wherein said melting pot is provided with a funnel extending upwardly therefrom, and inhibitor means disposed adjacent said opening and extending thereacross.

7. Apparatus as set forth in claim 6 wherein said inhibitor comprises a bar slidably mounted in said funnel and selectively positionable across said opening, and a lid on said funnel for closing the same at the top.

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HUGO O. SCHULZ, *Primary Examiner.*