M. KIND.

APPARATUS FOR COOLING LIQUEFIED SOLIDS.

APPLICATION FILED NOV. 2, 1911.

1,046,307.

Patented Dec. 3, 1912.

8 SHEETS—SHEET 1.

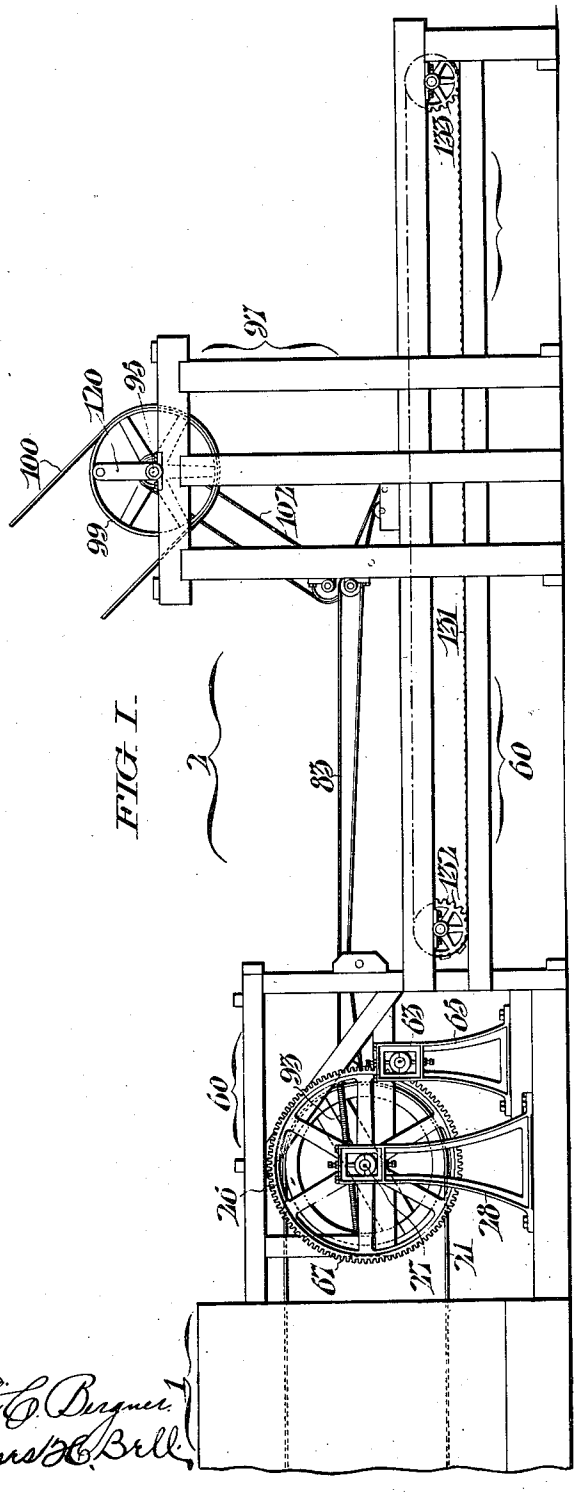

FIG. I.

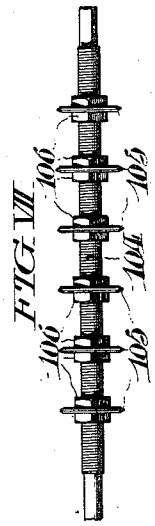

FIG. VII.

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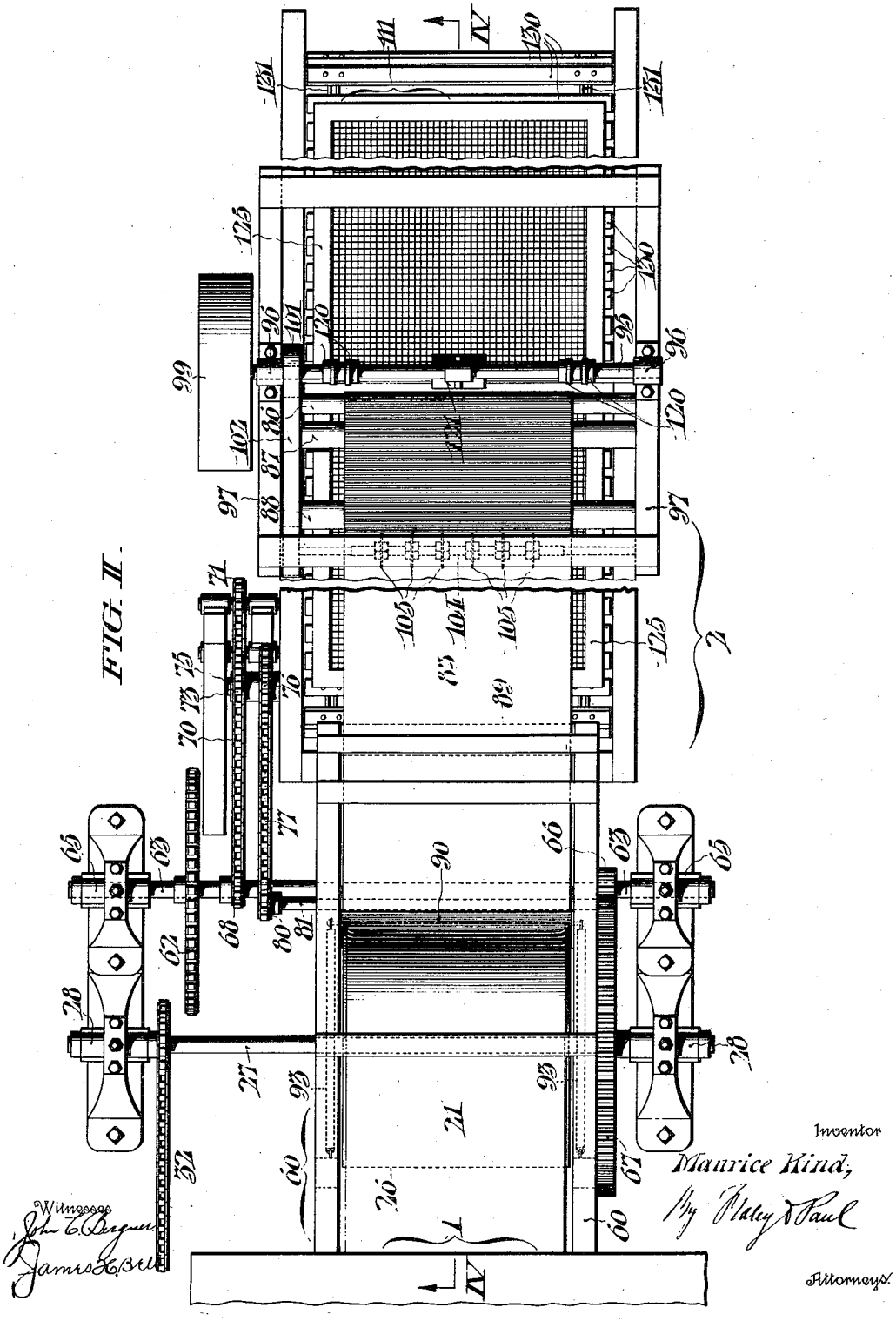
8 SHEETS—SHEET 2.

FIG. II.



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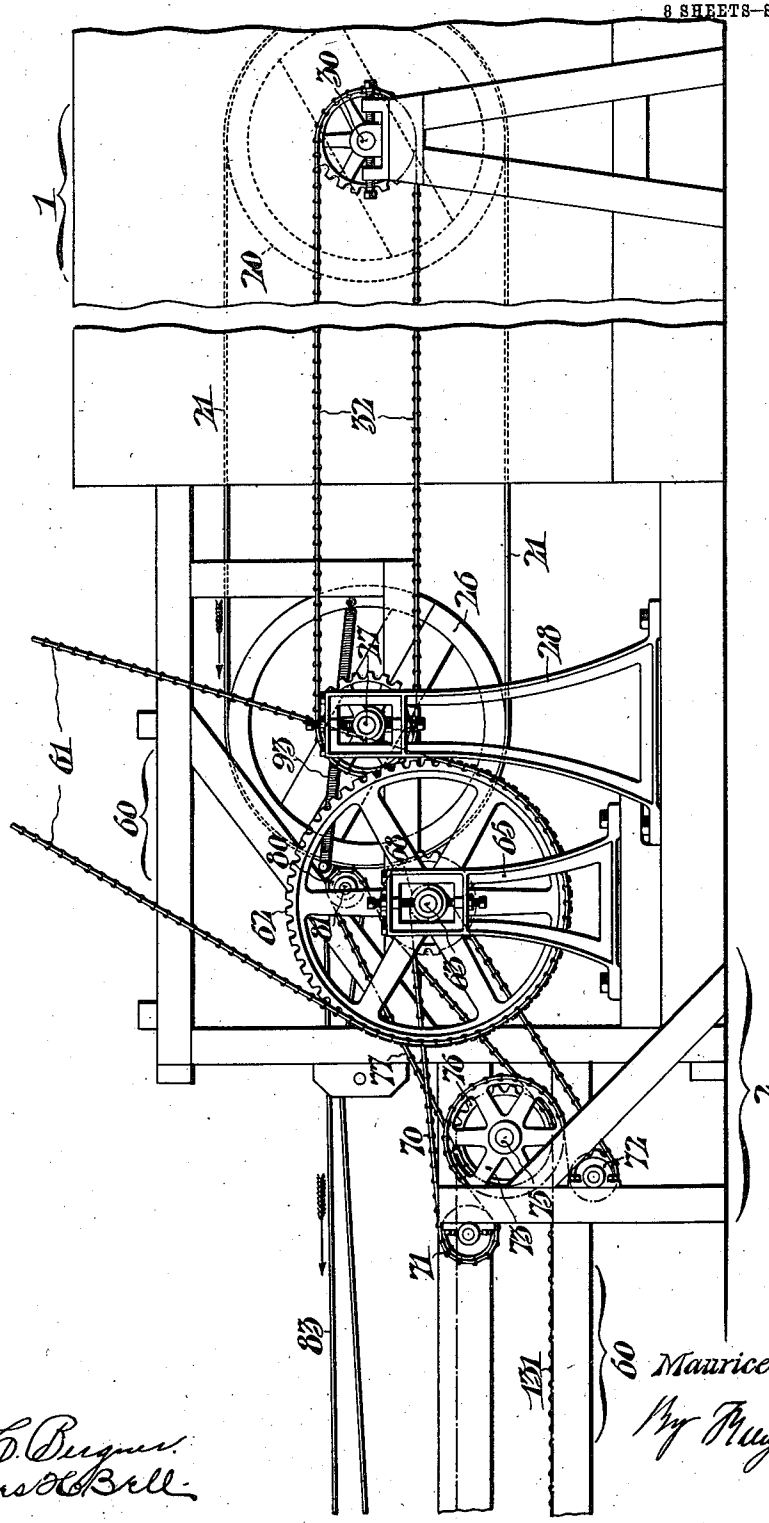
8 SHEETS—SHEET 3.

FIG. III.



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8 SHEETS—SHEET 4.

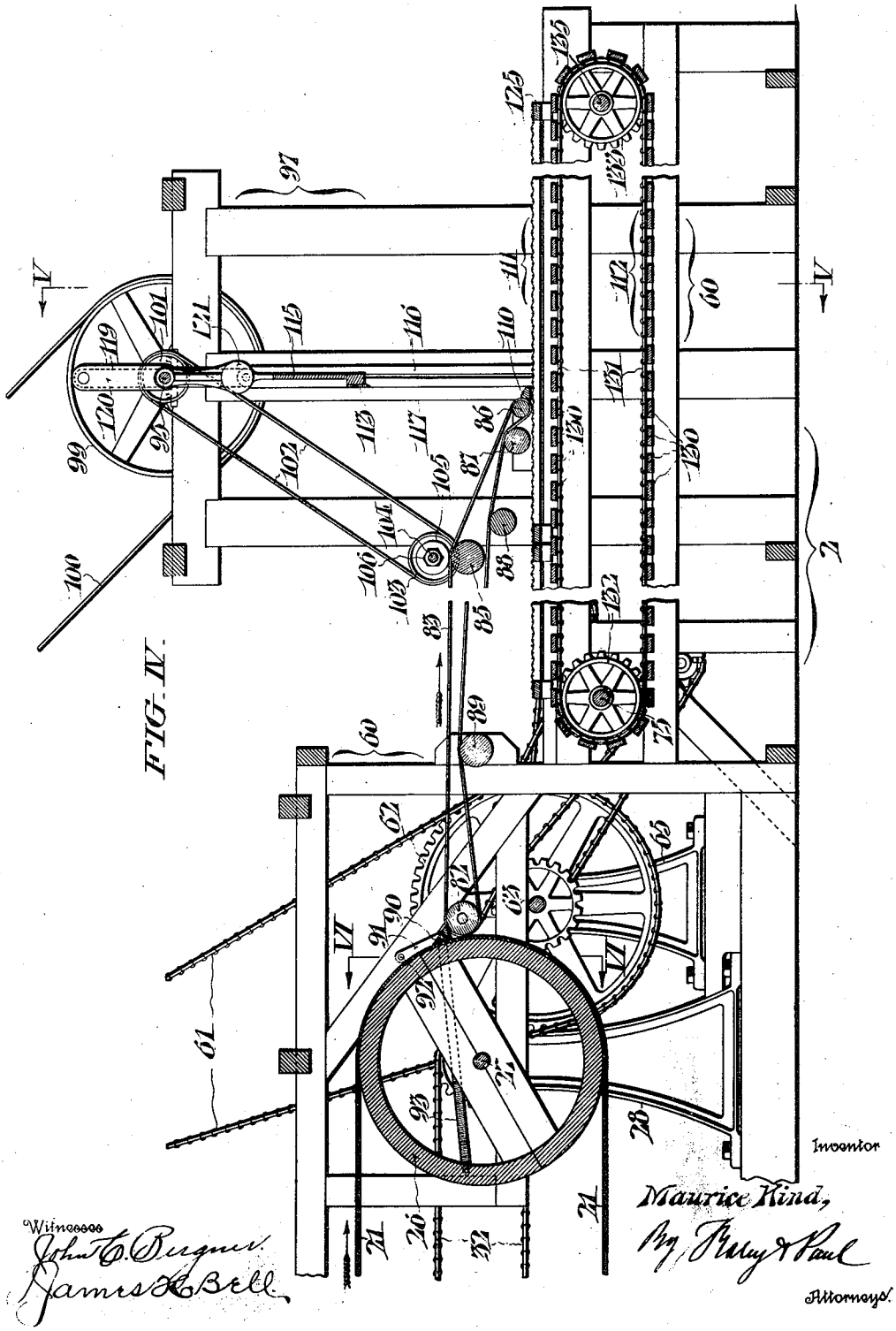

FIG. IV.

Witnesses
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8 SHEETS—SHEET 5.

FIG. V.

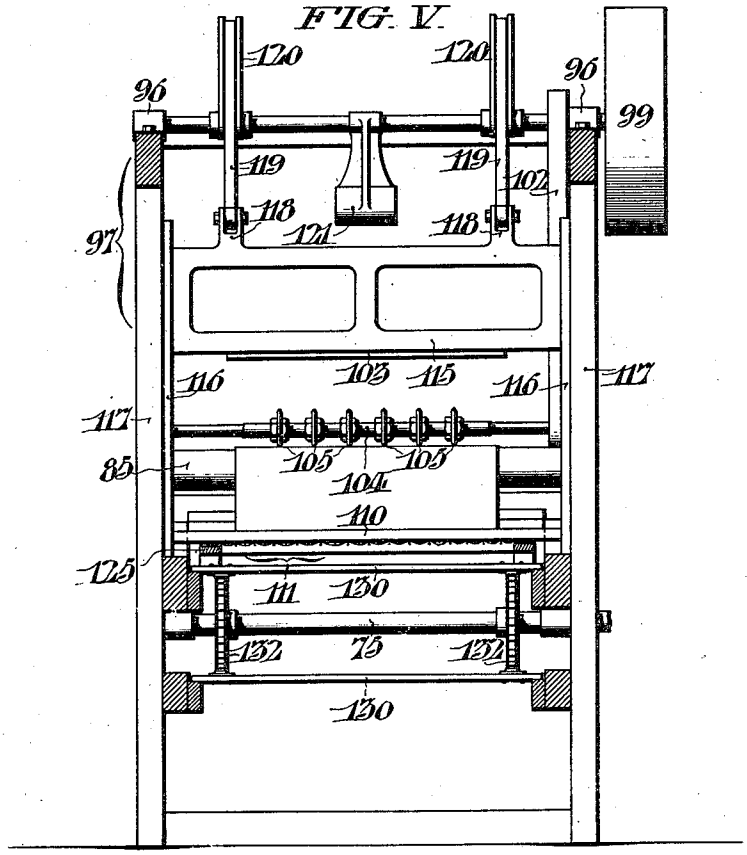
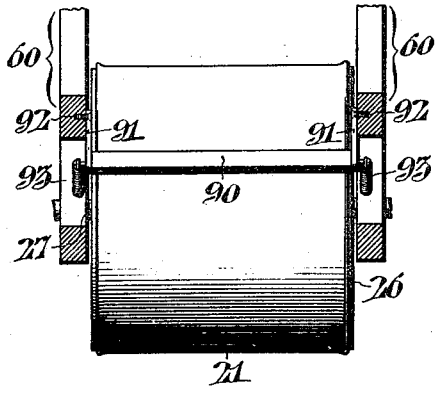


FIG. VI.



Witnesses

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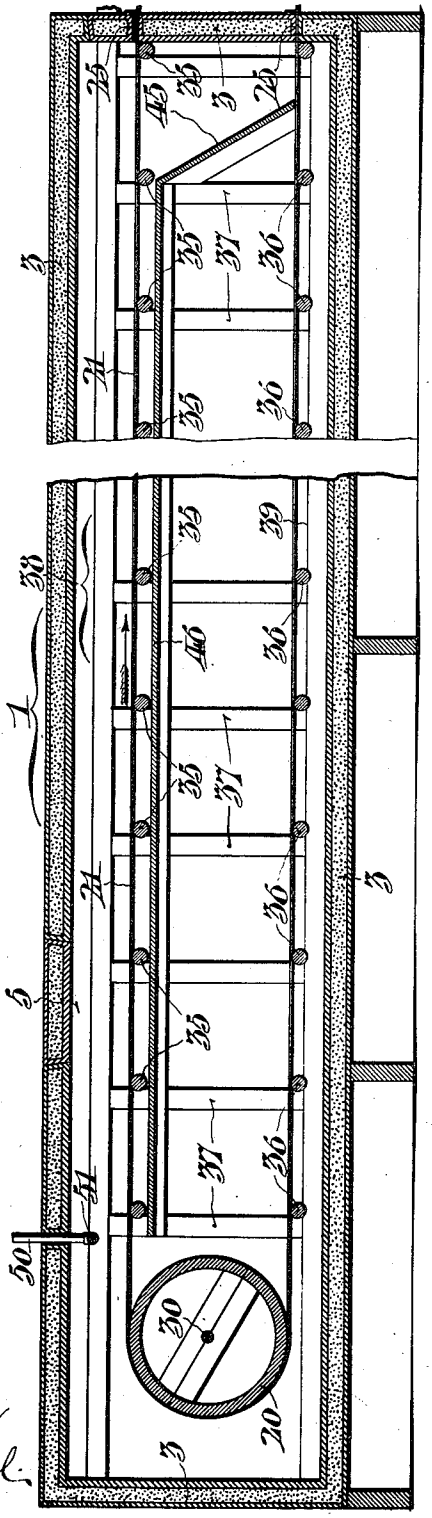
8 SHEETS—SHEET 6.

FIG. VIII.



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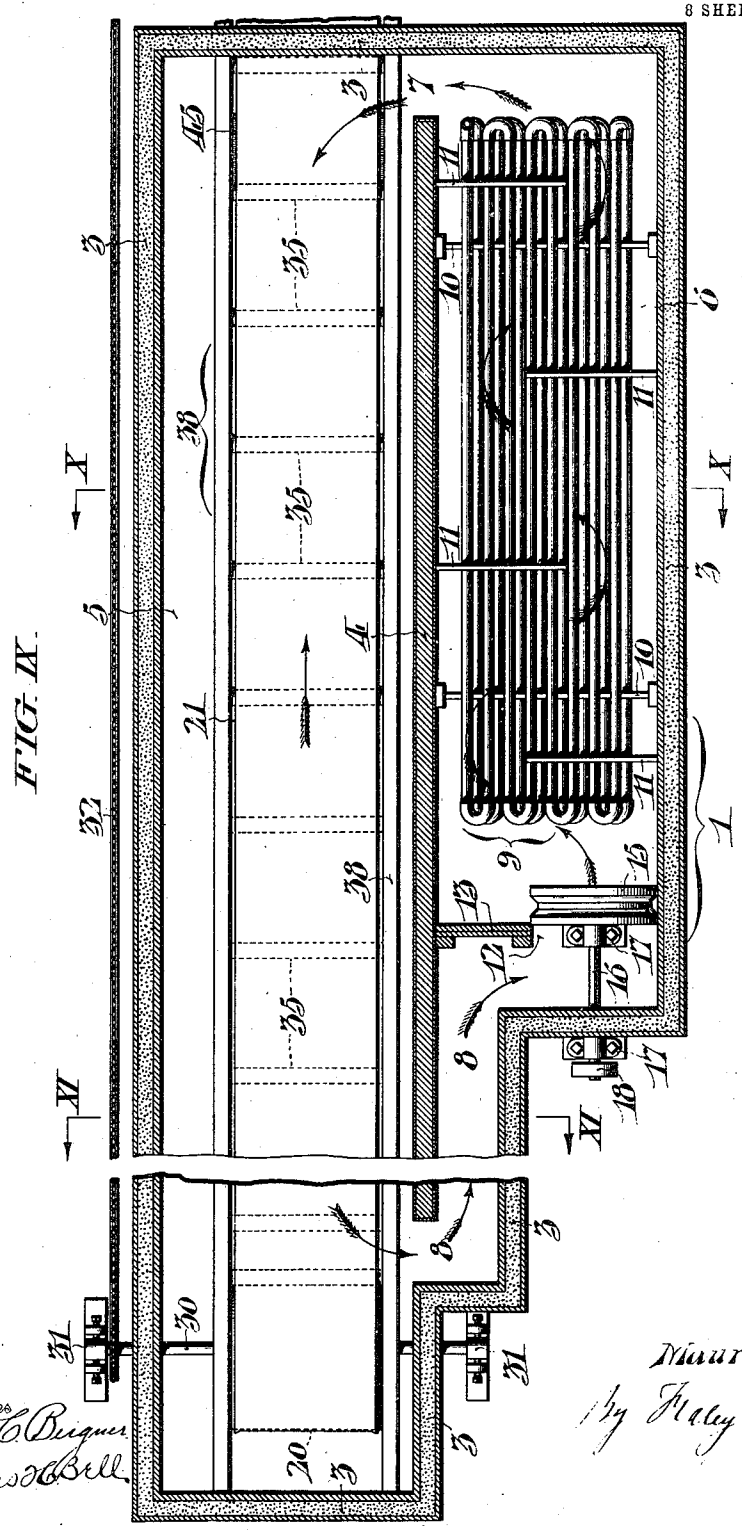
APPLICATION FILED NOV. 2, 1911.

1,046,307.

Patented Dec. 3, 1912.

8 SHEETS—SHEET 7.

FIG. IX.



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8 SHEETS—SHEET 8.

FIG. X.

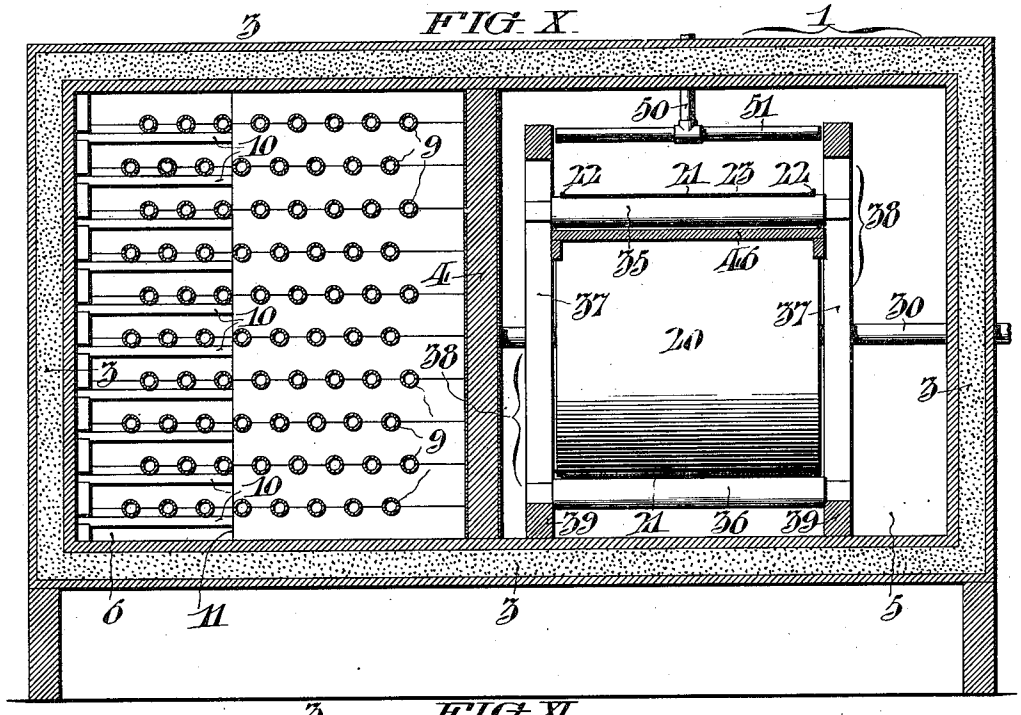
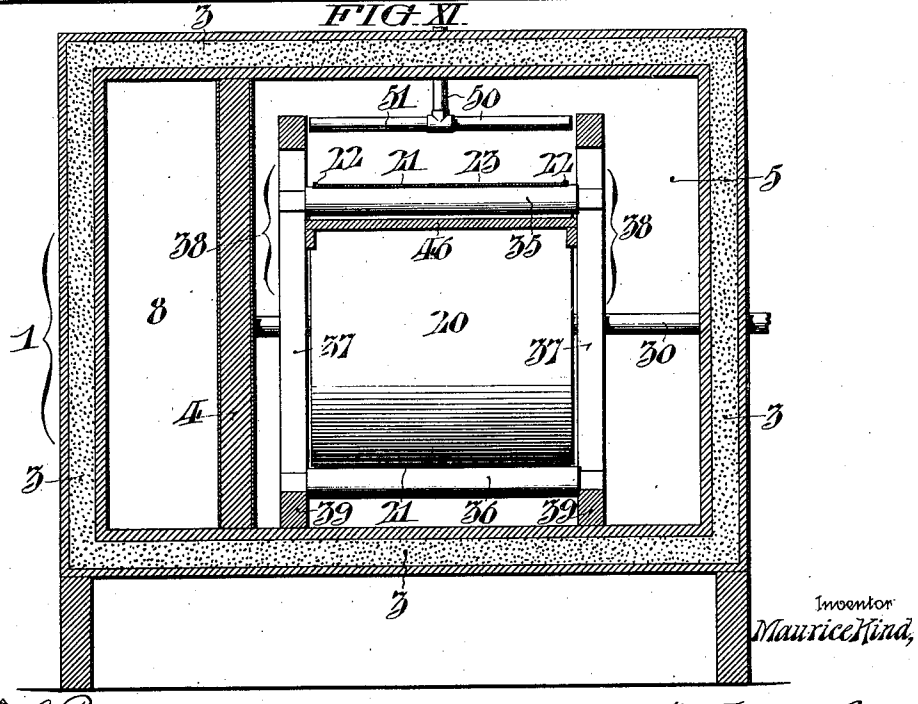


FIG. XI.



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UNITED STATES PATENT OFFICE.

MAURICE KIND, OF CAMDEN, NEW JERSEY.

APPARATUS FOR COOLING LIQUEFIED SOLIDS.

1,046,307. Specification of Letters Patent. Patented Dec. 3, 1912.

Application filed November 2, 1911. Serial No. 658,073.

To all whom it may concern:

Be it known that I, MAURICE KIND, of the city of Camden, county of Camden, and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Cooling Liquefied Solids, whereof the following is a specification, reference being had to the accompanying drawings.

An object of the invention is to provide an apparatus wherein gelatin or other products where heat is necessary for extraction, may be converted from a liquid state, into a semi-solid state by means of treatment with chilled air, and thereafter cut into the desired shapes for marketing purposes.

A further object of the invention is to provide an apparatus of the above character with means for directing chilled air on to the upper surface of the semi-solid sheet, as it is formed and passed through a cooler on a conveyer.

A further object of the invention is to provide a device of the above character with cutters for cutting the semi-solid sheets into strips.

A further object of the invention is to provide an apparatus of the above character with a cutting means for cutting the strips into sections, together with a conveyer for receiving said sections which conveyer is so timed in its movements as to space the sections in trays carried by the conveyer.

These and other objects will in part be obvious, and will in part be hereinafter more fully described.

In the drawings which show by way of illustration one embodiment of the invention, Figure I, is a side elevation of a machine conveniently embodying my improvements. Fig. II, is a fragmentary plan view of the same on a somewhat larger scale than that of Fig. I. Fig. III, is a side elevation of the machine looking from the top of Fig. II. Fig. IV, is a central longitudinal sectional view taken in line IV, IV, in Fig. II. Figs. V, and VI, are cross sections, respectively taken on lines V, V, and VI, VI, in Fig. IV. Fig. VII, is a detail view of the rotary cutter employed in cutting the gelatin into strips. Fig. VIII, is a vertical longitudinal section through the cooler. Fig. IX, is a horizontal section of the same. Figs. X, and XI, are cross sections through the cooler, respectively taken on lines X, X, and XI, XI, in Fig. IX.

The apparatus illustrated in the several figures comprises a cooler, comprehensively indicated at 1, which is supplemented by a cutting and conveying device 2. As seen in Fig. IX, the cooler is substantially rectangular in form, and is completely surrounded by insulated walls 3. The cooler, is subdivided by means of a central portion 4, into two separate compartments 5, and 6, which communicate at their ends, by means of the passages 7, and 8. Located within the compartment 6, are the refrigerating coils 9, which are conveniently supported by cross bars 10, and connected to any suitable source of refrigerant supply. Chamber 6, is further provided with a series of baffle plates 11, which are alternately spaced along the side walls thereof.

At its left hand end (Fig. IX) the compartment 6, communicates with passages 8, through a circular opening 12, in a transverse partition 13. Located within the opening 12, is a blower fan 15, mounted upon a shaft 16, which is suitably journaled in bearing blocks 17, and driven by means of a pulley 18, from any convenient source of power. By means of the fan 15, the air is sucked from the left hand end of the compartment 5, through the passage 8, and blown into the compartment 6, where it is effectively cooled by contact with the refrigerating coils 9. By means of the baffle plates 11, the air in circulating through the compartment 6, is compelled to take a zig-zag course as indicated by the arrows, and thus forced to traverse the refrigerating coils several times, thereby causing thorough chilling before it enters the compartment 5.

Mounted within the compartment 5, at its left hand end is a drum 20, over which passes an endless flat mold belt 21, having upturned edges 22, thus forming a shallow bed 23. (See Figs. X, and XI). This mold belt 21, is preferably formed of rubber, and passes through suitable openings 25, 25, in the right hand end wall, of the compartment 5, and thence over a second drum 26, which is located outside of and directly adjacent the cooler 1, as best shown in Fig. I. The drum 26, is mounted upon a shaft 27, which is journaled in suitable bearings 28, 28. Drum 20, is similarly mounted upon a shaft 30, journaled in bearings 31, 31, which are adapted for adjustment to regulate the tension of the mold belt 21. Shafts 27, and 30,

and therefore their respective drums 26, and 20, are both driven at the same speed by means of a chain connection 32.

In its passage through compartment 5, the belt 21, is conveniently guided at the top by a series of rollers 35, and at its bottom by a similar series 36. The rollers 35, are journaled in the several uprights 37, of a supporting frame 38, within the compartment 5. The rollers 36, are similarly journaled on the bottom rails 39, of the frames 38. The rollers 35, and 36, not only prevent the sagging of the mold belt 21, but perform a further function of acting as a substantial support to hold the said belt perfectly flat so that the gelatin which is fed in liquid form, as will be hereinafter more definitely described, may be evenly distributed over the bed of the said belt 21.

Between the uprights 37, of the frames 38, and at the right hand end of the cooler, is an inclined baffle plate 45, which extends upward to a point in close proximity to the top portion of the belt, where it is supplemented by a horizontal portion 46, which is also conveniently supported between the uprights 37. As the cooled air, circulating through the passage 7, enters the compartment 5, it strikes the inclined baffle plate 45, and is thereby directed upwardly, and by the co-action of the horizontal portion 46, is confined practically to the top portion of the belt 21, and thereby thoroughly chills the sheet of gelatin carried thereon.

Preparatory to the feeding of the gelatin it is heated to liquid form in any suitable device for the purpose. It is then fed by means of a pipe 50, which enters the top of the cooler 1, near its left hand end (Fig. VIII) and supplies a cross pipe 51, spanning the entire width of the belt 21. The cross pipe 51, is perforated along its bottom side, and the liquid gelatin is thereby evenly distributed over the width of the belt 21. The speed of belt 21, and the rate of feedings are relatively so adjusted that a layer of gelatin of unvarying thickness is conveyed through the cooler 1, and owing to the chilled air currents is transformed to a semi-solid state as it emerges therefrom.

The cutting and conveying device.—This device comprises a frame work having side frames 60, 60, which are connected by a number of cross pieces and by which the several working parts are supported.

Power is supplied by means of a chain 61, to a sprocket wheel 62, which is mounted on the main or driving shaft 63, of the machine. This shaft is journaled in bearings 65, 65, located on the outside of the supporting frame work. On its opposite end (Fig. II) the shaft 63, carries a pinion 66, which meshes with a toothed gear wheel 67, secured on the drum shaft 27, previously herein mentioned. Adjacent to the sprocket wheel 62, shaft 63, also carries a sprocket pinion 68. A chain 70, after passing over idler sprockets 71, and 72, transmits the motion of the sprocket pinion 68, in a reverse direction to a sprocket wheel 73, on a shaft 75. A second sprocket wheel 76, on shaft 75, is geared by means of a chain 77, to a sprocket pinion 80, mounted on the outer end of a cross shaft 81, suitably journaled in the side frames 60.

Upon the shaft 81, is mounted a driving roller 82, over which passes the intermediate conveyer belt 83, which may be formed of rubber or any other suitable material. The said belt after leaving roller 82, moves horizontally in the direction of the arrow over an idler roller 85, and is thereafter inclined downwardly and over a second idler 86, and returns over rollers 87, 88, and 89, to the roller 82.

As seen in Fig. IV, roller 82, is mounted in close proximity to the drum 26, so that the gelatin in its semi-solid form may be transferred from the mold belt 21, to the intermediate or conveyer belt 83. This is accomplished by means of a scraper 90, having a triangular cross section, which practically fills the gap between the drum 26, and roller 82. The scraper strip is suspended by means of arms 91, 91, Fig. VI, which are pivoted at 92, 92, to the side frames 60, 60. The scraper 90, is maintained in close contact with the mold belt 21, by means of springs 93, 93, which are fastened at one end to the arms 91, 91, and at their other ends to the supporting frame work. In order to effect a perfect transfer from the mold belt 21, to the conveyer belt 83, they are both operated at practically the same speed.

A shaft 95, for operating the cutters, is journaled in bearings 96, 96, which are mounted upon the top rails of a superstructure 97, comprised by the side frames 60, 60. Shaft 95, carries a pulley 99, which is driven by means of a belt 100, from any suitable overhead power supply. The motion of shaft 95, is transmitted through a second pulley 101, thereon, by means of a belt 102, to a similar pulley 103, on a cross shaft 104, mounted directly above the idler roller 85, already described.

The shaft 104, has an enlarged central portion which is threaded so as to permit the adjustment of the several cutters 105, carried thereon (see Fig. VII). These cutters 105, are circular in form and are provided with cutting peripheries and when properly adjusted are held in place on the shaft 104, between jam nuts 106. The edges of the cutters 105, as they rotate, contact with the surface of the conveyer belt 83, as it passes over the roller 85, and divide the sheet of semi-solid gelatin carried thereon, into several strips, whose width may be

varied at will by the adjustment of the several cutters.

After being divided into strips, the gelatin passes down the inclined path of the belt, and is transferred therefrom by a second scraper 110, to trays 111, carried by a conveyer 112, which will be directly more fully described. As the strips of gelatin leave the scraper 110, they are cut transversely by means of a vertically reciprocating knife edge 113, which is slightly wider in extent than the belt 83. The knife 113, shears against the edge of the scraper 110, and is mounted upon a frame 115, which reciprocates in guides 116, secured to the uprights 117, of the superstructure.

The frame 115, is provided at its top with lugs 118, for the pivotal connection of a pair of connecting rods 119, whose other ends are similarly connected to the crank arms 120, carried by the shaft 95. A counter balance weight 121, is also mounted on the shaft 95, between the crank arms 120, to compensate for the weight of the knife frame 115. It will be seen that by regulating the speed of the shaft 95, with respect to the speed of the belt 83, the gelatin strips may be severed transversely to any desired size.

The trays 111, already mentioned, to which the gelatin is finally transferred comprise rectangular frames 125, upon which is mounted a wire meshing. These trays 111, are sucessively inserted under the belt 83, (see Fig. I), and placed upon the conveyer 112, which consists of a plurality of cross strips 130, which span and are attached to a pair of chains 131, moving over sprocket wheels 132, and 133. The sprockets 132, are mounted upon the shaft 75, already described, and the sprockets 133, on a similar shaft 135, at the extreme right hand or delivery end of the device as seen in Figs. I, and IV.

The gear connections are so proportioned that the speed of the conveyer 112, is slightly greater than that of the belt 83, so that when the gelatin is delivered upon the trays 111, the pieces are separated so as to avoid adhesion.

In practice the charged trays are stacked upon trucks and transferred to drying chambers and therein again subjected to a current of air where the solidification is finally completed.

Having thus described my invention, I claim:

1. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler; a conveyer; means for supporting and causing said conveyer to traverse said cooler; means for feeding the said solids in liquid form to the conveyer traversing said cooler; means for causing the circulation of chilled air within the cooler; and means for cutting the said solids after leaving said cooler.

2. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler inclosed on all sides thereof; a conveyer adapted to pass into and out of said cooler; means for feeding the said solids in liquid form to the conveyer; means for causing the circulation of chilled air within the cooler and over the conveyer and means for cutting said solids into sections.

3. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler inclosed on all sides thereof; a conveyer belt adapted to pass into and out of said cooler; a pipe extending into said cooler and across the conveyer belt for feeding said solids in liquid form in a sheet on the conveyer; means for causing the circulation of chilled air within the cooler and means for cutting said solids into sections.

4. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler inclosed on all sides thereof; a conveyer belt adapted to pass into and out of said cooler; a pipe extending into said cooler and across the conveyer belt for feeding said solids in liquid form in a sheet on the conveyer; means for causing the circulation of chilled air within the cooler; a second conveyer for receiving the semi-solids from the first conveyer; means for causing said conveyers to travel at the same speed; and a scraper for transferring the semi-solids from the first conveyer to the second conveyer.

5. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler inclosed on all sides thereof; a conveyer belt adapted to pass into and out of said cooler; a pipe extending into said cooler and across the conveyer belt for feeding said solids in liquid form in a sheet on the conveyer; means for causing the circulation of chilled air within the cooler; a second conveyer for receiving the semi-solid from the first conveyer; means for causing said conveyers to travel at the same speed; a scraper for transferring the semi-solid from the first conveyer to the second conveyer; and means for cutting the solids into strips while on said second conveyer.

6. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler comprising a refrigerating compartment, and a traversing compartment; a conveyer traversing said last named compartment; means of communication between the ends of the said compartments; means for circulating air through the said compartments; means for feeding said conveyer with the liquefied

solids; and means for cutting the solids after leaving the said cooler.

7. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler comprising a refrigerating compartment; refrigerating coils for chilling the air in said compartment; a second or traversing compartment; a conveyer traversing said last named compartment; means of communication at the ends of the said compartments; a blower for circulating the chilled air through the said compartments; means for feeding the said conveyer with the liquefied solids; and means for cutting the product into strips after leaving said cooler.

8. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler comprising a refrigerating compartment; refrigerating coils for chilling the air in the said compartment; baffle plates located in said compartment to cause the air to repeatedly traverse the said coils; a traversing compartment; a mold belt traversing said last named compartment; means of communication between the ends of the said compartments; a blower for circulating the chilled air through the said compartments; means for feeding the belt with the liquefied solids; and means for cutting the said solids after leaving the cooler.

9. In an apparatus for the cooling of liquefied solids and cutting the same into sections, the combination of a cooler comprising a refrigerating compartment, having refrigerating coils therein; baffle plates alternately disposed on opposite sides of the said compartment to cause a current of air to repeatedly traverse the said refrigerating coils; a traversing compartment; a mold belt traversing the latter compartment; an inclined deflecting or baffle plate at the air inlet end of the belt traversing compartment, and a horizontal supplemental baffle plate extending beneath the top of the said mold belt, for directing and confining the current of chilled air to the carrying portion of the said belt; means for feeding said belt; communication passages between the ends of the two above mentioned compartments; a fan for circulating the chilled air through the said compartments; and means for cutting the solids after leaving the said cooler.

10. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler; a conveyer belt adapted to pass into and out of the cooler; means for feeding the said solids in liquid form to the conveyer; a second conveyer adapted to receive the semi-solid from the first conveyer; means for cutting the semi-solid into strips on the second conveyer; means for driving said belt and said second conveyer at the same speed; a third conveyer adapted to support trays; means for driving said third conveyer at a greater speed than the second conveyer; and means for cutting strips into sections as they pass from the second conveyer to the third conveyer.

11. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler; a mold belt traversing the said cooler; a conveyer belt external to said cooler; a scraper for directing the charge from the mold belt to the said conveyer belt; means for cutting the solids into longitudinal strips while carried by the conveyer belt; and means for cutting the said strips transversely.

12. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler; a mold belt traversing said cooler; a conveyer belt external to said cooler; means for feeding the said belt with the liquefied solid; a scraper for directing the charge from the mold belt to the conveyer belt; rotary cutters coöperating with the surface of the said conveyer belt to divide the charge longitudinally into strips; a scraper for directing the said strips from the conveyer belt; a knife cooperating with the last mentioned scraper for cutting the strips transversely.

13. In an apparatus for cooling liquefied solids and cutting the same into sections, the combination of a cooler; a mold belt traversing the said cooler; means for feeding the said belt with the liquefied solid; a conveyer belt external to the said cooler; a scraper for directing the charge from the mold belt to the conveyer belt; adjustable rotary cutters coöperating with the surface of the said conveyer belt for dividing the charge longitudinally into strips; a scraper for directing the said strips from the conveyer belt; a reciprocating knife coöperating with the last mentioned scraper, for cutting the said strips transversely; and a conveyer adapted to carry trays upon which the solid is finally deposited.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this twenty-sixth day of October 1911.

MAURICE KIND.

Witnesses:
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