

Sept. 21, 1926.

E. S. LEA

1,600,286

METHOD OF MANUFACTURING POTTERY WARE

Filed Nov. 12, 1924

3 Sheets-Sheet 1

Fig. 1.

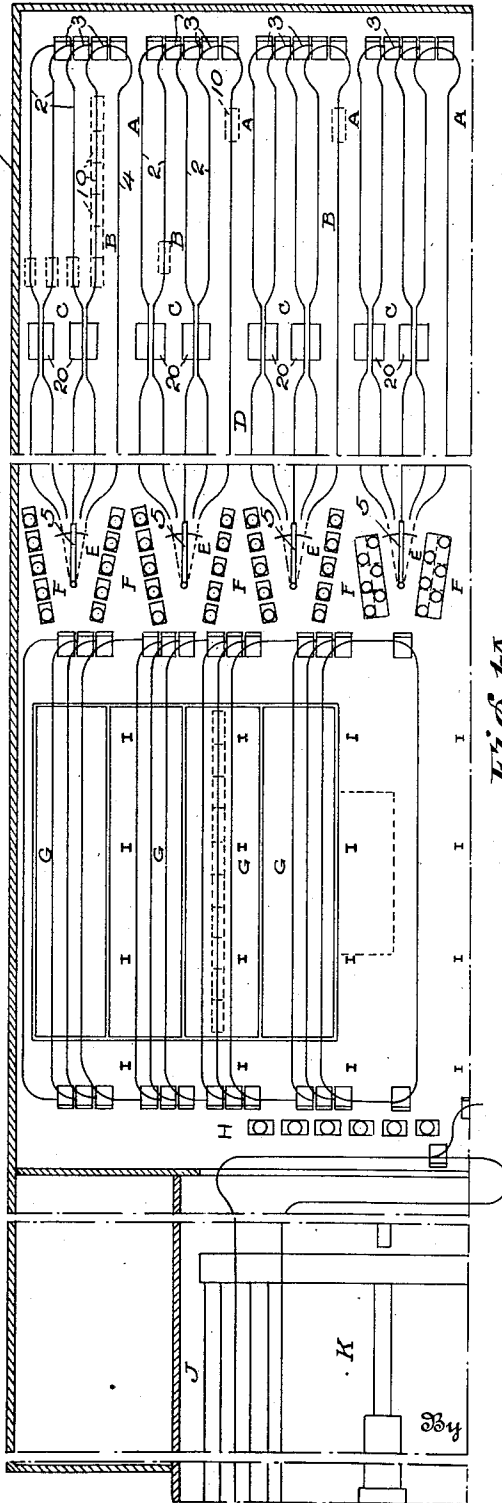
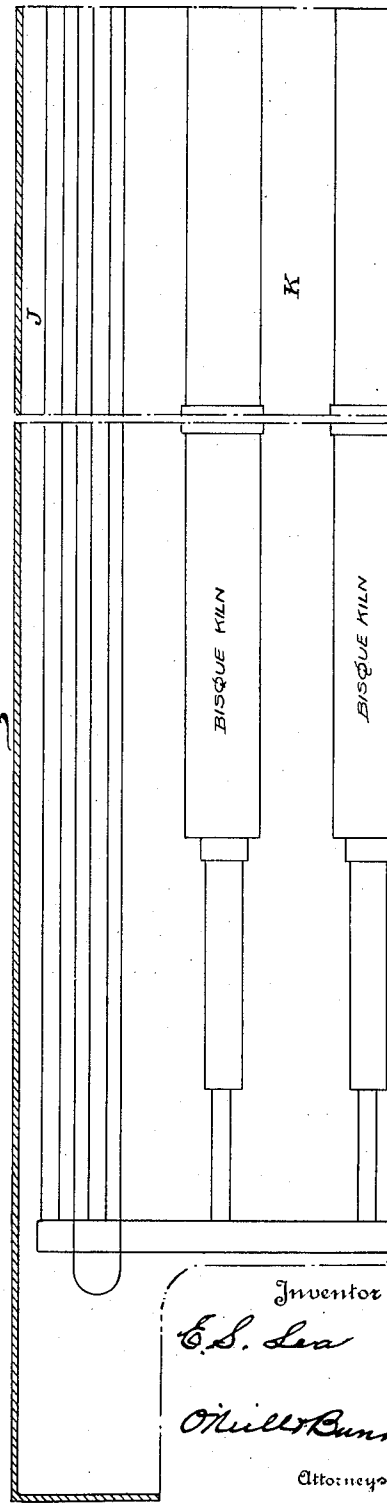


Fig. 1A.



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Fig. 2.

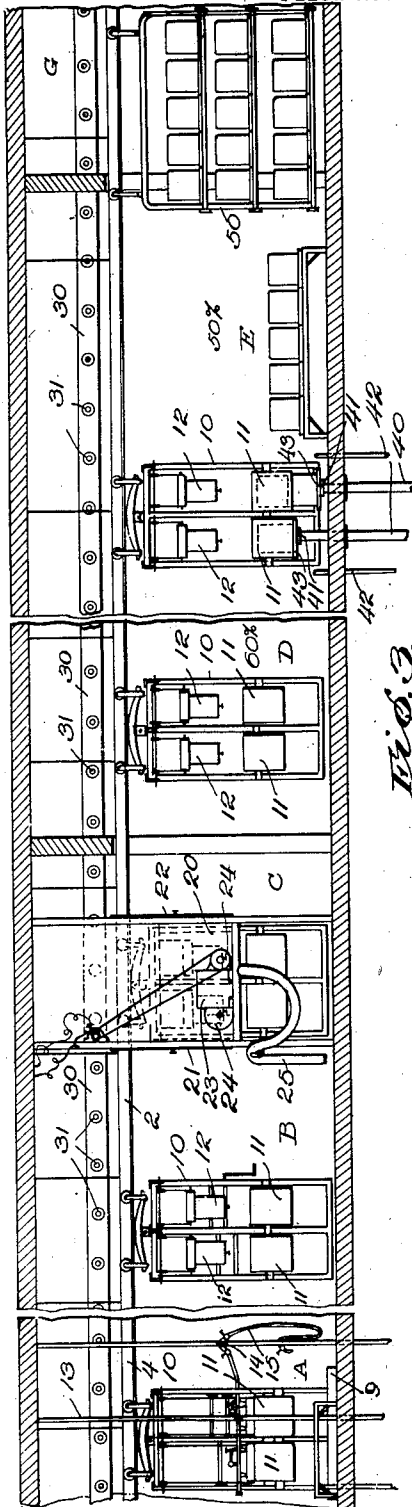
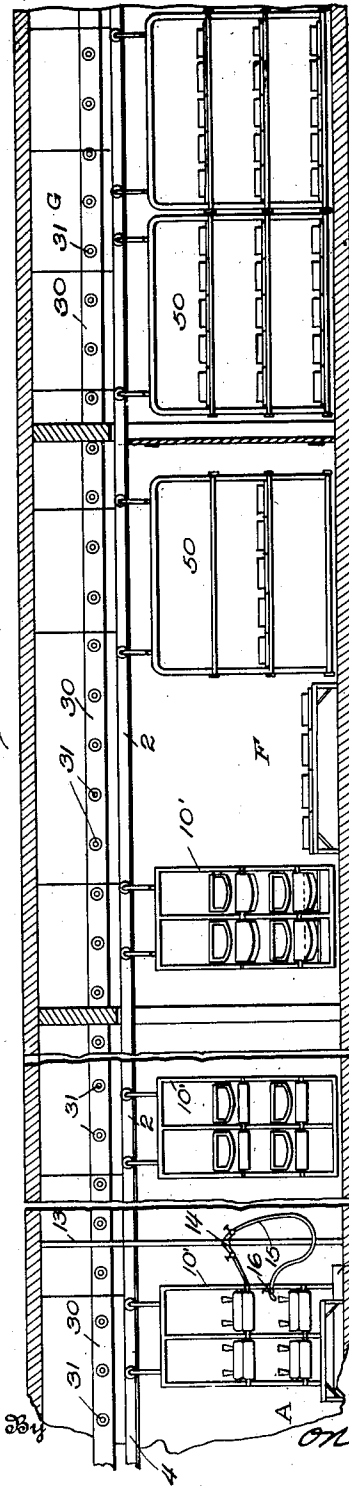


Fig. 3.



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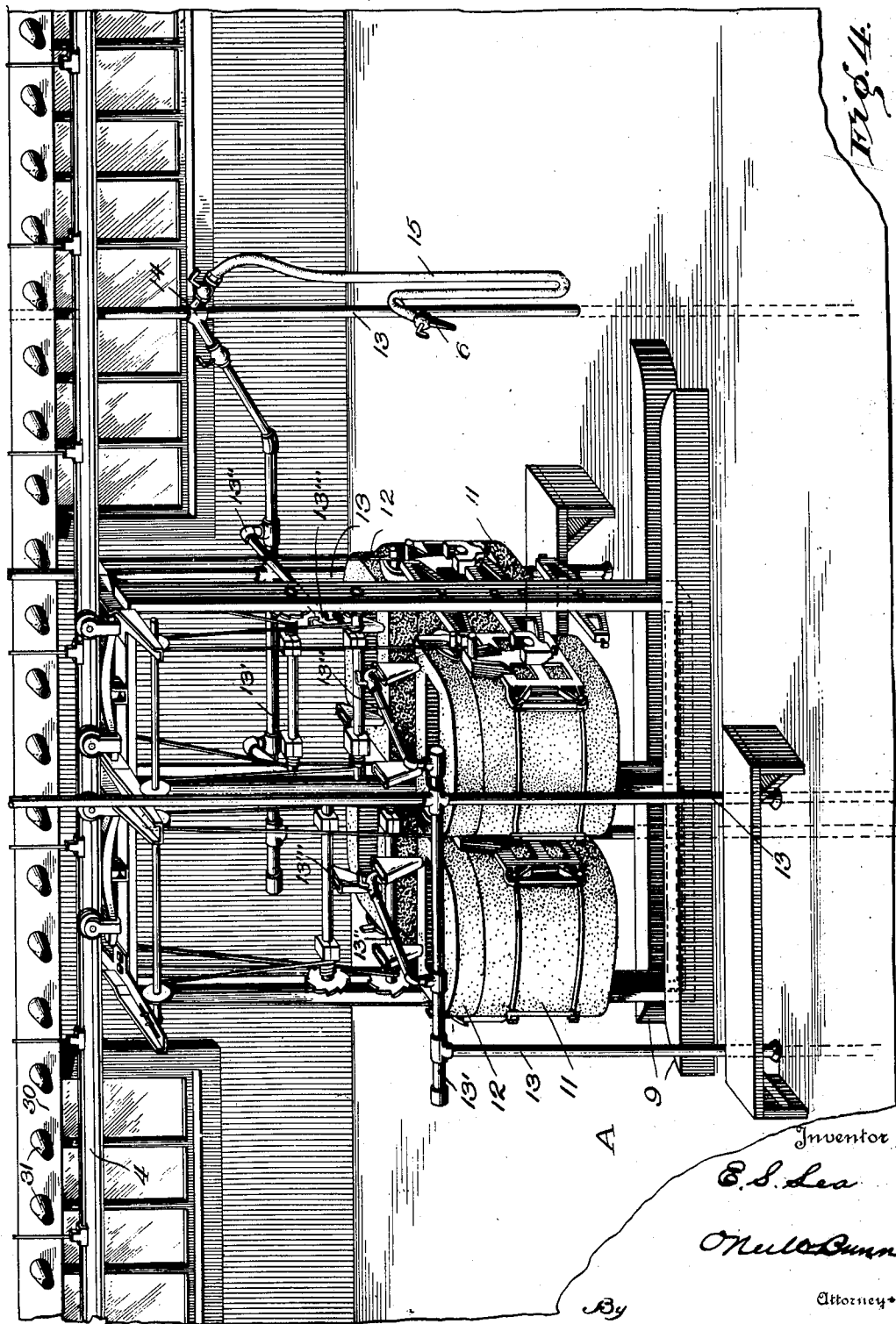
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE.

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METHOD OF MANUFACTURING POTTERY WARE.

Application filed November 12, 1924. Serial No. 749,490.

The invention relates to a novel method for fabricating pottery ware, especially relatively large pieces of sanitary ware, by casting the clay in the form of slip in standard molds, made of plaster of Paris or similar absorptive material, the molds and their accessories being permanently mounted upon trucks operating on continuous trackways, so that the sequential operations of pouring the slip, preliminarily drying the castings, pulling the cores, dusting the cores, partially drying the castings to permit them to be dumped and prepared for the final drying, may be carried out under conditions, insuring the uniform setting up of the slip and the formation of sound homogeneous castings, with a maximum saving of time and labor and a minimum loss of ware due to imperfections produced by or resulting from the former modes of assembling the molds, charging the slip therein, pulling the cores and conditioning the castings for dumping, the instant invention providing a series of simplified operations, that may be carried out by unskilled labor, with the molds and their accessories mounted in proper relative arrangement on the trucks, and the proper atmospheric conditions of temperature and humidity being maintained throughout the various sections of the plant where the sequential operations aforesaid are performed, as will be particularly described in the following specification, reference being had to the accompanying drawings, in which:

Figs. 1 and 1^A present a plan view of a plant equipped with apparatus for carrying out the various operations constituting the new method.

Fig. 2 is a vertical longitudinal section of the plant aforesaid, the sectional view being indicated as broken at various intervals to avoid unnecessary multiplication of identical devices.

Fig. 3 is a view similar to that shown in Fig. 2, involving the employment of apparatus for casting and conditioning another type of ware, the latter being shown as covers for the tanks fabricated in the apparatus shown in Fig. 2.

Fig. 4 is a perspective view of the slip pouring or casting section showing a special form of truck equipped with molds and accessories for casting the bodies of flush tanks.

In the manufacture of pottery ware, more especially heavy pieces of sanitary ware, by the casting process, as heretofore practiced, the clay in the form of slip is poured into molds made of plaster of Paris or similar porous material, the elements of the molds being assembled by hand, clamped firmly together and all of the subsequent operations, including the pouring of the slip, the preliminary drying of the castings to permit the pulling of the cores, the secondary drying preparatory to dumping the cast pieces from the molds, as well as the reconditioning of the elements of the molds to supply the latter with the requisite moisture for the next casting operation, have been largely matters of individual judgment and skill on the part of the workman, involving hard manual labor and great uncertainty as to the correctness of atmospheric conditions to effect satisfactory results, so that, as a matter of practical experience, a large proportion of the losses in the product may be directly attributed to the conditions and limitations incident to the old hand operations, and the lack of facilities for fixing and determining the moisture content of the molds when the slip is poured, of the castings when the cores are drawn and of the rooms or sections in which the secondary drying and reworking of the ware are effected. If, for example, the mold sections do not contain the proper amount of moisture uniformly distributed throughout the sections thereof, defective castings are inevitable, and, as the uniform humidification of the mold parts is largely dependent on atmospheric conditions in the various parts of the plant where the molds are employed, it is obvious that, unless proper conditions of humidity are maintained in all such parts or sections of the plant, the molds and cores will either gain or lose moisture continuously, thereby adversely affecting the desired uniform moisture control of the molds, requiring the latter to be either partially dried by artificial means in the one case, or to be rewet in the other case, both operations requiring the molds to be left idle for the time sufficient to effect the drying, or to insure the uniform distribution of the added moisture throughout the body of each mold part. If the mold is too dry, or relatively dry in spots, the casting dries too rapidly on the

- surfaces immediately in contact with the dry portions of the mold, thereby forming a hard shell on the casting, which, on account of the heavy shrinkage of the casting, will cause the sides of the latter to pull away from the relatively moist center, producing "piping" in the casting. Should the mold be too wet, the casting "balls" or separates along lines of horizontal cleavage.
- 10 In both cases, the castings are defective, the defects usually appearing only after the ware is fired, thereby entailing an additional loss of time, labor and expense incident to the preparation and firing of the defective
- 15 castings. Again, if the molds are not properly conditioned as to the moisture content preparatory to the casting operation, the castings frequently develop cracks and dunts which are not manifested until the
- 20 ware is fired, but which nevertheless are sufficient to necessitate the scrapping of the defective pieces.

The present invention overcomes all of the objections and limitations of the old

25 methods of casting pottery ware from slip, and renders it possible and readily feasible to make castings which may be much thicker and heavier than any heretofore produced by the slip process, with the practical

30 elimination of losses due to piping, balling, dunting and cracking, the various operations being effected in much less time and with a greater degree of certainty and precision than has been possible under the old

35 methods, even when the latter were carried out by the most skillful operatives. In short, by maintaining the proper conditions of moisture or humidity in the molds and in the portions of the plant in which the

40 molds and the castings therein are employed and operated upon, the casting and preliminary conditioning of the ware, may be effected at a great saving of time and labor, and practical elimination of the heavy losses

45 experienced by the old methods and apparatus, the saving in time and labor and the practical elimination of defective castings being, in large measure, due to the accuracy of the means and apparatus employed,

50 which render it possible to maintain the molds in their proper relative arrangements during the full cycle of operations and to cause the molds to take up and give off moisture at proper rates to insure, in the

55 shortest possible interval of time, the preliminary conditioning of the castings to permit the withdrawal of the cores, the secondary drying of the castings to permit the latter to be dumped from the molds, and

60 the restoration of the normal moisture content of the mold sections, to permit the latter to be used again, in subsequent casting operations, immediately after the dumping operations.

The drawings represent, more or less dia-

grammatically, a typical plant equipped for manufacturing relatively large elements of sanitary pottery ware from slip, the several operations including the casting at stations A, the preliminary drying or setting

70 up of the castings in the molds, between the casting stations A and the core pulling stations B, the dusting of the pulled cores at stations C, the secondary drying of the castings and partial drying of the cores in sections D, the dumping of the molds and reworking of the castings at stations E and F, respectively, the final drying of the castings in the special driers G, the sandpapering and other necessary finishing of the

75 dried castings at stations H and the first firing of the pieces in the bisque kilns K. The instant invention primarily involves the apparatus and operations contained in and carried out in sections A to D, inclusive,

80 which produce a larger percentage of perfect, homogeneous pieces of pottery, than has been possible of realization with any of the means or methods for casting relatively heavy pottery ware, heretofore employed.

85 The ancillary means for effecting the final drying and conditioning of the cast ware involves the method and apparatus for drying and conditioning materials as exemplified in Patent No. 1,330,238 of W. H. Carrier, dated February 10, 1920, and while no claim is made to the apparatus or method per se of the Carrier invention, the latter may be regarded as a proper supplement to applicant's invention, by means of which

90 the cast, dumped and reworked pieces may be completely prepared for the bisque kilns.

As a matter of economy and convenience, the plant is arranged on a single floor with the exception of the slip tanks, which are preferably located on a higher floor or level, so as to feed the slip to the molds by gravity. As a further matter of convenience, the floor space is divided into several sections, both transversely and longitudinally,

95 each longitudinal section being devoted to the casting and conditioning, including the final drying, of a particular type or class of ware, and each section may be employed for any selected class of work without interfering with the operations of the other sections. Obviously, the number of floors in building 1 may be increased as desired, and the arrangement of the apparatus in any of the floors may be such as to best accommodate the work to be done. It will be understood, therefore, that the plant, as illustrated, is merely typical of an ideal lay out, especially adapted for manufacturing relatively large pieces of sanitary pottery ware,

100 such as flush tanks and lids therefor, water-closets, lavatories and the like.

Suspended from the ceiling of the building structure 1 and extending longitudinally of the building, are generally parallel

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tracks 2 provided with interconnecting switches 3 at one end of the system and a swinging crane 5 at the opposite end provided with a trackway adapted to take trucks from any of the individual rail lines 2 and shunt said trucks onto a common return rail 4, from which the trucks may be distributed to any of the other rails 2, as will be obvious. As illustrated in Fig. 1, there are four separate track sections, each section including four outgoing lines of rails and a common return rail, but, obviously, the arrangement and disposition of the trackage may be such as to best accommodate the character and quantity of the work turned out.

Preferably located at a point, in each of the return rails 4, adjacent the front end of the building, is a casting station A, typically represented in Figs. 2, 3 and 4, where the trucks 10, operating on the lines of continuous overhead rails, are positioned successively to bring the molds carried by the trucks in proper relation to receive the slip from supply pipes leading from the slip tanks, said supply pipes being provided with suitable valved nozzles for controlling the flow of the slip to the molds. In Figs. 2 and 3, a special form of truck for simultaneously casting four flush tank bodies is illustrated, and, in Fig. 3, another special form of truck to permit the simultaneous casting of eight lid sections for the tanks, is shown in diagram, but, inasmuch as these trucks and their accessories are fully shown and described in applicant's Patents Nos. 1,557,371 and 1,557,372, granted October 13, 1925, no detailed description of either of said trucks is considered necessary in the instant application, other than to state that each truck comprises a generally rectangular framework suspended on trolleys run on the single rail trackways, the lower portion of the truck frame being held firmly in vertical position at the casting station or stations between parallel guide rails 11 secured to the floor. In the tank casting trucks, special means are provided for supporting the bodies of the molds 11 in pouring, core pulling and dumping relation, for inserting and pulling the cores 12 and accurately adjusting the latter with respect to the molds, also for suspending the cores above the molds after the cores have been pulled, so that the cores are retained in proper relation with their appropriate molds during the entire sequence of operations and the necessity of matching cores and molds is obviated.

While a single pouring station is indicated as an operative unit of each trackage section, obviously one or more pouring stations may be arranged in series as the exigencies of the work may require.

The supply of slip to each pouring station is delivered by vertical pipes 13 extending

from the slip tanks (not shown), which are located in an elevated position above the pouring stations, preferably on the next floor above, so that the slip is automatically fed by gravity. Each of the supply pipes 13, in the arrangement shown in Figs. 2 and 4, is provided with a lateral branch 13', from which extend two pipe sections 13'' terminating in valved supply nozzles or cocks 13''', which are adapted to register with the usual pouring funnels removably mounted in the pouring openings in the cores, which openings communicate with the mold space defined by the core and the interior surface of the mold body. One of the supply pipes 13 is preferably provided with a valved fitting 14, to which is connected a flexible hose 15 having a valved discharge nozzle 16, said hose being employed for charging molds which are so constructed and arranged as to be unable to receive the slip from the pipe extensions 13''. For example, the flexible hose 15 may be conveniently employed for charging the several cover casting molds, carried by the trucks 10', illustrated in Fig. 3. Similarly, the flexible hose may be utilized for charging molds employed for casting any other types of relatively small pieces of pottery ware.

As indicated, the trucks bearing the assembled molds and cores, in the relation shown in Figs. 2 and 3, for example are moved successively to the charging station A and the slip delivered into each of the molds until the latter are completely filled, which is evidenced by the slip rising in the funnels. After all of the molds on each truck have been completely charged with slip, the truck is advanced along one of the rails 2, until practically all of the rail space is filled with trucks, the advance truck on each rail occupying station B, where the cores of all of the molds are subsequently pulled. The accumulated trucks containing the charged molds, are permitted to remain quiescent on the rails between the charging stations A and the core pulling stations B, for a period sufficient to permit the slip to take its initial set and allow the cores to be pulled. In order to expedite the setting up of the slip in the molds, without producing undue shrinkage of the slip, the temperature of the room or section of the building in which the trucks are permitted to stand is maintained at approximately seventy degrees and the humidity of the air maintained at about sixty per cent. Under these conditions, the slip forming the castings for flush tanks and covers therefor and pieces of the same general character, will take the necessary set to permit the cores to be withdrawn within about one hour and a half.

As a matter of convenience, in the manufacture of tanks and covers therefor, each

tank casting truck is provided with four molds and each cover casting truck carries eight molds, so that the trucks may be operated by first charging the molds on two tank trucks, then the molds on one cover truck, and so on in the same order, which will result in the same number of tanks and covers being delivered to the ultimate mold dumping station at or about the same time.

After the initial drying of the molds to cause the preliminary setting up of the slip, the cores are pulled. This pulling operation is preferably effected at stations B, to which point the trucks are moved successively, the cores of the tank molds being withdrawn by the special winch mechanism carried by the tank trucks, so that the cores are retained in suspended relation above the molds through all of the subsequent operations and until the cores are again lowered into the molds, when the trucks bearing the latter are returned to the casting station. In the case of the cover molds, each upper mold section is pivoted to the truck and is adapted to be swung upward and backward to withdraw the core section and leave the cover in the lower mold section. Immediately after the cores have been withdrawn, the portions of the latter which engage the mold cavity are dusted while still wet. To effect the dusting of the cores of the tank molds, or similar large cores, the portions of the trucks on which the cores are suspended are passed through a special dusting apparatus, which, in its simplest form, includes a housing 20 through which two of the rails 2 pass, as indicated in Fig. 1, said housing being provided with doors 21 and 22 at front and back, to effectively close the housing when not in use, but permitting access from either the front or the rear of the housing, for the purpose of spraying dust onto the surfaces of the cores. The bottom of the housing is provided with longitudinal slots to permit the passage of the vertical frame members of the trucks and, at the same time, prevent the dust passing out of the housing and lodging on the molds and the castings therein, while the latter lie below the housing during the dusting operation, as shown in Fig. 2. The dusting apparatus is provided with a dust box 23 on one side, which is in communication with a fan blower 24, the discharge end of which is provided with a flexible hose 25. In the dusting operation, two of the trucks 10 with the cores withdrawn and suspended thereon above the molds, are passed in through the open front door 21 of the dusting apparatus. The fan blower 24 is then started and a stream of dust from the flexible hose 25 is directed against the sides, front end and bottom of each core, after which the doors 21 are closed, doors 22 opened and the dusting operation repeated until all of the surfaces of all of the cores

within the dust chamber, except the tops of the cores, are thoroughly coated with dust, which readily adheres to the cores, because of the relatively wet condition of the latter. In the dusting of the relatively small core sections of the cover molds, it is not necessary to employ the particular form of dusting apparatus as described, as the dust may be readily applied to the core sections of the cover molds by means of a brush, mop or similar device ordinarily employed for this purpose. The advantage of dusting the cores immediately after the latter have been withdrawn or pulled, is that they are then in the best condition to retain the dust, with which it is absolutely essential that all portions of the core which engage the casting be covered, in order to permit the cores to be withdrawn from subsequent castings without damaging the latter.

After each dusting operation, on the individual trucks, the latter are advanced on the track rail into a secondary drying and conditioning section, which is preferably in the form of a separate room or compartment of suitable capacity to contain a number of trucks carrying a full day's output of the casting section or sections, the several tracks 2 extending in the same general relation through the secondary drying and conditioning room D where the trucks containing the charged molds and the drawn and suspended cores may be assembled, allowed to remain for an appropriate time in a properly conditioned atmosphere, which will result in the drying the castings within the molds to an extent sufficient to permit the castings to be dumped from the molds without damaging the former. This secondary drying and conditioning of the castings is preferably carried out in an atmosphere of normal room temperature and having a relative humidity of approximately 60%. Under these conditions, it is found that the castings will become sufficiently dry to permit dumping within about twenty-two and one-half hours, so that the entire sequence of operations thus far described will require approximately twenty-four hours, thereby permitting each complement of molds to be used every day. To illustrate by concrete example, the molds and cores are assembled on track 4 and pouring is begun at 7 in the morning at station A and the trucks containing the poured molds run onto rails 2 where they are permitted to stand each for an hour and a half approximately, so that the mold cores of the first truck may be pulled at 8:30. The cores are then dusted and the trucks immediately passed into the secondary drying and conditioning room or section D, where they remain under ideal conditions for drying the castings until the next morning, when the first truck may be dumped at about 7 o'clock.

In making castings of the character indi-

eated, the slip contains about 22% of water. At the time of pulling the core of a given mold, about 2% of the water in the slip has been transferred to the mold and core. By the following morning, the core, under the atmospheric conditions in section D, heretofore indicated, has lost the amount of water which it absorbed from the casting, and the mold has absorbed on the inside about 4% of water from the casting, and, at the same time, has given off approximately the same amount of water to the surrounding air. In other words, if the conditions are such as prescribed, the amount of water taken from the casting to put it into proper shape to be reworked and finally dried, is removed under ideal drying conditions, and both the molds and the cores contain the proper amount of moisture uniformly distributed throughout the same to enable them to be immediately employed for a subsequent casting operation. From the secondary drying and conditioning room D, the trucks containing the molds, cores and castings are passed in proper sequence to the dumping stations E. Said dumping stations may be located either at the rear of section D, or in a room separated therefrom by a suitable cross wall or partition, so that the conditions of temperature and humidity of the air in the dumping section may be made to correspond closely with similar conditions in section D.

As an element of convenience in handling the trucks at the dumping stations E, the pivoted track section 5, is adapted to be swung into registry with the individual trolley rails 2 and 4 to receive the trucks from the former and deliver the trucks to the latter and also to position each truck preparatory to dumping the castings therefrom, over a suitable elevating device diagrammatically illustrated in Fig. 2 and comprising individual rams, each comprising a cylinder 40, a plunger 41 operating therein having a head to engage the center of a pallet 43, which latter is adapted to be placed over the mouth of the mold to support the casting therein. Each ram is controlled by a foot lever 42, so that, when the latter is depressed and pressure admitted to the ram, the plunger therein will be raised in position to engage the corresponding pallet 43. In dumping the trucks, the molds 11, each having a pallet applied to the open end thereof, are reversed by swinging them on their individual axes and elevating the plungers of the rams to engage the respective pallets, after which the plungers are lowered by operating the corresponding foot levers 42, each plunger carrying with it the corresponding pallet and the casting carried by the latter. The molds on the dumped truck are then shifted back to upright position and the truck switched back onto one of the rails 2 or the

return rail 4 and permitted to remain during the ensuing twenty-two hours and a half in the atmosphere of section D, or a similarly conditioned atmosphere, which will, as heretofore described, reduce the amount of moisture in the mold and the mold core to normal and thereby render the molds ready for immediate use the following morning.

The castings dumped from the trucks are transferred to benches at station F and permitted to stand in an atmosphere having a humidity of approximately 50% until the castings are in condition for reworking, that is to say, trimming off the fins and any other irregularities that may have been formed on the casting, cutting out the necessary openings in the casting and otherwise reducing the latter to its ultimate form preparatory to passing the castings into the final drier.

As heretofore indicated, the final drying is effected in driers G of the type shown in the Carrier patent aforesaid, the reworked pieces of pottery being loaded onto trucks 50, operating on overhead tracks or rails passing through the drier sections. Preferably the drying rooms G are arranged in pairs, so that one room may be filled with trucks containing the castings undergoing final drying, while the other room is being filled with loaded trucks. After the final drying has been effected, which result will require approximately twenty-four hours, the trucks containing the thoroughly dried ware are run out into a room or section H at the rear of the driers, where they are unloaded from the trucks and given a final working, such as sandpapering and finishing, when the ware is ready for the bisque kilns in section K.

In order to maintain the necessary temperature and humidity in the several rooms in which the various operations heretofore explained are carried out, the plant is provided with a series of air supply ducts 30 having lateral discharge nozzles or outlets 31, said ducts being in communication with suitable air heating and humidifying apparatus, preferably the type shown in the Carrier patent aforesaid, the heated and humidified air being forced into the several rooms under sufficient pressure to induce an active circulation of the conditioned air in the room, the circulation being maintained by return or exhaust ducts similarly arranged and disposed, as indicated in the said Carrier patent. Obviously, any desired degree of humidity and temperature may be produced and maintained in any of the rooms or sections and, in order to permit varying degrees of temperature and humidity to be maintained in laterally adjacent sections, the latter may be separated by suitable longitudinal walls or partitions. For example, when stuck up castings are made, involving the fabrication of separate parts,

which are cast and treated as hereinbefore described up to and including the dumping from the molds, and the several sections constituting the finished piece are to be stuck together, it will be necessary to effect the sticking operation in a room in which the humidity is maintained as high as possible. These operations and results may be effected in any one of the sections D, for example, or, if desired, in an additional section or room interposed between D and the dumping sections. After the sticking up has been effected, the ware is again slightly dried and reworked. The provision of means for regulating the temperature and humidity in any of the rooms or sections, more particularly in the secondary drying sections D, presents an additional advantage in the efficient operation of the plant as a whole, in that it provides means for varying the rate of drying to such an extent that the castings and the molds may be retained in the drying and conditioning rooms D as long as necessary. For example, should the drying rooms D be filled with cast ware in the molds the day preceding a holiday or other occasion when the plant is shut down, by properly adjusting the humidifying apparatus, the rate of drying of both the castings and the molds may be regulated to such an extent that the castings will be in proper condition to be dumped and reworked and the molds and cores in proper condition for the succeeding casting operations, when the plant is started up. Obviously, the same conditions may be maintained in any of the other rooms or sections by so regulating the humidity of the air therein that the preliminary, or secondary drying may be completed in any prescribed period of time. If, for instance, it is found necessary to suspend operation when the initial section of the plant is practically filled with trucks which have been charged with slip, but the cores of which have not been pulled, the humidity of the air in the initial section may be so regulated as to retard the preliminary drying of the castings to such an extent that the castings will be at just the proper condition to permit the cores to be pulled, when work is resumed.

From the foregoing description, it will be apparent that the method and apparatus involved in the instant invention insure a maximum output of practically perfect pieces of pottery ware ready for the bisque kilns, the entire sequence of operations being effected in a minimum of time by unskilled labor. The arrangement of the elements of the molds on trucks, in itself, constitutes a material factor making for economy of operation and reduces the losses, by reason of defects developed in the ware during the casting and conditioning operations, to a minimum, inasmuch as all of the ele-

ments of an individual mold are retained permanently on the truck, so that they may be assembled and separated without possibility of interchange or confusion with like parts of other molds. This means, for example, when a mold and its core have been properly assembled and adjusted and mounted upon a truck, the identical mold parts may be used together repeatedly and until one or the other part has worn out or become damaged beyond repair. Furthermore, the mounting of the molds and cores on the trucks in the manner illustrated, secures a maximum exposure of the exterior surfaces of the molds and cores to the atmosphere, thereby insuring a uniform rate of drying of the castings. The permanent location of the mold parts on the trucks and the operation of the latter on the continuous system of rails extending through the plant from the casting station to the dumping station, greatly reduces the labor cost of the various operations, as compared with the former methods, in which the various operations were performed manually. With a typical plant involving the apparatus and modes of operation, as heretofore described, it has been possible to reduce the cost of manufacture of a complete pottery flush tank more than 50%, the individual elements of the tank being prepared ready for the bisque kilns in a fraction of the time heretofore required by the old hand operations, and the losses due to defects in the ware produced during the casting and conditioning operations have been reduced practically to the vanishing point.

What I claim is:

1. The method of manufacturing pottery ware from slip which comprises assembling the elements of absorbent molds on trucks and effecting the sequential operations of pouring the slip in the molds, preliminarily drying the castings, separating the mold elements, partially drying the castings, and dumping the latter from the molds, while the mold elements are retained in proper relative arrangements on the trucks.

2. The method of manufacturing pottery ware from slip which comprises assembling the elements of absorbent molds on trucks and effecting the sequential operations of pouring the slip in the molds, preliminarily drying the castings, separating the mold elements, partially drying the castings, dumping the latter from the molds, while the mold elements are retained in proper relative arrangements on the trucks, and regulating the drying atmospheres as to temperature and humidity to produce effective drying of the castings in a minimum of time and to restore the proper conditions of humidity to the mold parts.

3. The method of manufacturing pottery ware from slip which comprises assembling

the molds and cores on trucks, and effecting the sequential operations of pouring the slip in the molds, preliminarily drying the castings, pulling the cores, dusting the cores, partially drying the castings, and dumping the latter from the molds, while the molds and cores are maintained in proper relative arrangements on the trucks.

4. The method of manufacturing pottery ware from slip which comprises assembling the molds and cores on trucks, and effecting the sequential operations of pouring the slip in the molds, preliminarily drying the castings, pulling the cores, dusting the cores, partially drying the castings, dumping the latter from the molds, while the molds and cores are maintained in proper relative arrangements on the trucks, and regulating the drying atmospheres as to temperature and humidity to effect rapid uniform drying of the castings.

5. The method of manufacturing pottery ware from slip which comprises assembling the molds and cores on trucks, advancing the trucks successively to a pouring station, pouring the slip in the molds, advancing the trucks containing the charged molds to and retaining them in an atmosphere to effect preliminary drying, pulling the cores, retaining the pulled cores suspended on the trucks, passing the portions of the trucks carrying the cores through a dust laden atmosphere to dust the cores, assembling and retaining the trucks containing the filled molds and the pulled and dusted cores in a secondary drying atmosphere, conditioning the latter to effect rapid uniform drying of the castings, and dumping the castings from the molds.

6. The method of manufacturing pottery ware from slip which comprises assembling the molds and cores on trucks, advancing the trucks successively to a pouring station, pouring the slip in the molds, advancing the trucks containing the charged molds to and retaining them in an atmosphere to effect preliminary drying, pulling the cores, retaining the pulled cores suspended on the trucks, passing the portions of the trucks

carrying the cores through a dust laden atmosphere to dust the cores, assembling and retaining the trucks containing the filled molds and the pulled and dusted cores in a secondary drying atmosphere, conditioning the latter to effect rapid uniform drying of the castings, dumping the castings from the molds, and finally drying the castings in a specially conditioned atmosphere.

7. The method of manufacturing pottery ware from slip which comprises assembling the molds and cores on trucks, advancing the trucks successively to a pouring station, pouring the slip in the molds, advancing the trucks containing the charged molds to and retaining them in an atmosphere to effect preliminary drying, pulling the cores, retaining the pulled cores suspended on the trucks, passing the portions of the trucks carrying the cores through a dust laden atmosphere to dust the cores, assembling and retaining the trucks containing the filled molds and the pulled and dusted cores in a secondary drying atmosphere, conditioning the latter to effect rapid uniform drying of the castings, dumping the castings from the molds, and reworking the castings.

8. The method of manufacturing pottery ware from slip which comprises assembling the molds and cores on trucks, advancing the trucks successively to a pouring station, pouring the slip in the molds, advancing the trucks containing the charged molds to and retaining them in an atmosphere to effect preliminary drying, pulling the cores, retaining the pulled cores suspended on the trucks, passing the portions of the trucks carrying the cores through a dust laden atmosphere to dust the cores, assembling and retaining the trucks containing the filled molds and the pulled and dusted cores in a secondary drying atmosphere, conditioning the latter to effect rapid uniform drying of the castings, dumping the castings from the molds, reworking the castings, and finally drying the castings in a specially conditioned atmosphere.

In testimony whereof I affix my signature.
EDWARD S. LEA.