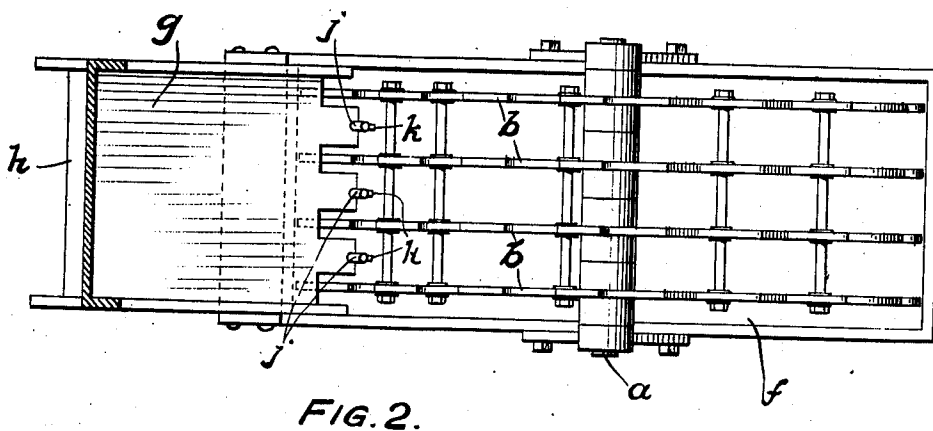
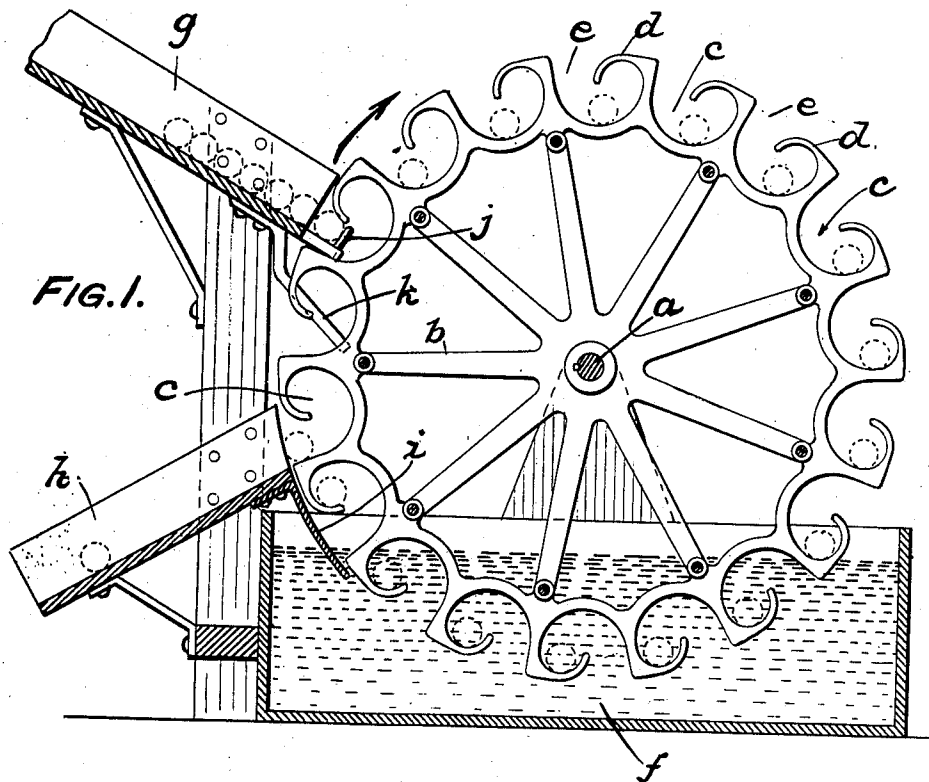


H. P. HALL.
DIPPING MACHINE.
APPLICATION FILED MAR. 26, 1912.

1,062,001.

Patented May 20, 1913.



WITNESSES:

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DIPPING-MACHINE.

1,062,001.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HIRAM P. HALL, a citizen of the United States, residing at New York city, county of New York, and State of New York, have invented a new and useful Improvement in Dipping-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object to provide a machine to effect the automatic coating of paper shells containing high explosives. In handling such shells it is necessary that, throughout the manipulation required to receive, coat and discharge the shells, all sources of friction should be avoided or eliminated. It is also desirable that the shells should be automatically delivered and discharged from the coating mechanism, and also that they should be delivered and discharged from the same side of the machine.

To effect these objects the invention consists, generally speaking, of a drum, made up preferably of a plurality of wheels spaced apart, rotating partly within and partly without a liquid-containing vat and provided with transversely extending peripheral pockets so shaped as to receive the shells from a chute in the rotation of the drum, retain the shells during their passage to and through the liquid in the vat and discharge the shells onto another chute after their emergence from the liquid.

The invention also consists in the specific form of the pockets and in the specific arrangement of the chutes relatively to each other and to the wheels.

I will first describe the embodiment of my invention shown in the accompanying drawing, and then point out the invention in the claims.

In the drawings: Figure 1 is a vertical section of my invention. Fig. 2 is a plan view of the same.

a is a shaft upon which, spaced apart, are secured a plurality of wheels *b*. Each of these wheels has grooves *c*, corresponding grooves in the different disks being in alignment with each other and forming peripheral pockets extending across the drum. Each groove or pocket is of a peculiar shape, the utility of which will be apparent in the description of the operation. Starting from the periphery of the drum at the outer edge

of one side of the pocket, the inner wall of the pocket extends inward toward the axis, thence curves around toward the periphery of the wheel and thence curves inward toward itself. It will be noticed that the wall is of concave form nearly or quite from one end to the other. It will also be noticed that the curve described by the inner side of the pocket approximates a spiral, although the degree of curvature does not radically change until that part of the wall is reached beyond which it starts to curve inwardly upon itself, wherefore the pocket may be said to be a compound one comprising a main pocket of relatively large capacity and of approximately semi-circular shape and having its base nearest the axis, and a supplemental pocket of relatively small capacity having its base nearest the periphery, the two pockets of course merging into one another and affording a smooth continuously concave surface along which the article rolls in its passage around the axis of the drum as hereinafter described. It will also be noticed that the supplemental pocket is formed by a curved extension *d* from one side wall of the pocket, which extension is of substantially less width than the pocket and hence leaving a space forming a mouth *e* for the reception and discharge of the shells, as hereinafter described.

f is the vat in which the drum revolves. In this vat is the liquid with which the article is to be coated.

g is the chute for the delivery to the drum of the article to be treated. This chute *g* has a serrated outer end between the serrations of which the wheels project so that the chute, as it were overlaps the drum.

h is the discharge chute. It will be observed that the discharge chute *h* is located directly over the vat at one side of the latter and slightly below the level of the axis of the drum, and that the delivery chute *g* is located directly above the discharge chute on the same side of the drum and slightly above the level of its axis. It will also be observed that the serrations in the delivery chute *g* are of approximately the depth of the diameter of the shells to be coated and that stops *j* are provided on the extreme end of the delivery chute.

By means of the described construction of the delivery chute, each pocket, as the drum rotates, will pick up one shell, and only one

shell, which immediately passes through the mouth of the main pocket and rolls toward the base thereof. As the drum continues to rotate, the shell rolls along the concave inner wall of the main pocket, and thence, as the shell approaches, or reaches, the vat, the shell drops into the supplemental pocket, in which the shell is carried during its passage through the coating liquid. Immediately after the shell emerges from the pocket it has nearly reached the outer edge of the curved extension *d* and about the time it reaches the discharge chute *h* it has rolled out of the supplemental pocket into the mouth *e*. In order to insure the retention of the article until it reaches the discharge chute *h*, a guard *i* is provided which extends downward from the discharge chute parallel to and close to the periphery of the drum but does not extend any substantial distance through the vat. In order to insure the discharge of the shell before it reaches the delivery chute *g*, I employ a knock-off arm *k*, which is conveniently secured to the delivery chute *g* and extends downward and inward within the periphery of the drum between the wheels thereof, this knock-off device being so shaped and located as to act as a cam to carry the shell out of the pocket in case it should not have previously rolled out.

It will be observed that the pockets are so shaped as to be adapted to contain the shells, without any supplementary retaining devices, throughout nearly one entire revolution of the drum. This is advantageous in that the delivery chute and discharge chute may be located on the same side of the machine. The absence of any auxiliary retaining devices involves an elimination of a likely cause of friction or binding of parts, the possibility of which would render the machine so dangerous as to be useless for the purposes for which it was designed. In fact, as will be clear from the drawings and the foregoing description, the shape of the pockets and the arrangement of the feeding and delivery means are such as to insure a smooth, gentle and unobstructed manipulation of the shells from the beginning to the end of the operation.

While I have described the machine as one specially adapted to the coating or dipping of shells containing high explosive material, the machine is of course not limited to the handling of this specific article, as it is equally well adapted for use in the dipping or coating of other articles, especially those of cylindrical or tubular form.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft, a plurality of wheels spaced apart

upon said shaft and suspended so as to revolve in said liquid in the revolution of the shaft, each wheel having a series of grooves in its periphery, the grooves of one wheel alining with the corresponding grooves of the other wheels and forming transversely extending receptacles or pockets for the reception and carriage of the articles to be dipped, each pocket having an inner wall curved from one end to the other in substantially a spiral form, the last named end of the pocket wall extending toward, but terminating short of, the wall, to permit the pockets to receive the articles, convey them through the vat and discharge them.

2. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft and a drum thereon provided with pockets each having a peripheral receiving and discharging mouth of substantially less width than, and located at one side of, the pocket, the wall of the pocket extending around from one side of the pocket and mouth to the other side of the pocket and thence over to the other side of the mouth, thus forming a main pocket opening outwardly and a supplemental pocket opening inwardly and thereby permitting the articles to roll from one end to the other of the wall as the drum revolves and be retained in the pockets during nearly a complete revolution of the drum, and a delivery and discharge chute located one above the other on the same side of the machine and adapted to respectively deliver and receive the articles to be dipped.

3. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft, a drum carried thereon provided with peripheral pockets, each pocket having a concave inner wall extending from the peripheral part of the drum inward, thence curved around toward the periphery and thence curved inward toward itself, whereby the pocket is provided with a mouth between its opposite ends adapted to both receive and discharge the article and with a supplemental pocket near its last named end to contain the articles during their passage through the vat.

4. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft, a drum carried thereon provided with peripheral pockets, each pocket having a concave inner wall extending from the peripheral part of the drum inward, thence curved around toward the periphery and thence curved inward toward itself, a delivery chute arranged on one side of the machine from which the articles are delivered to the first named end of the pocket, and a discharge chute arranged on the same side of the machine below the delivery chute and adapted to receive the articles from the same end of the pocket after the same have,

in nearly a complete revolution of the wheel, traveled from one end of the pocket to the other and dropped back to the first named end thereof.

5. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft and a drum carried thereon provided with peripheral pockets each pocket having an inner wall which extends inward from the periphery toward the axis and thence is of concave form to substantially the opposite end of said wall, said last named end extending inwardly, whereby a pocket is formed adapted to hold the article to be dipped throughout the greater part of a complete revolution of the drum.

6. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft and a drum carried thereon provided with peripheral pockets, each pocket being inclosed at its inner portion, its sides and at its outer portion adjacent to one side thereof, thereby forming a receiving and discharging mouth of substantially less width than the width of the pocket, the inner wall of said pocket being concavely curved to enable the article to roll along the inner wall during the rotation of the drum.

7. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft and a drum thereon provided with peripheral pockets, each pocket having an inner wall of approximately semi-circular shape in cross-section and provided with an extension from one outer corner curved inwardly and of less width than the pocket, whereby the pocket is adapted to hold and retain an article in any position of the drum except when the pocket is moving within an arc comprising a relatively small part of the drum's circumference.

8. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft and a drum thereon provided with pockets each having a peripheral receiving and discharging mouth of substantially less width than, and located at one side of, the pocket, that part of the wall of the pocket located between said mouth and the opposite side of the pocket being curved inward to form a supplemental pocket adapted to contain the articles during their passage through the vat.

9. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft, a drum thereon, a discharge chute whose inner end is located immediately above one side of the vat, and a delivery chute located on the same side of the drum

above the discharge chute, said drum having formed in its periphery pockets each having an inner wall of approximately spiral form one end of which extends toward itself, thus adapting the articles to be dipped to be received from the delivery chute, carried up and thence down to the vat and thence through the vat up to the discharge chute.

10. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft, a drum thereon, a discharge chute whose inner end is located immediately above one side of the vat, a guard extending down from the inner end of the discharge chute, a delivery chute located on the same side of the drum above the discharge chute, and a knock-off device located between the two chutes and extending within the periphery of the drum, said drum having formed in its periphery pockets each comprising a main pocket adapted to receive the article to be dipped from the delivery chute and carry them up and thence down toward the vat and a supplemental pocket merging into the main pocket and adapted to carry the articles within the vat toward the discharge chute.

11. In a dipping machine, the combination with a vat adapted to contain a liquid, of a shaft, a plurality of wheels spaced apart upon said shaft and suspended so as to revolve in said liquid in the revolution of the shaft, each wheel having a series of grooves in its periphery, the grooves of one wheel alining with the corresponding grooves of the other wheels and forming transversely extending receptacles or pockets for the reception and carriage of the articles to be dipped, a discharge chute arranged adjacent to the peripheries of the wheels at one side of the machine, a delivery chute located above and on the same side of the machine as the discharge chute, said delivery chute having a serrated end forming portions projecting between the wheels and therefore overlapping the pockets, and stops on the ends of the projecting portions, whereby automatically the articles may be fed one by one to the machine, dipped and discharged.

In testimony of which invention, I have hereunto set my hand, at New York city, N. Y., on this 18th day of March, 1912.

HIRAM P. HALL.

Witnesses:

M. M. HAMILTON,
E. E. WALL.