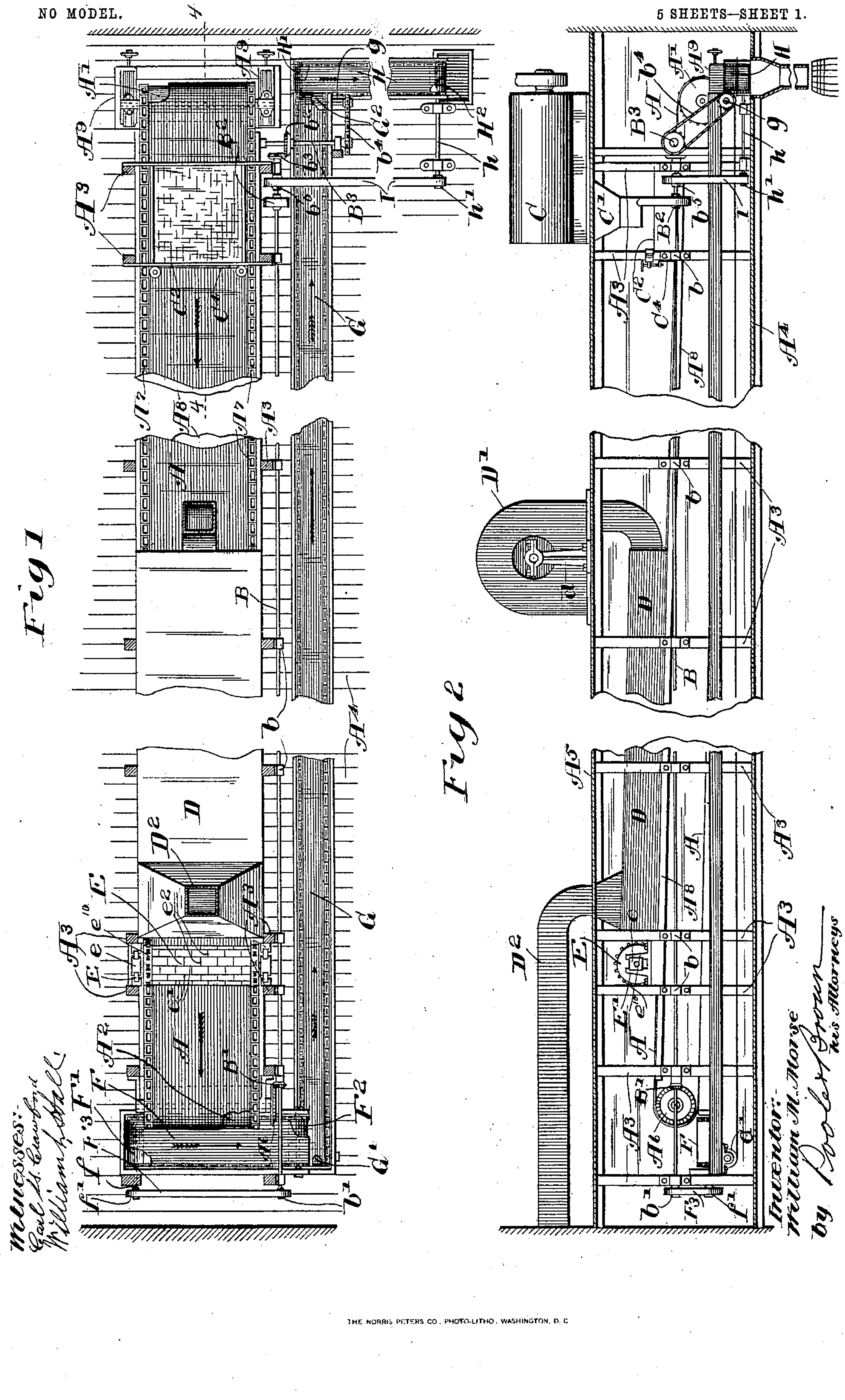
No. 755,915. PATENTED MAR. 29, 1904.

W. M. MORSE.

APPARATUS FOR MAKING CHIP SOAP OR THE LIKE.

APPLICATION FILED APR. 10, 1903.

NO MODEL. 5 SHEETS—SHEET 1.



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NO MODEL. 5 SHEETS—SHEET 2.

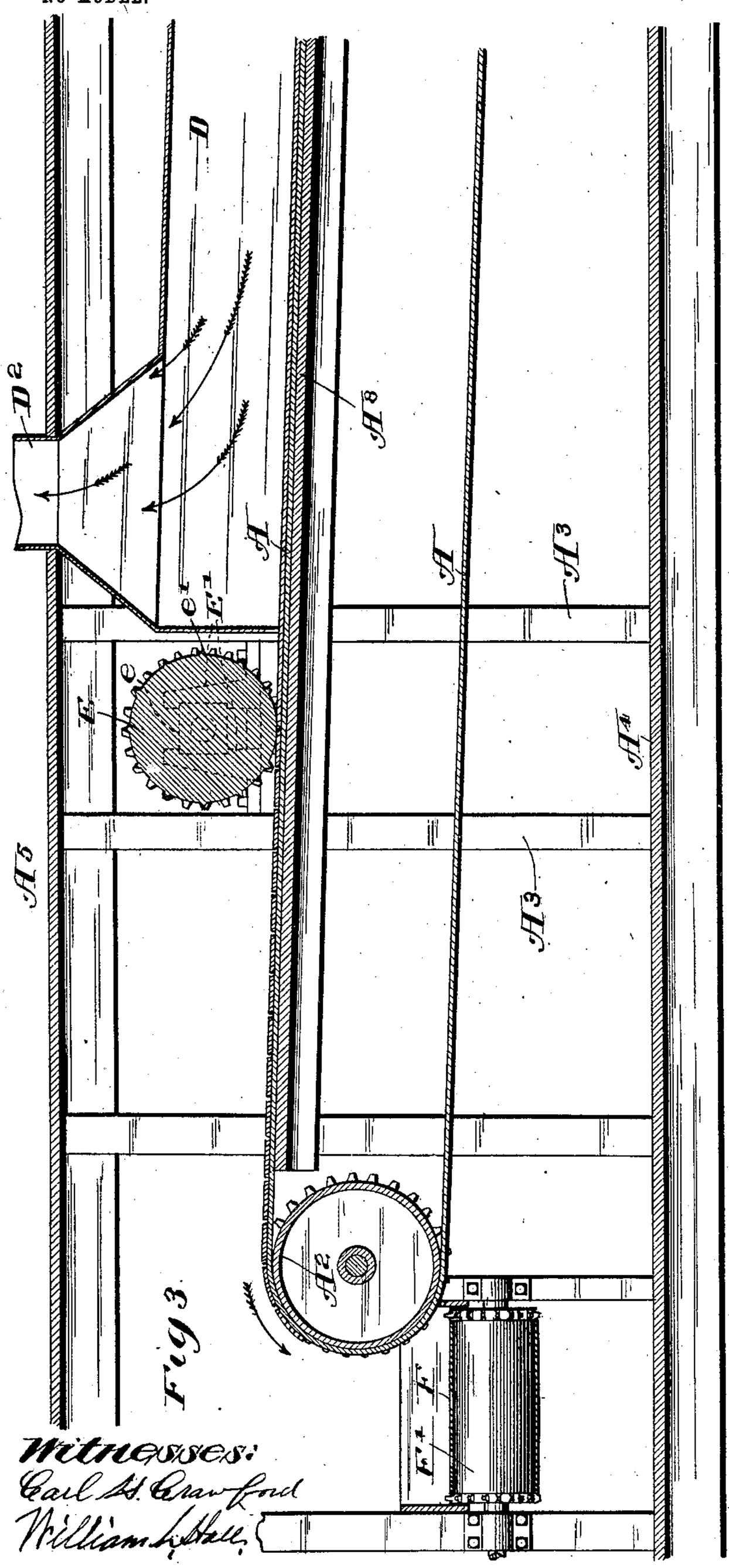

Fig 3

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NO MODEL. 5 SHEETS—SHEET 3.

Fig 4

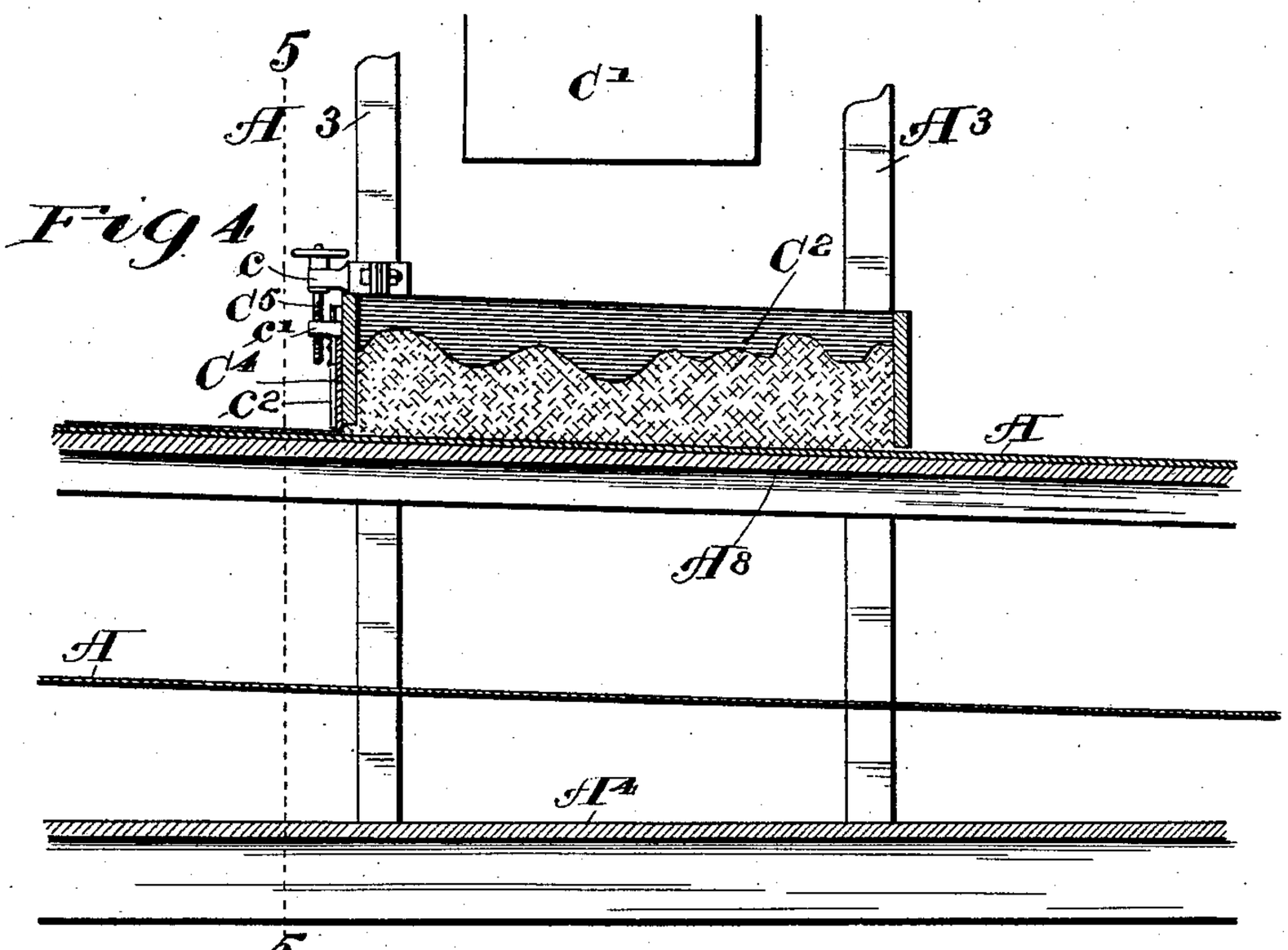

Fig 5

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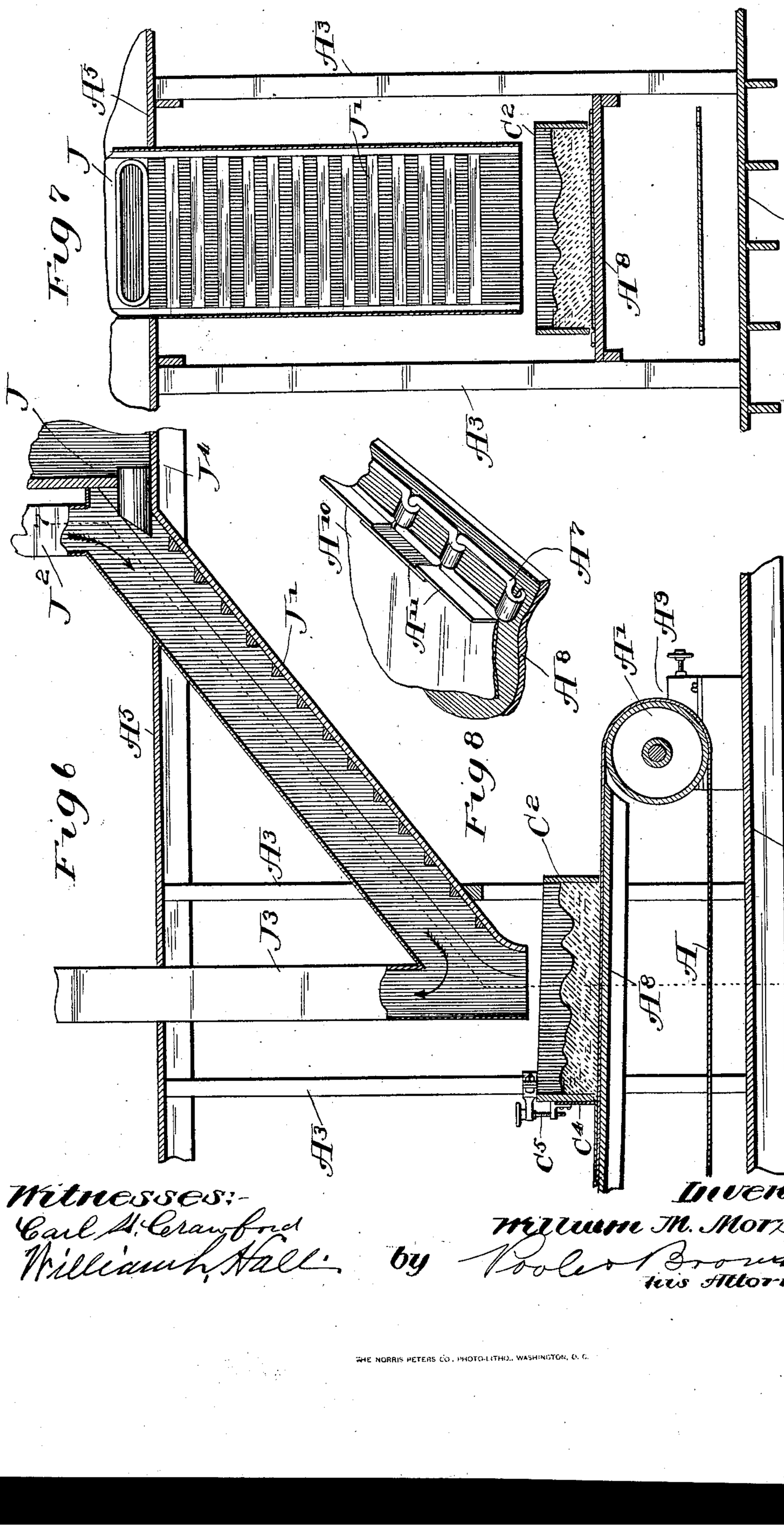
NO MODEL. 5 SHEETS—SHEET 4.



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NO MODEL. 5 SHEETS—SHEET 5.

Fig 9

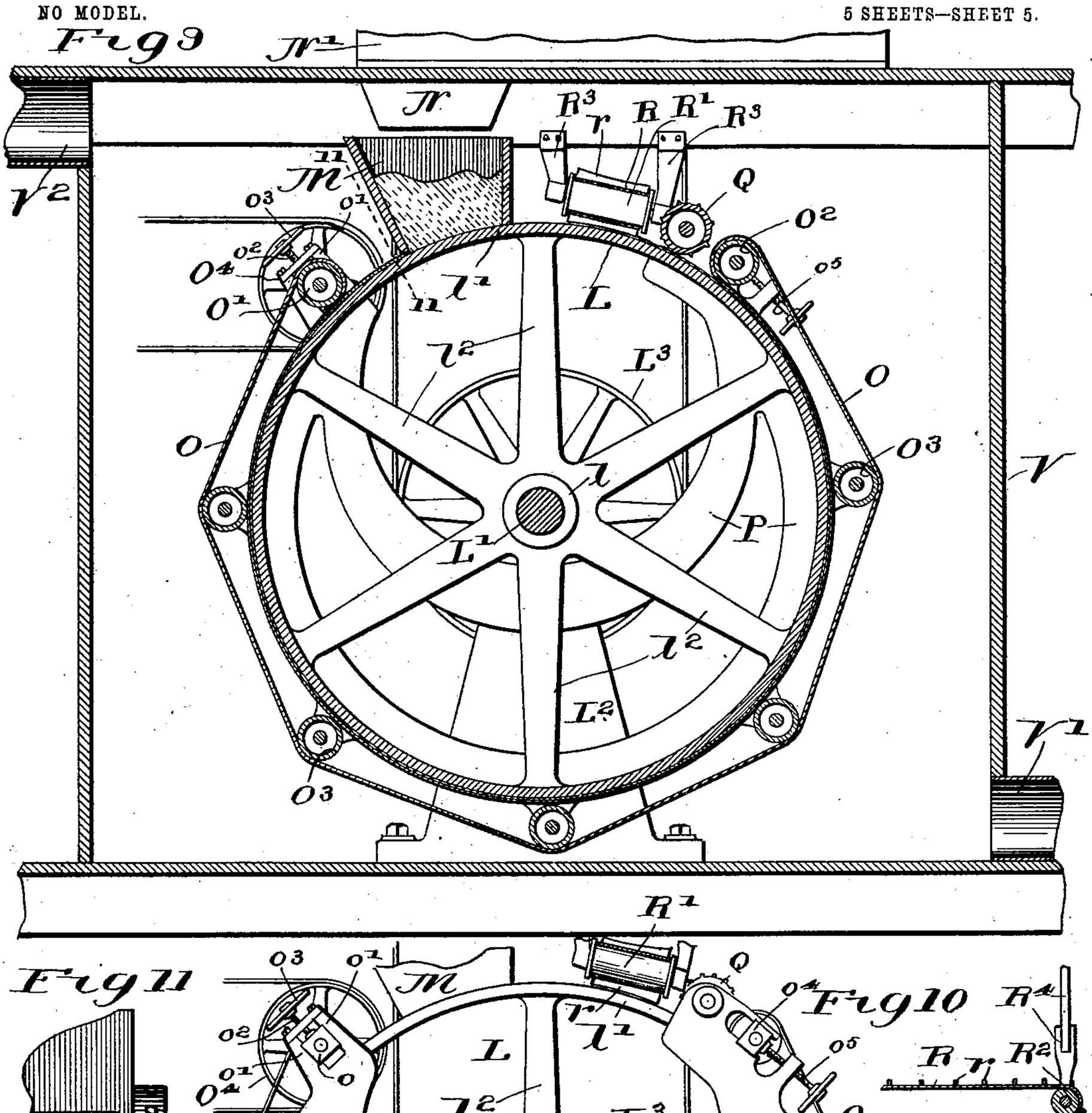

Fig 11

Fig 10

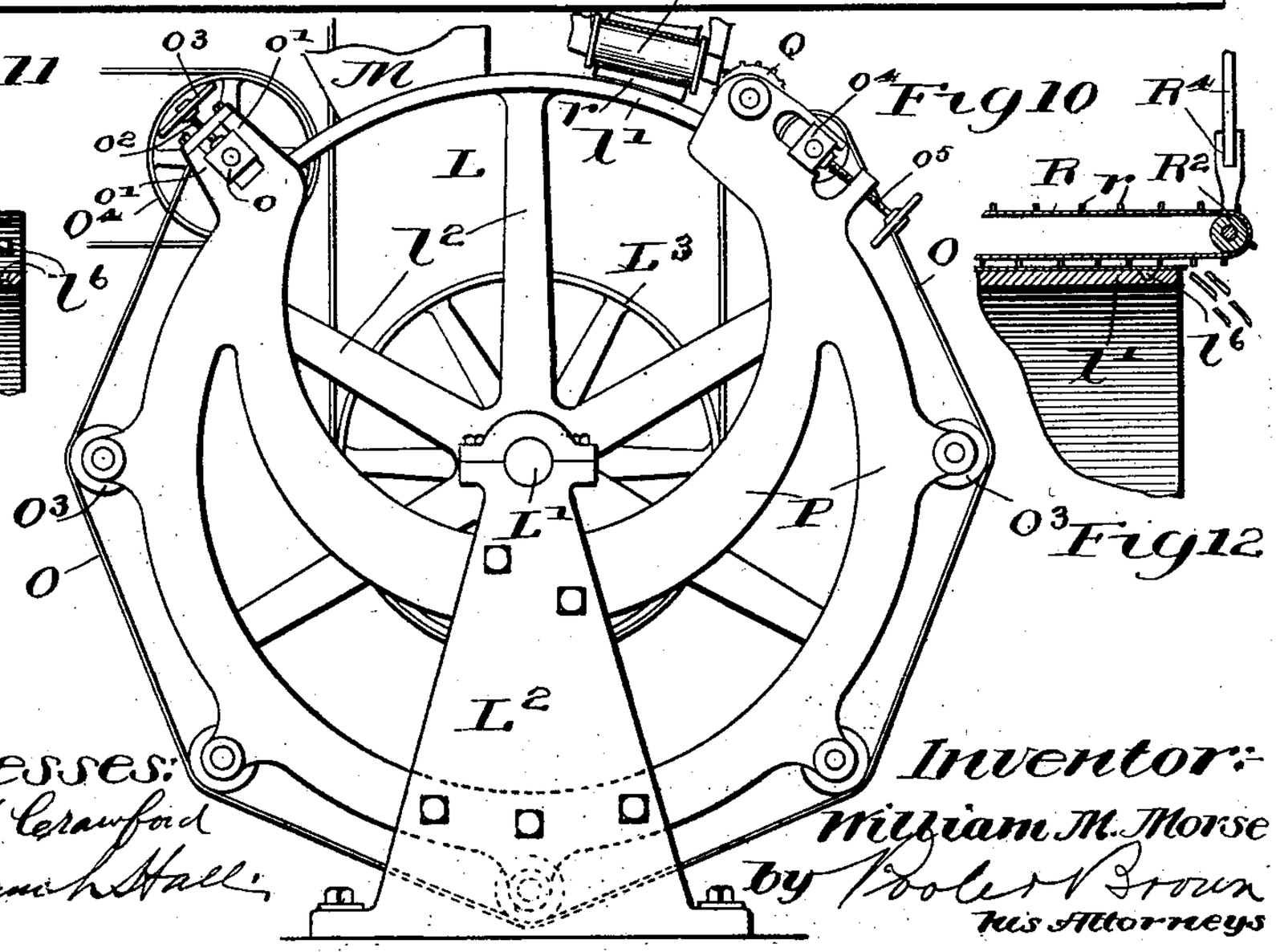

Fig 12

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Inventor:
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by Robert N. Brown
His Attorneys

No. 755,915. Patented March 29, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM M. MORSE, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO LEWIS R. SPEARE AND EDWARD R. SPEARE, OF BOSTON, MASSACHUSETTS.

APPARATUS FOR MAKING CHIP-SOAP OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 755,915, dated March 29, 1904.

Application filed April 10, 1903. Serial No. 152,013. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. MORSE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Making Chip-Soap or the like; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a novel apparatus designed, primarily, for manufacturing chip-soap or soap which has the form of thin flakes or chips and which readily dissolves in water when used and may be employed for producing other forms of commodities for plastic or semi-plastic substance when made according to the general mode of procedure hereinafter described.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a top plan view of my novel apparatus designed for producing chip-soap with parts broken away and parts shown in section. Fig. 2 is a longitudinal vertical section thereof. Fig. 3 is an enlarged longitudinal section of the rear end of the apparatus. Fig. 4 is an enlarged vertical section taken on line 4 4 of Fig. 1. Fig. 5 is a vertical section taken on line 5 5 of Fig. 4. Fig. 6 illustrates another means for delivering the saponified mass from the saponifying vat to the belt. Fig. 7 is a section on line 7 7 of Fig. 6 looking from the rear of the machine. Fig. 8 is a fragmentary perspective detail of a modified form of carrier. Fig. 9 is a central vertical section of a modified form of apparatus. Fig. 10 is a side elevation thereof. Fig. 11 is a cross-section taken on line 11 11 of Fig. 10. Fig. 12 is a fragmentary cross-section taken through the rim of the cylindric carrier shown in Figs. 9 and 10 and showing devices for discharging the broken soap chips from said carrier.

As shown in Figs. 1 to 5 of said drawings, A designates an endless carrier or belt trained about rollers A' A^2 at the front and rear, respectively, of the apparatus. The belt is driven through the medium of a horizontal shaft B, arranged parallel with and at one side of the path of the belt, and said shaft is mounted in suitable bearings *b*, which are supported on vertical standards A^3, rising from the floor A^4 of the compartment in which the apparatus is located. The principal part of the apparatus is located in a compartment contained between said floor A^4 and a horizontal wall or ceiling A^5. The rear roller A^2 is driven from the shaft B through the medium of a beveled gear B′, affixed on said shaft and a beveled gear-wheel A^6, mounted on the shaft of said rear roller. Said shaft B is rotated through the medium of a belt-pulley B^2, located near the front end of the apparatus, as shown in Fig. 1. The belt is preferably made of canvas or like material and is provided at its margins with sprocket-chains A^7 A^7, which engage sprocket-teeth at the ends of the rollers $A'A^2$, whereby said belt is positively driven. The upper lap of the belt is supported between the rollers on a narrow horizontal platform A^8, supported in any suitable manner on the frame and of the apparatus, whereby the upper lap of the belt is maintained horizontal and prevented from sagging under the weight of the load carried thereby.

C designates a saponifying-vat located at the front end of the machine and in which the material from which the soap is made is saponified. Said vat is provided with a discharge-spout C′, through which the contents of the vat is discharged into an open-topped spreading-chamber C^2, located over the belt and supported on the standards A^3, rising from the floor A^4. The bottom of said chamber is formed by the belt A, and said saponified material is discharged directly upon the belt and is merely confined by the walls of said chamber for the purpose of holding it in position to be properly spread upon the belt as the belt passes thereunder in the manner hereinafter to be described. The tension of the belt is maintained by means of tension devices A^9 A^9, located at the front of the apparatus, as

shown in Fig. 1. The saponified material in the chamber C^2 is spread in any suitable manner upon the traveling belt A in a uniformly-thin layer, and for this purpose I may employ various spreading devices. I have herein shown a spreading device which I have found to be practical and which is made as follows:

The rear wall of the chamber C^2, or that at the side thereof toward the direction of travel of the belt, terminates short of the belt, as shown in Fig. 4, so as to leave between the same and the belt an elongated opening or slot at the rear end of the chamber through which a thin layer of the material spread upon the belt may pass, the thickness of which layer depends upon the width of said slot. In order to be able to readily control the depth or thickness of the layer, I have provided a vertically-movable gage-plate C^4, Figs. 4 and 5, which is located outside of the rear wall of the chamber and which fits flat thereagainst and extends at its lower margin somewhat below the lower edge of said rear wall of the spreading-chamber. Said plate C^4 is adjustable vertically by means of two screw-shafts C^5 C^5, located one at each end of the front wall of the chamber and rotatively mounted in bearings *c*, supported on the adjacent standards A^3. Said screw-shafts have screw-threaded engagement with apertured screw-threaded lugs *c'*, extending rearwardly from said gage-plate C^4. Said gage-plate has guiding engagement at its ends with vertical guides c^2, attached to the rear wall of the chamber adjacent to the posts A^3. With this construction it will be obvious that the depth or thickness of the layer of saponified material spread upon the belt may be varied by raising or lowering the plate, as desired. The saponified material operated upon is of such consistency when it reaches the chamber C^2 that it will retain its form on the belt after having been spread thereon by the means above described.

It will be observed by reference to Fig. 4 of the drawings that the belt or carrier A travels flat on the support A^8 beneath the gage-plate C^4, whereby said belt is prevented from sagging at the place where the layer of the saponified material is given form. In other words, the upper and lower confines of the slot through which the material is passed to form said layer are unyielding, so that the layer formed thereby is of unvarying thickness regardless of the state or condition of the saponified material with respect to its consistency. This construction insures that the chips which are produced from said layer shall be of a desired uniform thickness.

The saponified material, after being spread upon the belt A in the manner described, is subjected to the influence of a drying agent, such as air, for the purpose of absorbing the moisture of the layer on the belt and dry and harden the same. As herein shown, the material is carried, after being spread upon the belt, through a drying-chamber D, which is located over a portion of the belt, Figs. 1, 2, and 3, and fits closely thereover, so as to prevent the escape of any considerable amount of air between the same and the belt. Preferably said drying-chamber is located some distance in advance of said spreading-chamber, so that the thinly-spread layer of saponified material will be subject to the action of atmospheric air before passing into said chamber. Said drying-chamber D is supplied with air through the medium of a fan-blower D', which is supported by standards *d*, rising from the horizontal wall or ceiling A^5 of the chamber or compartment in which the apparatus is located. Said drying-chamber D is made of a length sufficient to properly dry the material, which is passed slowly therethrough on the belt, and the air, after absorbing the moisture from the layer of soap on the belt, is discharged from the drying-chamber through an eduction-pipe D^2, which leads to the outside of the building. The length of the drying-chamber will depend upon the speed at which the belt is operated and also somewhat upon the amount of moisture contained in the saponified material and the degree of hardness which is to be imparted to said layer. Said layer is subjected to the influence of the drying agent until it is practically dry enough to store, and it is usually not necessary to subject the same to a further drying operation, though in the manufacture of certain grades of soap it may be desirable to additionally dry the soap.

After the soap has been dried in the manner described it is divided into flakes or chips of a size convenient for handling commercially. A practical manner of dividing or separating the layer of soap into a number of parts or chips is herein shown, which consists of a rotary cutter E, which is mounted in bearings *e*, contained in divided standards E', one at each side of the machine and supported between adjacent standards A^3 A^3, constituting part of the supporting-frame of the apparatus. Said rotary cutter is provided with longitudinal and transverse cutting-blades *e'* e^2, respectively, whereby the layer of soap as it passes thereunder is divided into a plurality of rectangular or other shaped pieces. The rotary cutter is free to move vertically and rests on the belt and is driven by means of sprocket-teeth e^{10}, Figs. 1 and 2, on the ends of the cutter, which mesh with the sprocket-chains at the sides of the belt A.

The soap after being cut into flakes or chips is carried rearwardly by the belt A and is discharged upon a transverse carrier or belt F, which is located in rear of the roller A^2 of the belt A. Said belt F is trained about rollers F' F^2. The shaft *f* of the roller F' is provided with a driving-pulley *f'*, and said pul-

ley is driven through the medium of a belt F^3, which is trained about said pulley f' and a pulley b', affixed to an extension of the driving-shaft B. The belt F discharges the divided or small soap chips upon another belt G, which is located at one side of the frame carrying the belt A and parallel therewith and travels in a direction opposite to that of the belt A. Said belt G is trained about driving-rollers G' G^2, located one near each end of the apparatus. The belt G is driven from the shaft B through the medium of a shaft B^3, located transversely to the shaft B and provided with a gear-wheel b^2, which meshes with a gear-pinion b^3 on the shaft B. To the other end of the shaft B^3 is affixed a sprocket-wheel, which is connected, by means of a sprocket-chain or link belt b^4, with a sprocket-wheel which is affixed to the shaft g of the roller G^2 of said belt G. The belt G may discharge the mass of soap chips carried thereby directly into a chute leading to a storage-receptacle. I have herein shown, however, said belt as discharging upon a short transverse belt H, which is trained about rollers H' H^2. The belt is driven from the roller H^2, the shaft h of said roller being provided with a driving-pulley h', which is connected by a belt I with a pulley b^5 on the shaft B in the manner clearly shown in Fig. 1. All of the belts F, G, and H are preferably made of canvas and are provided at their margins with sprocket or link belts which engage annular series of sprocket-teeth on the rollers about which they are trained, so that said belts are positively driven.

As before stated, the drying-chamber D is usually made of sufficient length and the speed of the belt A is so timed with respect to the length of the drying-chamber that the layer of soap as it emerges from the said drying-chamber is sufficiently dried and hardened that the flakes or chips cut therefrom by the rotary cutter E are in a condition to be at once stored or used. It may, however, in some instances be desirable to supplement the drying of the soap effected in the chamber D by a further drying process, and this may be accomplished in any suitable manner while the soap is passing from the rear end of the apparatus to the front end thereof on the belt G.

The operation of the apparatus described is obvious from the foregoing, but may be briefly stated as follows: The saponified material is delivered to the spreading-chamber C^2 through the spout C' to the belt A, and as the belt travels beneath said chamber and outwardly therefrom it carries with it the lower part of the mass of saponified material supported thereon, due to the tendency of said saponified material to adhere thereto. The part of said saponified material above the level of the upper part of the slot in the rearward part of the spreading-chamber, however, is retarded by the rear wall of said chamber, and only a layer of the material is allowed to pass outwardly from said chamber on said belt of a thickness determined by the width of said slot. Said layer of the saponified material after leaving said chamber is subjected to the influence of the atmosphere and is set or hardened on the belt and thereafter passes through the drying-chamber D, where it is brought under the influence of the air forced therethrough by the air-forcing device or fan-blower D'. The moving air acts to absorb or take up the moisture from the soap or saponified material, and when said material leaves said chamber it is in a comparatively dry and brittle state and ready to be cut into small pieces by the action of the rotary cutter E or other suitable cutting device. The soap when thus dried does not adhere to the belt, but is freely removable therefrom, leaving the belt free to receive another layer to be subsequently dried thereon.

In some instances, as where the saponification of the soap material takes place under high temperatures and the saponified material leaves the saponifying-vat in a liquid or semiliquid state, it may be desirable to preliminarily reduce the saponified material from such a liquid or semiliquid state to a plastic state before it is delivered on the carrying-belt A. When making soap under these conditions, I may locate the saponifying-vat J, Figs. 6 and 7, at a considerable distance above the level of the belt and direct the liquid saponified material to the spreading-chamber through an inclined chute or conduit J', which discharges at its lower end into the spreading-chamber C^2. The lower wall of said chute is provided with a plurality of raised transverse ridges, which constitute a riffled surface, over which the liquid or semiliquid material passes and by which it is retarded and broken up, so that it may be subjected to a chilling agent, as air, for the purpose of chilling the same, so that it will retain its form when spread upon the belt. Preferably air is directed through said chute by means of an inlet and outlet air branch J^2 J^3, respectively, to hasten the chilling operation. The liquid or semiliquid material passes from said vat J to the chute through a short pipe or conduit J^4.

I may employ a belt of the character shown in Fig. 8, wherein the belt, which is designated by the reference-letter A^{10}, is provided on each side with a raised flange, forming, in effect, a trough, which prevents the semiliquid material from running over the sides of the belt. The flanges of said belt are shown as made of a number of short sections A^{11}, which are attached to the belt in any suitable manner—as, for instance, they may be made integral with the links A^7 of the belt. Said flange-sections have overlapping engagement at their ends, whereby when the belt occupies a horizontal position the flange-sections constitute a continuous flange, while at the same time said belt is enabled to freely flex when

passing around a guiding or driving roller of the apparatus.

In Figs. 9 to 12 is illustrated a modified form of apparatus, wherein the carrier has the form of a rotative wheel-like member L, upon the periphery of which the layer of saponified material is spread and upon which it is dried as said member rotates. The saponified material is applied to the periphery of the rotary carrier at one part thereof and remains thereon during an almost complete rotation of the carrier, and is cut into small pieces or chips by means of a suitable cutter located adjacent to the spreading means. Said carrier is contained in a suitable chamber V, through which air is forced to dry the layer of saponified material on the carrier's periphery.

Referring now to the structural details of the modification shown in said Figs. 9 and 10, they are constructed and arranged as follows: Said rotary carrier comprises, as herein shown, a central hub l, a broad flat rim l', upon the outer cylindrical surface of which is spread the saponified material, and radial spokes l^2, connecting said hub and rim. The carrier is fixed to a horizontal rotative shaft L', mounted in the upper ends of standards L^2, one at each side of the carrier. M designates a spreading-chamber located above the carrier. Said chamber is open at its top and bottom, and the open bottom conforms closely to the periphery of the wheel and is formed to provide at the lower edge of its rear wall a transverse spreading-slot, (like the spreading-slot of the chamber C^2, before described,) which determines the thickness of the layer spread on the carrier. The saponified material is delivered to the spreading-chamber by means of a spout N of a superjacent saponifying-vat N'.

The layer of saponified material is confined on the carrier by means of an endless belt O, which is trained about rollers O' O^2, located one in each bight of the belt and intermediate rollers O^3, disposed about the carrier, as shown in Fig. 9. Said confining-belt extends partially only around the carrier, being interrupted at the upper side of the carrier to provide space for the spreading-chamber and the cutter, hereinafter to be described. The inner lap of the confining-belt conforms to the periphery of the carrier, so as to press or confine the layer upon the carrier, while the outer lap thereof is trained outside the intermediate guide-rollers O^3. The rollers O', O^2, and O^3 are carried by side frame members P P, bolted to the standards L^2, as shown in Fig. 10. The shaft of the roller O' is mounted in blocks o, which have sliding engagement with bearing-brackets o' in a manner to move toward and from the surface of the carrier. Said block is moved toward and from the carrier and locked in a given position by means of screw-shafts o^2, having hand-wheels o^3. In this manner the distance between the roller O' and the carrier may be varied to correspond with the thickness of the layer on the carrier. The tension of the belt is maintained by means of a tension device, embracing bearing-blocks o^4, sliding in the frame P, and screw-shafts o^5, connected with said blocks and having screw-threaded engagement with the frame. The carrier L is rotated through the medium of a belt-pulley L^3, fixed on the shaft L'. The belt O is driven through the medium of a belt-pulley O^4, affixed to the shaft of the roller O'. The belt and carrier are so driven as to impart equal speeds to the belt and periphery of the carrier, so that there is no relative movement of the inner lap of the belt with respect to the carrier, while said belt is in position to confine the layer of saponified material on the carrier. Drying-air is introduced to said chamber through an inlet-conduit V', located at the bottom of said chamber, and is discharged therefrom through an outlet-conduit V^2, leading from the top of the chamber on the side thereof remote from the inlet-conduit. The air forced through said chamber passes over and around said carrier and in contact with the layer of saponified material on the carrier and absorbs the moisture therefrom, and the carrier is rotated at such speed with respect to the circumferential length of the carrier so that the layer of saponified material while passing from the roller O' to the roller O^2 is dried sufficiently to be cut or divided into chips and is preferably sufficiently dried to be in condition for immediate storage. The confining-belt O is made porous to permit the drying-air to pass therethrough into contact with the layer of saponified material, a coarse woven canvas being a suitable material for this purpose.

Located in front of the roller O^2 with respect to the direction of movement of the carrier is a cutting-cylinder or rotary cutter Q, made like the cylinder E, hereinbefore described. Said cutting-cylinder extends transversely across and rests on the periphery of the carrier and is journaled in the frame P, as shown in Fig. 10. Said cylinder is driven by means of annular series of teeth located at the ends thereof, which engage corresponding series of recesses or sockets l^6 in the peripheral face of the carrier. The chips or divided pieces of soap are removed from the carrier by means of a horizontal belt R, located transversely in front of the cutting-cylinder and provided with transverse slats r, which engage the carrier with a wiping action, as more clearly shown in Fig. 12, and clears the carrier of the soap chips produced by said cutting-cylinder. The belt R is trained over inner and outer rollers R' R^2, the former shown in Figs. 9 and 10 and the latter in Fig. 12. The roller R' is journaled in the lower ends of brackets R^3, depending from the top wall of the chamber, and the roller R^2 is likewise journaled in brackets R^4, one of which is shown in Fig. 12. Said discharge-belt may be driven by power applied to either of the rollers R' R^2.

Further changes in the structural details may be made without departing from the spirit of my invention, and I do not wish to be limited to illustrated details except as hereinafter made the subject of specific claims.

I claim—

1. An apparatus for the purpose set forth comprising an endless traveling carrier, a spreading-chamber located thereover into which is delivered the plastic material, a spreading-slot in the wall of said chamber which extends transversely above and across the carrier and having unyielding upper and lower walls whereby the slot is of unvarying width, and through which slot the plastic material is passed to spread or form it in a thin layer upon the belt of a thickness equal to the desired thickness of the finished product, means for drying said layer on the carrier, and means for thereafter breaking the layer into parts.

2. In an apparatus for the purpose set forth, an endless traveling carrier, a spreading-chamber located thereover into which the plastic material is delivered upon said carrier, said chamber being provided in its wall with a spreading-slot which extends transversely above and across the carrier and the lower side of which is defined by said carrier, and means whereby the carrier beneath said slot is supported unyieldingly, thereby maintaining the slot of an unvarying width regardless of the consistency of the plastic material which is passed therethrough.

3. In an apparatus for the purpose set forth, an endless traveling carrier, a spreading-chamber located thereover into which the plastic material is delivered upon said carrier, said chamber being provided in its wall with a spreading-slot which extends transversely across, and the lower wall of which is formed by, the carrier, and a support for the carrier beneath the spreading-slot.

4. In an apparatus for the purpose set forth, an endless traveling carrier, a spreading-chamber located thereover into which the plastic material is delivered upon said carrier, said chamber being provided in its wall with a spreading-slot which extends transversely across, and the lower wall of which is formed by, the carrier, a gage for determining the width of said spreading-slot, and means whereby the carrier beneath said slot is supported unyieldingly, thereby maintaining the slot of an unvarying width regardless of the consistency of the plastic material.

5. An apparatus for the purpose set forth comprising an endless traveling carrier, a spreading-chamber located thereover into which the plastic material is delivered upon the carrier, said chamber being provided in its wall with a spreading-slot which is located transversely across said carrier, and the lower wall of which is defined by said carrier, means whereby the carrier beneath said slot is supported unyieldingly, thereby maintaining the slot of an unvarying width, means for drying said layer on the carrier, and means for dividing the dried layer into parts.

6. An apparatus for the purpose set forth comprising a traveling carrier, means for spreading the plastic material on said carrier in a layer, means for drying said layer, and a rotary cutter located over said carrier for dividing the layer into parts, said cutter being provided with an annular series of teeth and the carrier with a series of recesses or sockets which coact with said teeth to rotate said cutter.

7. An apparatus for the purpose set forth comprising a traveling carrier, means for spreading the plastic material on the carrier in a layer, a chamber inclosing said carrier in advance of said spreading means, means for forcing air through said chamber for drying the layer on said carrier, and a rotary cutter located in advance of said chamber and provided with peripheral blades which divide the layer in a plurality of parts.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 18th day of March, A.D. 1903.

WILLIAM M. MORSE.

Witnesses:
WILLIAM L. HALL,
GEORGE R. WILKINS.