E. L. WATROUS, DEC'D.

A. B. WATROUS, EXECUTRIX,

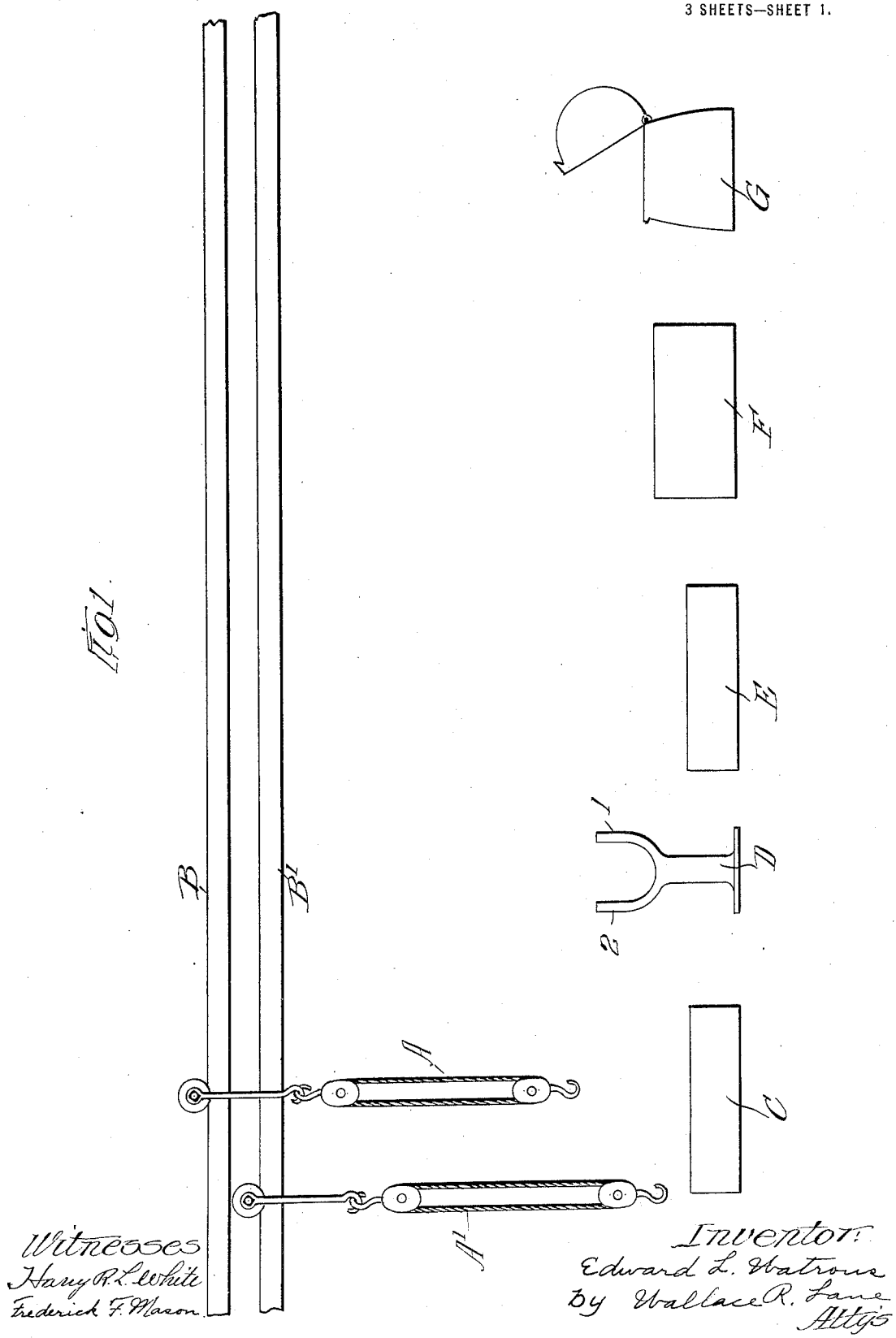
METHOD AND APPARATUS FOR COATING PIPES, BARS, ANGLES, AND THE LIKE.

APPLICATION FILED JAN. 21, 1918.

1,346,618.

Patented July 13, 1920.

3 SHEETS—SHEET 1.



Witnesses
Harry R. L. White
Frederick F. Mason

Inventor:
Edward L. Watrous
by Wallace R. Lane
Atty's

E. L. WATROUS, DEC'D.

A. B. WATROUS, EXECUTRIX,

METHOD AND APPARATUS FOR COATING PIPES, BARS, ANGLES, AND THE LIKE.

APPLICATION FILED JAN. 21, 1918.

1,346,618. **Patented July 13, 1920.**

3 SHEETS—SHEET 2.

Fig. 2.

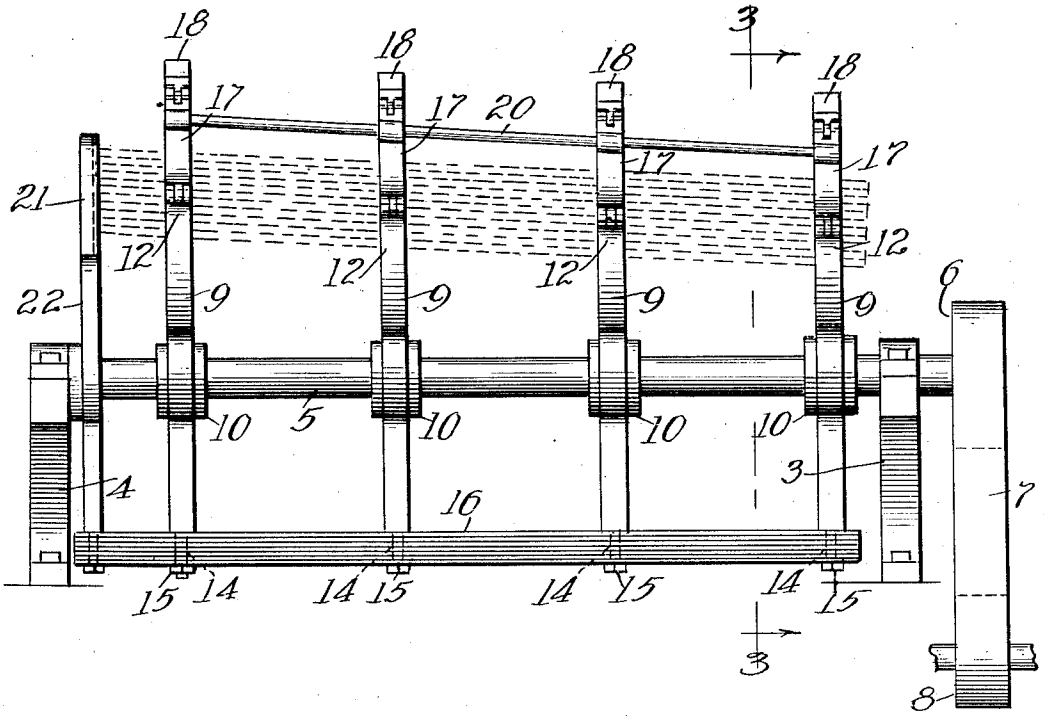
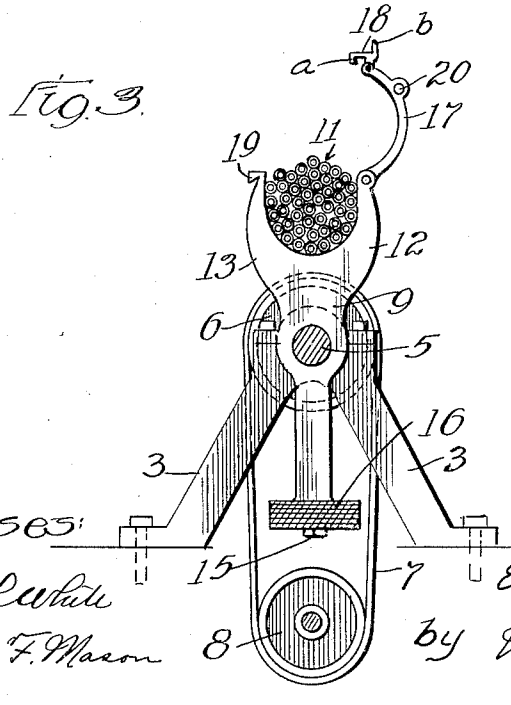


Fig. 3.



Witnesses:
Harry R. Lewis
Frederick F. Mason

Inventor:
Edward L. Watrous
by Wallace R. Lane
Atty

E. L. WATROUS, DEC'D.

A. B. WATROUS, EXECUTRIX,

METHOD AND APPARATUS FOR COATING PIPES, BARS, ANGLES, AND THE LIKE.

APPLICATION FILED JAN. 21, 1918.

1,346,618. **Patented July 13, 1920.**

3 SHEETS—SHEET 3.

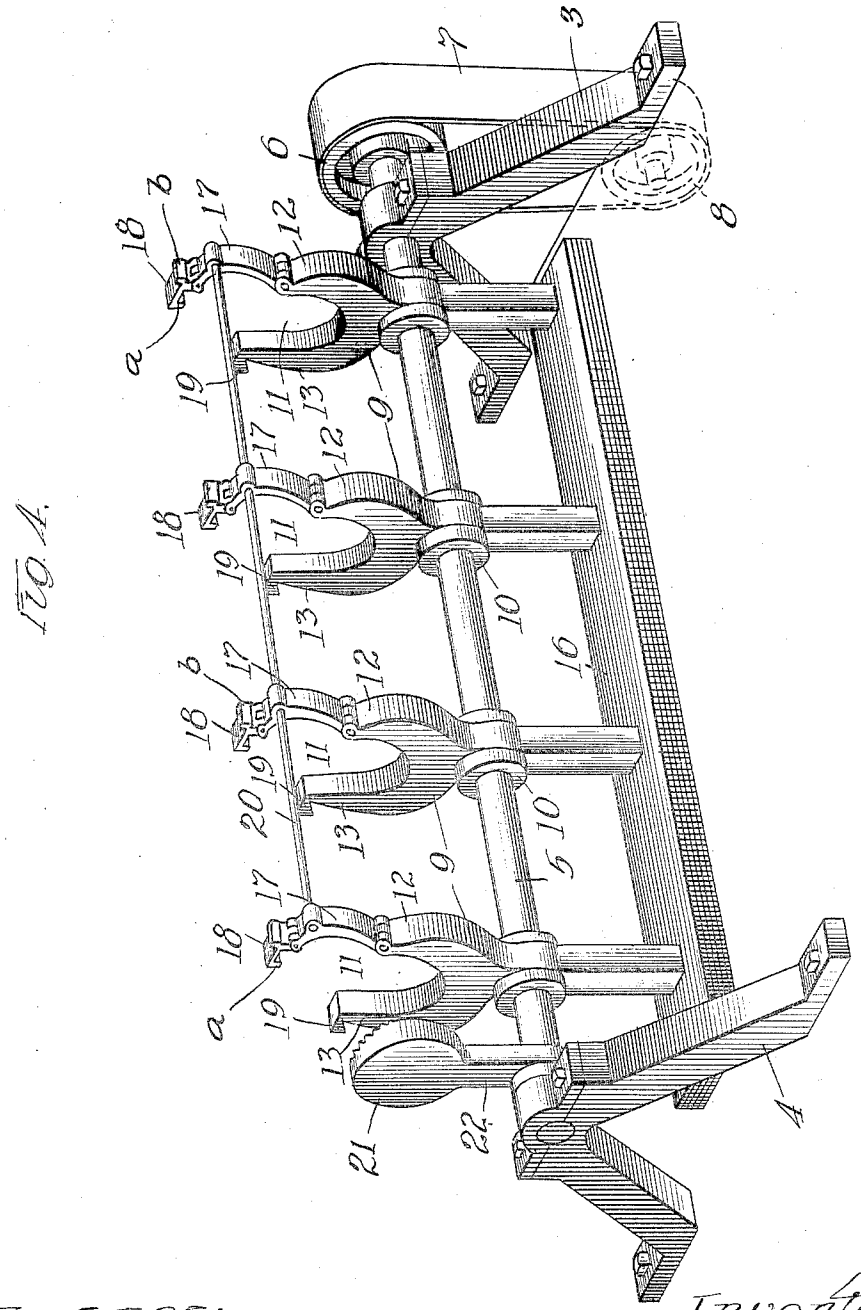


FIG. 4.

Witnesses:
Harry R. L. White.
Frederick F. Mason

Inventor:
Edward L. Watrous
by Wallace R. Lane
Atty.

UNITED STATES PATENT OFFICE.

EDWARD L. WATROUS, OF EL PASO, TEXAS; AGNES B. WATROUS EXECUTRIX OF SAID EDWARD L. WATROUS, DECEASED.

METHOD AND APPARATUS FOR COATING PIPES, BARS, ANGLES, AND THE LIKE.

1,346,618. Specification of Letters Patent. Patented July 13, 1920.

Application filed January 21, 1918. Serial No. 212,908.

To all whom it may concern:

Be it known that I, EDWARD L. WATROUS, a citizen of the United States, residing at El Paso, in the county of El Paso and State of Texas, have invented certain new and useful Improvements in Methods and Apparatus for Coating Pipes, Bars, Angles, and the like, of which the following is a specification.

This invention relates to an improved method of coating pipes, bars, angles, and the like, and to apparatus for accomplishing the same, and more particularly to a method and apparatus involving the application of centrifugal force to the pipes, bars, angles, and the like after being immersed in the coating bath.

While in the following description especial reference has been made to a method and apparatus for galvanizing, I desire it understood that the same is equally applicable to other forms of coating such as tinning, asphalt coating, and the like.

In galvanizing metal pipes, bars, angles, and the like by the old process and with the heretofore known apparatus, the finished articles possess certain undesirable features, such for example as the collection on the under side thereof, while the coating is still plastic, of accumulations of the coating material in a manner similar to the accumulation of drops of water on the lower side of a wet pipe or rod. This is especially objectionable, for the reason that such accumulated drops, in the galvanizing of pipes, bars, angles, and the like, solidify, and form a series of rough projections on one side thereof, which projections not only involve a useless waste of galvanizing material, but are also dangerous and liable to injure the hands of the person handling the same, in addition to being objectionable in other respects. This and other objections are entirely eliminated by my new method and apparatus.

Among the objects of my invention is to render possible the coating of pipes, bars, angles, and the like, in such a manner that they will have an even coating and be free from rough surfaces; further to greatly increase the efficiency, economy, and saving of time in coating such articles; further to subject the freshly coated pipes. bars, angles, and the like to centrifugal action to throw off all surplus material from both inside and outside, and insure a smooth uniform coating; further to provide a new and improved rotatable apparatus for subjecting such articles when freshly coated to centrifugal force; further to provide means for counterbalancing the weight of the pipes, bars, angles, or the like in such apparatus; further to form the counter-balance in increments whereby the weight of the same may be increased or decreased in accordance with the weight of the articles being operated upon; further to provide a thrust plate against which the pipes may be thrust to bring the ends of the pipes, bars, angles, and the like even with each other; further to provide means in such thrust plate to permit the escape from the end of the pipe of any surplus coating material that may be ejected from the interior thereof during rotation; further to provide means whereby a bundle of pipes, bars or the like may be securely locked in position in the machine; further to provide means for positively forcing any surplus material inside of the pipes out at one end; and such further objects, advantages, and capabilities as will later more fully appear.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings, in which, while I have illustrated a preferred embodiment of apparatus for carrying out my method, I desire it to be understood that the same is susceptible of modification and change without departing from the spirit of my invention.

In the drawings:

Figure 1 illustrates in diagrammatic form the various steps involved in my improved method and a conventional form of hoisting and conveying apparatus used in transferring the pipes, bars, angles, or the like from one step to another.

Fig. 2 is a side elevation of my improved apparatus for subjecting the pipes, bars, and the like to centrifugal force.

Fig. 3 is an end elevation of the same.

Fig. 4 is a perspective view of the same.

Referring to the drawings, and particularly to Fig. 1, A and A′ represent suitable

blocks and tackles mounted for traveling upon the beams B and B′ respectively. The hoisting and conveying means, however, instead of assuming this form may be in the form of a traveling crane or other suitable mechanism. C is a pickling tank in which the pipes, bars, and the like may be immersed for cleaning, after which they will be removed by means of the hoisting and conveying means, and placed between the upright arms 1 and 2 of the scale and forming apparatus D. In this apparatus the pipes, bars, and the like will be weighed into suitable quantities and formed into bundles, in which form they will be treated throughout the rest of my method. When the desired quantity of pipes, bars, and the like, has been formed in D into a bundle, they are then carried to the flux tank E, in which they are immersed and coated with a desirable flux. From the flux tank, they are then carried to the spelter kettle F, in which is contained in a melted condition the usual spelter bath, into which the bundles are dipped and allowed to remain sufficiently long to insure the entry of the spelter into the pores and other irregularities in the surface, after which the bundles will be placed within the revolving arms of the centrifugal machine G. After being subjected to centrifugal action for a suitable length of time, they will be removed from the centrifugal machine and stored in any convenient place.

Referring now to Figs. 2, 3 and 4, the centrifugal machine comprises the standards 3 and 4, located one at each end of the machine, and in which standards is suitably journaled the shaft 5, which carries upon one end the pulley wheel 6, over which operates the belt 7 driven by any suitable source of power, as for example, the drive wheel 8 of a motor, (not shown.) It will be understood, of course, that for the belt 7, I may substitute a sprocket or any other desired form of means for. transmitting power.

Fixed upon the shaft 5, and suitably spaced apart are the arms 9, the hubs 10 of which encircle the shaft. One end of each of the arms 9 is provided with the recess 11 defined by the upstanding projections 12 and 13. The opposite end of each of the arms 9 is reduced in size so as to form the projection 14, which is provided throughout its length with screw threads, upon which threads are secured the nuts 15. The function of the projections 14 is to receive the counterweight elements 16, the number of which to be applied will be determined by the weight of pipes, bars, or the like being operated upon in the machine.

By providing the counter-weights in increments, as disclosed, which counterweights it will be observed are held in place by the nuts 15, it will be seen that in order to accommodate a larger or smaller quantity of pipes, bars, or the like, in the machine, the counter-weight may be added to or subtracted from by simply adding additional increments or removing any desired number of increments therefrom.

Hinged to the projections 12 are the caps 17, each of which carries at its forward end the pivoted catch 18, comprising the locking lip *a* adapted to engage with the projection 19, for the purpose of securely locking the caps in closed position; and the releasing projection *b* against which a blow may be directed for unlocking the catch; it being obvious, of course, that any other form of locking means may be substituted for the catch 18 and projection 19, if desired. In order to insure the simultaneous closing of all the caps upon the operation of any one of them, I have provided the rod or bar 20, which extends through suitable perforations in each of the caps 17, thereby connecting them together, and as a result of which the operation of any cap will effect the simultaneous operation of all of the caps. By this arrangement, when a bundle of pipes, bars or the like is placed within the recesses 11, all that is necessary in order to lock the bundle in place is to grasp one of the covers 17 and throw the same into closed position, the caps 17 as explained above, all operating in unison. It is obvious that a similar bar may be used in connection with the catches 18 for the purpose of operating them simultaneously if desired.

In order to bring the ends of the pipes, bars, or the like even with each other when placing them in the recess 11 of the centrifugal machine, I have provided the thrust plate 21 which is formed upon the end of the arm 22, which arm is provided with a hub, through which hub the shaft 5 passes. This hub will be of sufficient strength to insure the required rigidity in the thrust plate 21. The arm 22 upon its opposite end is formed with the projection and nut for passing through and securing in place the counterweight elements 16, in a manner similar to that already described in connection with the arms 9. The thrust plate 21 upon its inner face is provided with a plurality of corrugations, which extend vertically when the thrust plate is in the position shown in Fig. 4. The purpose for these corrugations is to permit the escape, when pipes or the like are being coated, of any surplus coating material which may be thrown from the inside thereof during the rotation of the machine. In order to insure the forcible ejection of any surplus material from the inside of the pipes during rotation of the machine, the bottom of the recesses 11 are placed at gradually increasing distances from the

shaft 5 as they proceed from the right to the left, which idea is more clearly shown in Fig. 2. This will result in the pipes when placed in position within these recesses, assuming an inclination to the axis of the shaft 5, as a result of which when the machine is rotated, any surplus coating material on the inside of the pipes, as will be obvious, will be forced out at the end which is farthest away from the shaft 5. The inclination of the pipes has been somewhat exaggerated in Fig. 2 for the sake of clearness. Were the inner face of the thrust plate 21 in the form of a plane surface, the escape of such excess material would be prevented, and the same would be caused to solidify in the end of the pipe. However, by providing the inner face of this plate with the substantially radially extending corrugations, the escape of this material from the inside of the pipes will be readily effected, and the material thrown outwardly away from the machine.

While for the sake of clearness, I have omitted in Figs. 2, 3 and 4, the casing or jacket from the centrifugal machine, it is pointed out that there is such jacket provided, see Fig. 1, to entirely incase this machine, whereby any excess spelter or coating thrown from the pipes, bars, or the like, when being operated upon, will be caught by such jacket or casing, and confined therein, thus preventing the undesirable flying of the same in all directions.

In the carrying out of my improved method, the pipes, bar, or the like, are first dipped in the pickling tank, then weighed and formed into bundles in the scale and forming apparatus D, which bundles will then be dipped in the flux tank E, after which they will be immersed in the spelter or other coating bath F to give the pipes, bars, or the like the desired coating, and the bundles finally placed within the recesses 11 of the centrifugal machine, with one end of each pushed into abutment with the thrust plate 21, after which the cover plates 17 will be thrown closed and locked in such position. The machine will then be caused to rotate at a desirable speed, the counter-balance having been properly adjusted, and this rotation continued until all excess spelter or other coating material will be thrown from the pipes, bars, or the like, thus resulting in an even and uniform coating throughout the entire length thereof. Due to the inclination of the pipes (when such are being coated) as above described, this rotation will also forcibly throw any excess material from the inside thereof at the end situated the farthest from the shaft 5.

Having now described my invention,

I claim:—

1. In apparatus of the class described, a support, a shaft rotatably mounted in said support, means on said shaft for holding freshly coated elongated articles, and means for rotating said shaft to cause said articles to rapidly move in a path substantially transverse to their length, whereby to throw off excess coating material.

2. In apparatus of the class described, a support, means rotatably mounted in said support to receive freshly coated elongated articles with their length extending in substantially the direction of the axis of rotation, and means to rotate said first mentioned means and articles.

3. In apparatus of the class described, means for subjecting pipes, bars, or the like, located substantially on one side of a rotating axis, to centrifugal action, and separate means to counter-balance the same during said centrifugal action.

4. In apparatus of the class described, a shaft, a plurality of arms mounted on said shaft, means at one end of said arms for receiving and holding a number of pipes, bars, or the like, and means for causing said arms and pipes, bars, or the like to rotate.

5. In apparatus of the class described, a shaft, a plurality of arms mounted on said shaft, means at one end of said arms for receiving and holding a number of pipes, bars, or the like, means at the opposite end of said arms to counterbalance said pipes, bars, or the like, and means for causing said arms and pipes, bars, or the like to rotate.

6. In apparatus of the class described, a shaft, means on said shaft for holding pipes, bars, or the like, and means to cause said shaft and pipes, bars, or the like to rotate in a direction transverse to their length.

7. In apparatus of the class described, a pair of supports, a shaft journaled in said supports, a plurality of arms fixed on said shaft and provided at one end with a recess to receive a number of pipes, bars, or the like, means to lock said pipes, bars, or the like in said recesses, and means for causing said shaft, arms, and pipes, bars, or the like to rotate as a unit.

8. In apparatus of the class described, a pair of supports, a shaft journaled in said supports, a plurality of arms fixed on said shaft and each provided at one end with a recess to receive a bundle of such articles as pipes, bars, or the like, means to lock said articles in said recess, means for causing said shaft, arms and articles to rotate as a unit, and means on the opposite end of said arms from said recesses to counter-balance the weight of said articles.

9. In apparatus of the class described, a pair of supports, a shaft journaled in said supports, a plurality of arms fixed on said shaft and each provided at one end with a recess to receive a bundle of such articles as pipes, bars, or the like, means to lock said articles in said recesses, means for causing said shaft, arms, and articles to rotate as

a unit, and a plurality of individually detachable counter-balancing means on the opposite end of said arms from said recesses.

10. In apparatus of the class described, a shaft, a plurality of arms on said shaft, said arms having alined recesses therein adapted to receive a bundle of pipes, bars, or the like, means on each arm for locking said pipes, bars, or the like, in said recesses, means for causing each of said locking means to operate simultaneously upon the operation of any one, and means for rotating said shaft.

11. In apparatus of the class described, a shaft, means on said shaft for receiving and holding a number of pipes, bars, or the like, further means on said shaft for bringing the ends of said pipes, bars, or the like in substantially the same plane, and means for rotating said shaft.

12. In apparatus of the class described, a shaft, a plurality of spaced arms on said shaft, said arms having at one end alined means adapted to receive and hold a bundle of freshly coated pipes and so arranged that said pipes will lie at an angle to said shaft, and means to rotate said shaft and arms, whereby to throw any excess coating from both the outside and the inside of said pipes.

13. In apparatus of the class described, a shaft, a plurality of spaced arms on said shaft, said arms having at one end alined means adapted to receive and hold a bundle of freshly coated pipes at an angle to said shaft, means to rotate said shaft and arms, whereby to throw any excess coating from both the outside and the inside of said pipes, and means on said shaft for bringing the end of said pipes even with each other and at the same time permitting said excess coating to escape from the inside of the pipes.

14. In apparatus of the class described, a shaft, a plurality of arms on said shaft, alined means on one end of said arms to receive and hold a number of pipes, a thrust plate on said shaft and in alinement with said alined recesses, means on the inner face of said thrust plate to permit the escape of excess material from the inside of said pipes upon the rotation of said arms and means for rotating said shaft.

15. The method of coating pipes, bars, and the like which comprises rotating said pipes, bars, or the like about an axis nearly parallel with their length, thereby subjecting the freshly coated pipes, bars, or the like to centrifugal action in a direction transverse to their length, whereby to throw excess coating material therefrom.

16. The method of coating pipes, bars, or the like, which consists in dipping the same in a coating bath, placing them in a centrifugal machine, and then rotating said machine in a direction transverse to the length of the pipes, bars or the like whereby to throw excess coating material therefrom.

17. The method of coating pipes which consists in dipping said pipes in a coating bath, placing them at an inclination to the axis of rotation in a centrifugal machine, and then rotating said machine at such speed as to throw the excess coating material from both the outside and the inside of said pipes.

18. The method of galvanizing pipes which consists in immersing said pipes in a pickling bath, removing said pipes from said bath to a combined weighing and bundling machine, weighing out and bundling the desired amount of said pipes, immersing said bundles in a flux bath, transferring said bundles from said flux bath, and immersing them in a spelter bath, then placing said bundles in a centrifugal machine, and rotating said machine in a direction transverse to the length of the pipe whereby to throw off the excess coating material therefrom.

19. The method of coating pipes which consists in dipping said pipes in a coating bath, then placing them at an inclination to the axis of rotation in a centrifugal machine, then bringing the adjacent ends of said pipes into substantially a common plane, and then rotating said machine whereby to throw the excess coating from both the outside and inside of said pipes.

In witness whereof I hereunto subscribe my name to this specification.

EDWARD L. WATROUS.