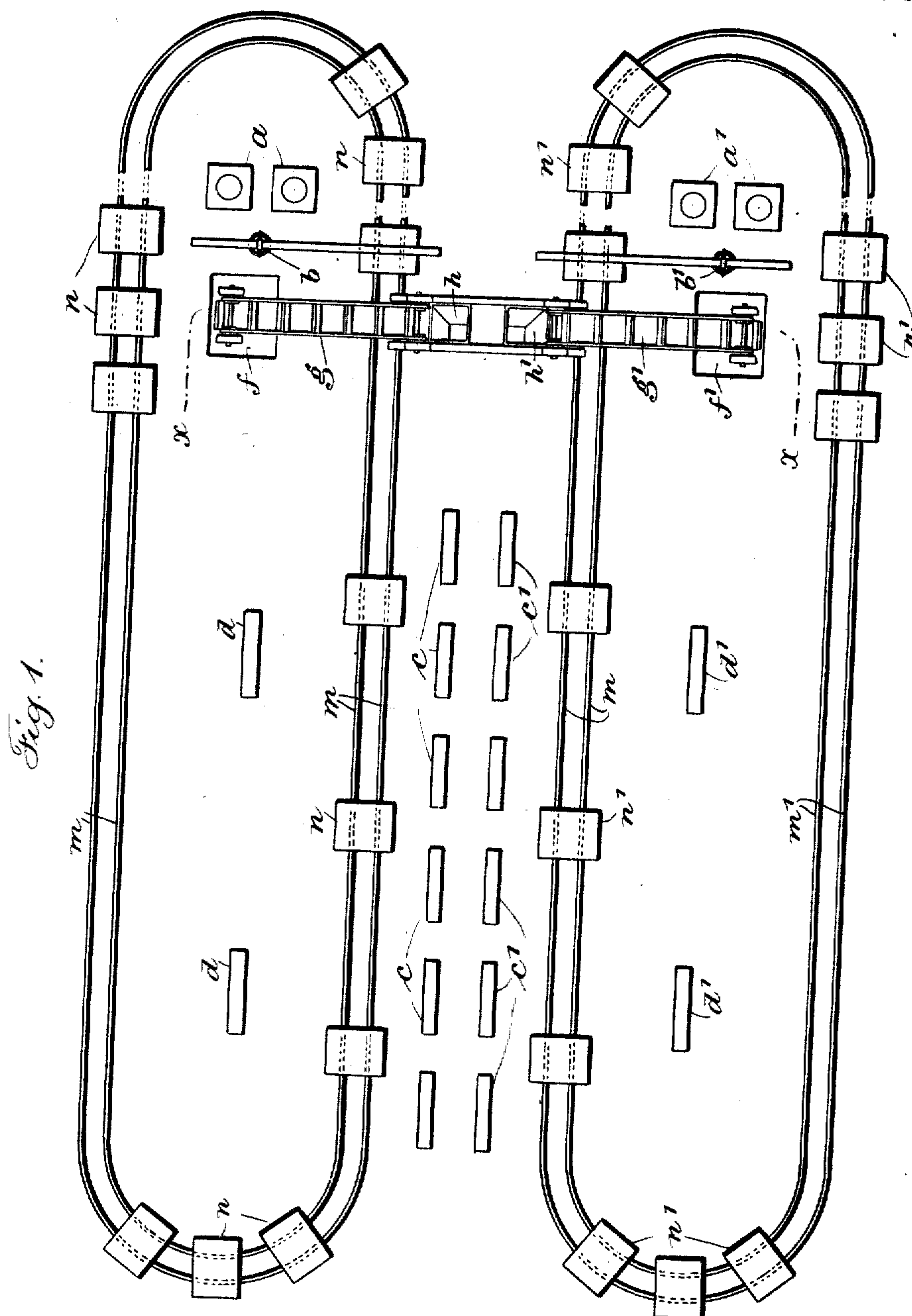


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METHOD OR SYSTEM OF CASTING ARTICLES IN METALS.  
APPLICATION FILED JUNE 19, 1908.

910,448.

Patented Jan. 19, 1909.

4 SHEETS—SHEET 1.



Witnesses  
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by Harold Serrell his atty.

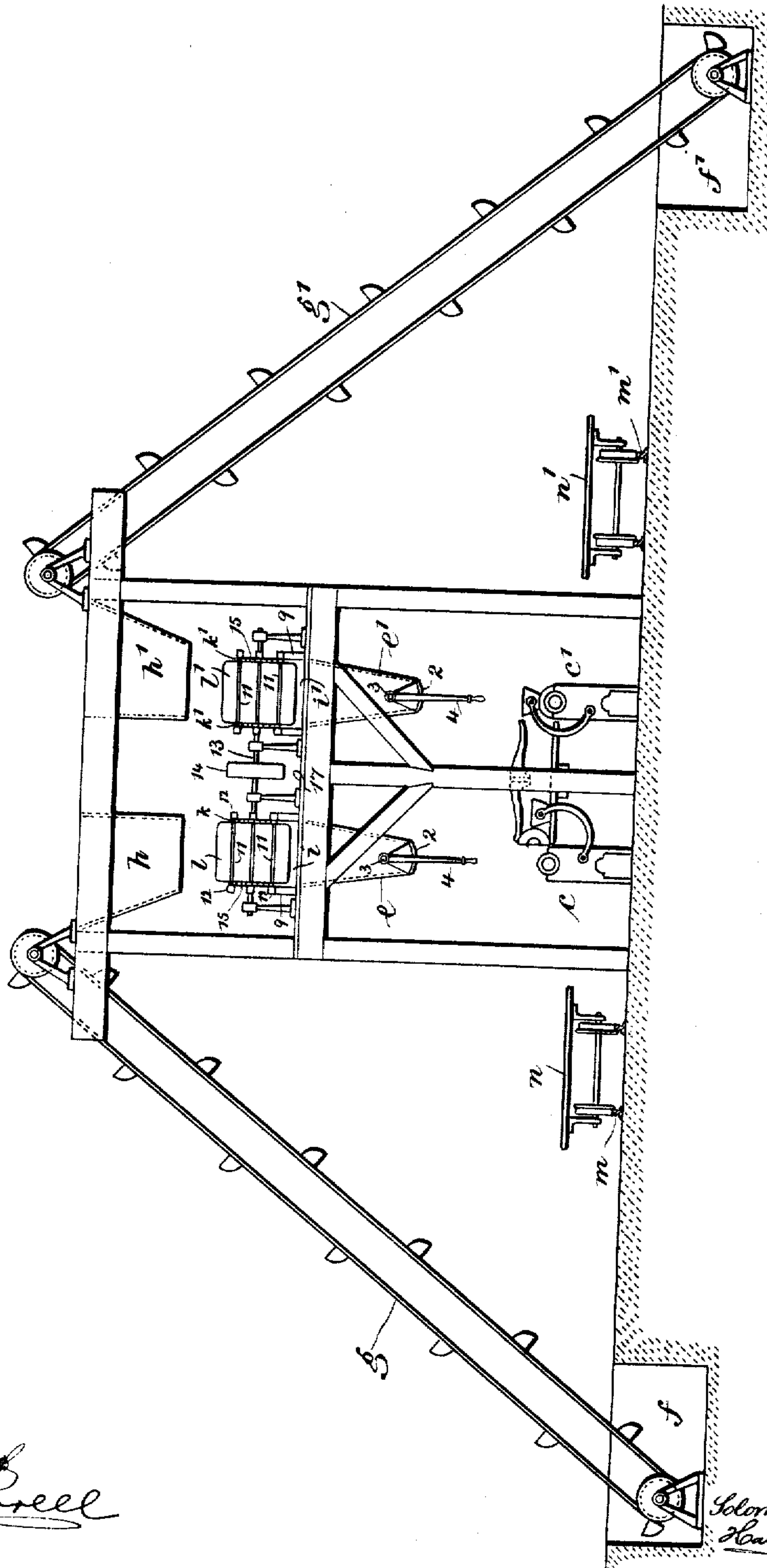
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4 SHEETS—SHEET 2.

Fig. 2.



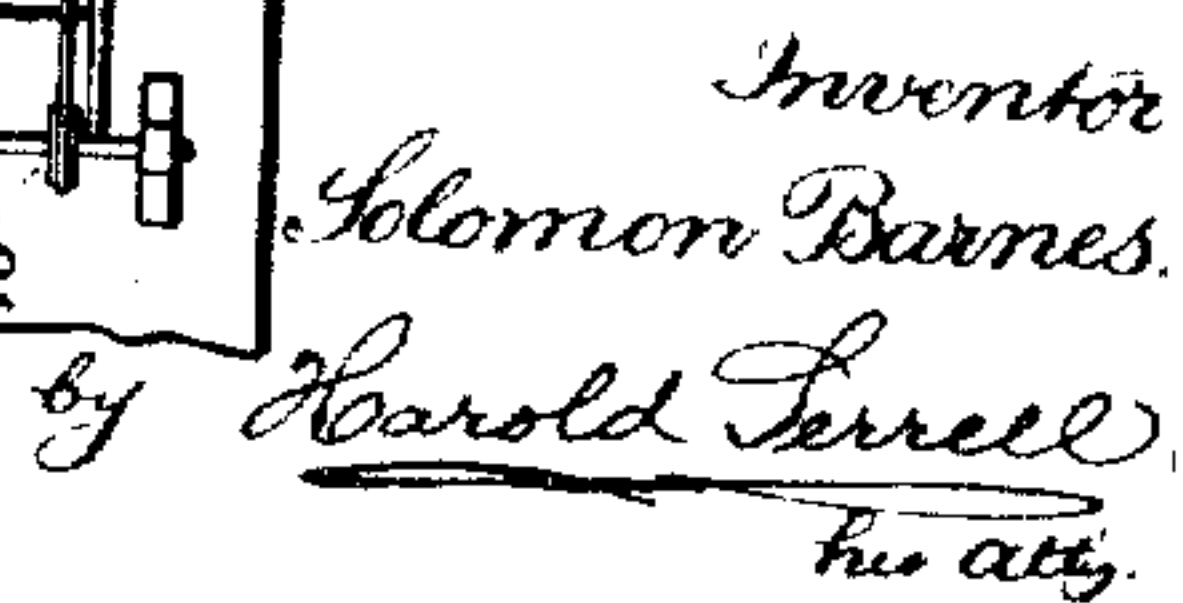
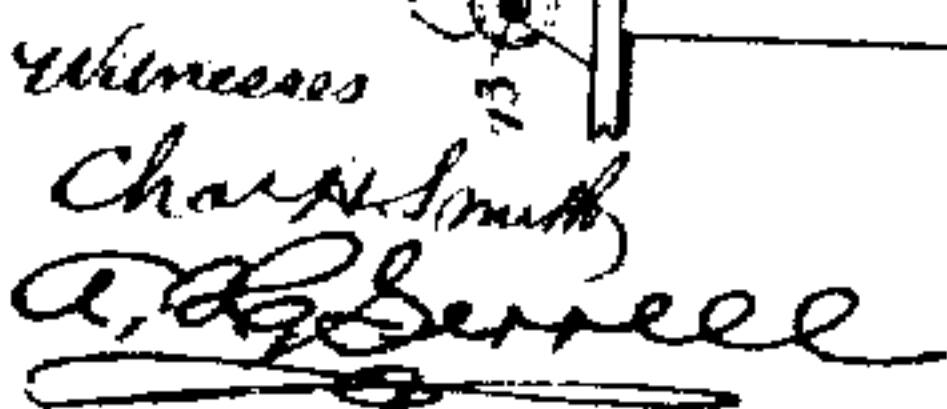
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 5.

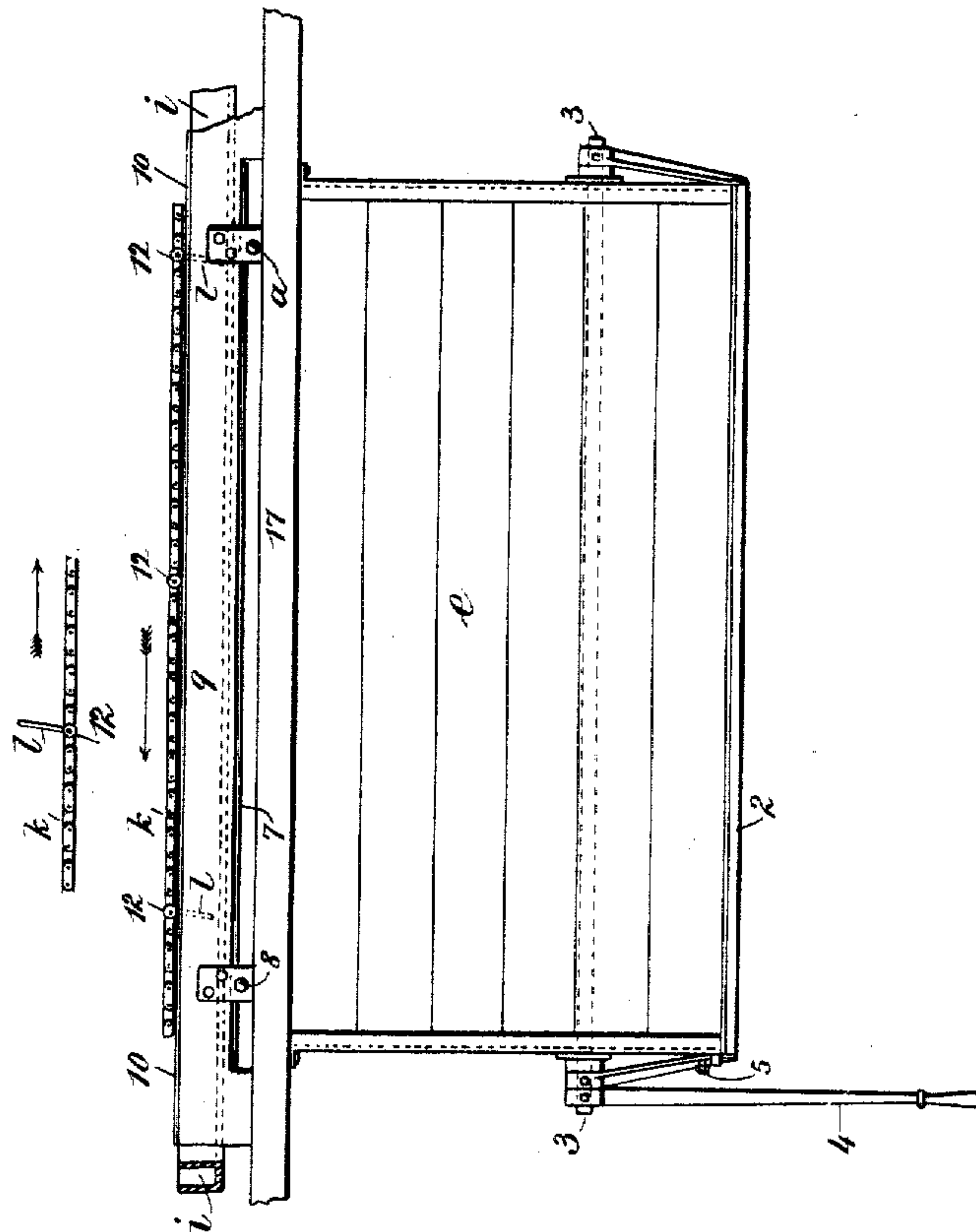
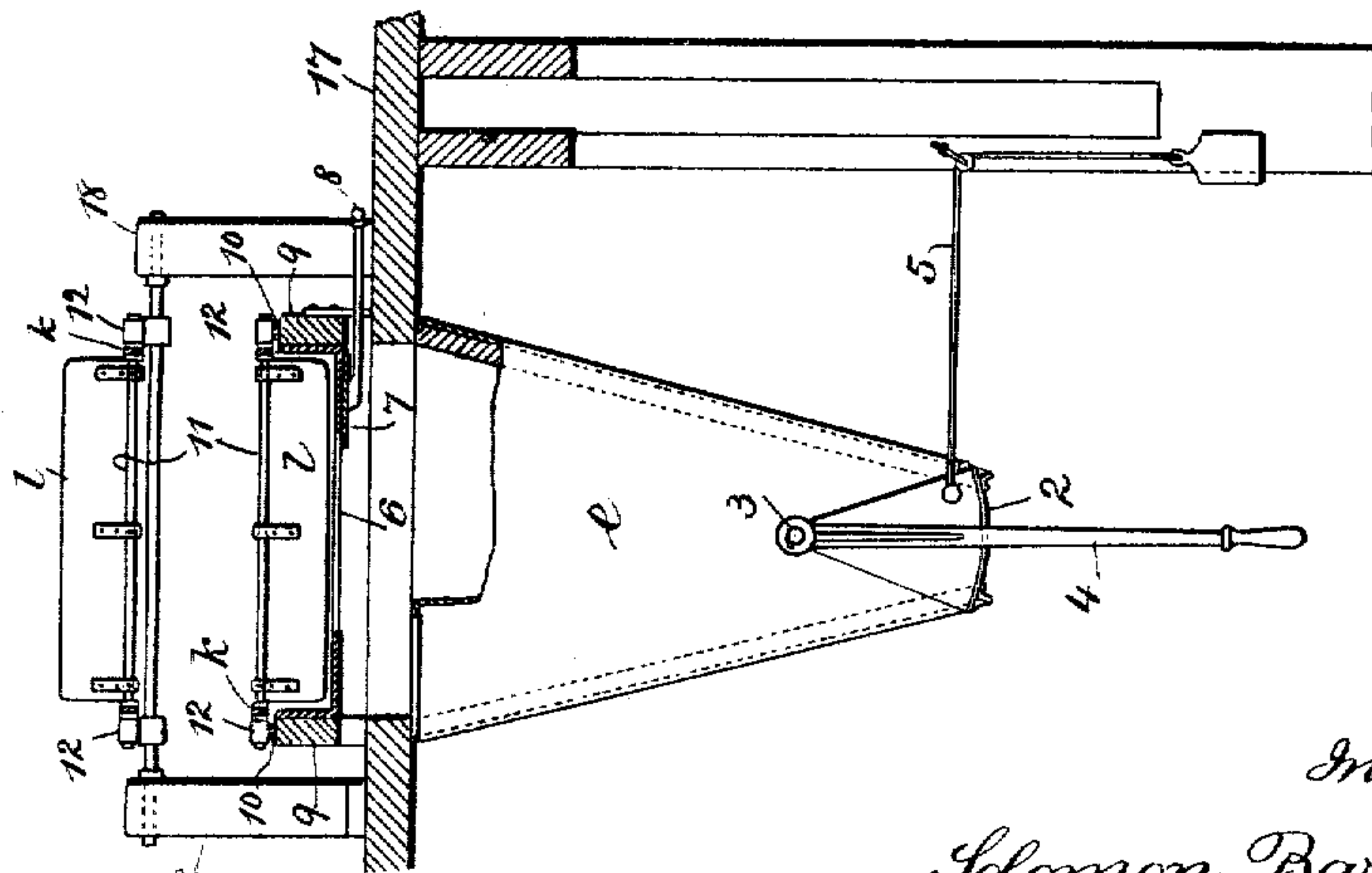


Fig. 6.



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# UNITED STATES PATENT OFFICE.

SOLOMON BARNES, OF MAISONNEUVE, QUEBEC, CANADA, ASSIGNOR TO WILLIAM A. MILLS,  
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## METHOD OR SYSTEM OF CASTING ARTICLES IN METALS.

No. 910,448.

Specification of Letters Patent.

Patented Jan. 19, 1909.

Application filed June 19, 1908. Serial No. 439,299.

*To all whom it may concern:*

Be it known that I, SOLOMON BARNES, a citizen of the United States, residing at Maisonneuve, Province of Quebec, Canada, have invented an Improvement in the Method or System of Casting Articles in Metal, of which the following is a specification.

Heretofore in the art of casting articles in metal it has been usual to arrange the furnace for melting the metal, the molding devices, core boxes and finished molds all in proximity or close relation to one another, hence in an establishment of any magnitude there are many of such groups or small plants. This is not conducive to financial or operative economy or economy in the force employed or in the output of the goods manufactured.

My invention relates to an economical and efficient method or system of casting articles in metal, and in carrying out the same the furnace or furnaces for melting the metal and the ladles or devices for receiving and pouring the same are arranged together and occupy a predetermined position to the devices for molding etc.

I arrange the pattern and molding devices in series beneath suitable overhead hoppers containing the sand employed in making the molds. I employ a pit receiving the sand as shaken out from the molds after removing the castings, an elevating conveyer for raising the sand from the pit to a higher level and delivering the same into a trough along which it is moved by pusher blades to supply said overhead hoppers.

One stretch of an endless track runs along the pattern and molding devices parallel therewith and with the higher level trough. Numerous cars run on these endless tracks and as the molds are completed and ready to receive the fluid metal they are placed on the cars and are run along to the furnaces and ladles where the metal is poured into the molds. These molds are successively filled and progressed. The metal cools during the progression and by the time the cars come around to the pit the castings are cool enough to remove and the sand of the mold is thrown into the pit to be used over again.

The car and core or molding boxes are returned by the endless track around to the place of making up the molds where they are removed to repeat the operations.

These devices are advantageously duplicated in parallel series if desired, and though they are so shown and described herein, I do not limit myself to using them in duplicate.

By means of these devices a continuous casting method or system is maintained.

My improved method or system is particularly adapted to the casting of soil pipe although the same is equally well adapted for the casting of any duplicate parts of articles of manufacture.

In the drawing, Figure 1 represents by a general diagrammatic plan view the devices in duplicate which go to make up my improved method or system. Fig. 2 is a cross section and elevation in larger size at about  $x, x$ , of Fig. 1 representing the elevating conveyers and the parts adjacent thereto. Fig. 3 is a diagrammatic side elevation of the conveyer and molding devices and Fig. 4 a plan of the top floor of the same. Fig. 5 is a side elevation and partial section and Fig. 6 a cross section and end elevation representing one of the overhead hoppers for holding sand and the devices for supplying the sand thereto, all of which is hereinafter more particularly set forth.

At  $a, a'$  in Fig. 1, I have indicated the position of the furnaces and at  $b, b'$  I have indicated the ladles or devices for receiving the fluid metal and from which the same is to be poured into the molds.

At  $c, c'$  I have indicated the pattern and molding devices in series.

At  $d, d'$  I have indicated core machines which would be employed in a particular plant for the manufacture of soil pipe for making the core which in the casting is necessary for forming the pipe and around which the metal is poured.

At  $e, e'$  I have represented a series of overhead hoppers supported on suitable cross beams between suitable uprights which are shown approximately in Fig. 2.

At  $f, f'$  I have indicated the pits provided for receiving sand from the molds after the casting has been removed.

At  $g, g'$  I have represented elevating conveyers of any desired construction dipping into the pits  $f, f'$  and passing around suitable drums journaled in said pits and at their higher and upper ends passing around suitable drums journaled in said pits and at their higher and upper ends passing around suitable drums supported on cross bearers



above the standards hereinbefore referred to. These conveyers elevate the sand thrown into the pits  $f f^1$  and deliver the same into the hoppers  $h h^1$ . From these hoppers the sand descends into the troughs  $i i^1$  on a level higher than the ground. The sand falling into these troughs  $i i^1$  is moved along progressively by the operation of conveyer chains  $k k^1$  and pusher blades  $l l^1$  and is progressively delivered to the overhead hoppers  $e e^1$ . I have shown and prefer to construct these overhead hoppers  $e e^1$  of a form tapering toward the lower end with bottom plates 2 and shafts 3 from which said plates are supported; each of the hoppers being provided with a lever handle 4 and a cord and weight 5; said parts being provided for effecting the removal of the bottom plates to discharge the sand and for the return of the same to close off the supply of sand. These hoppers are each connected to and suspended below a platform 17 and located directly above the pattern and molding devices  $c c^1$  so that the attendant molding the pattern in the molding device can supply machines with as much sand as is required or sand necessary from time to time in the molding operation.

The troughs  $i i^1$  on the higher platform 17 are provided with tapering openings 6 in the platform floor which vary in size, the same being smallest nearest to the elevating conveyers  $g g^1$  and largest at the distant end furthest away from said conveyers, for the reason that near the supply end there is of course more sand and most distant from the supply end less sand, so that the openings are provided of varying sizes and tapering, with the object of insuring as near as possible an equal amount of the sand passing to each of the overhead hoppers  $e e^1$ . These openings are preferably provided in each instance with a regulating slide 7 actuated by a hand-rod 8 and the hoppers are preferably placed between and supported by the side frames 9, the upper edges of which form the tracks 10.

The pusher blades  $l l^1$  are secured to the conveyer chains  $k k^1$  in any desired manner. For this purpose I prefer to employ and have shown the cross bars 11 having on their respective ends rollers 12 which run on the tracks 10 at the lower part of the conveyer and which part is performing the work of pushing along the sand.

At either end of the conveyer chains I employ a power shaft 13 and a pulley or belt wheel 14 and sprocket devices 15 for engaging the conveyer chains and for actuating the same. These devices are mounted in bearing brackets and other bearing brackets 18 are provided at suitable intermediate places to hold up the upper or returning member of the conveyer chains and the pusher-blades supported thereby.

I have shown and employ the endless tracks  $m m^1$ . These are arranged in parallel series which are also parallel with the pattern and molding devices and the troughs and conveyer chains on the higher level. The small cars  $n n^1$  are adapted to be run on these tracks and the tracks may be of any circular or elliptical proportions desirable and suitable for carrying out the system of casting according to my invention.

While I have shown in Figs. 1, 2 and 4, two series of casting devices, I do not limit myself to the employment of the same because while thereby the product is doubled and more economical, still a single track and a series of single molding devices and a single elevated conveyer, etc., may be employed to equal advantage but not of course for as great an output.

The operation of the devices as generally shown and described herein is substantially as follows:—Workmen at the core machines prepare the cores which are placed in the pattern machines and the complete mold for casting is made in the usual manner. These molds are placed upon the cars, the cars being then by attendants run along the track to the place of pouring the fluid metal.

The pouring is accomplished successively in the molds and they are progressed along the endless track. This track from the place of pouring may be of any suitable or desired length which in the progression will give time for the metal to cool. When the cars as progressed come around to the pits the cast articles are removed and the sand is removed from the molds and thrown into the pit and broken up. The mold boxes are then returned by the cars around to the place where suitable attendants remove them for the making of other molds.

The sand from the pits is conveyed to a higher level by the elevating conveyers, is delivered into a hopper and from the hopper into the troughs on a higher level and is progressively moved along the troughs by the pusher blades of the conveyer chains so as to supply the series of hoppers on a higher level and which hoppers come over the pattern or molding devices; thus the forming of cores, the making of molds, the pouring of the metal for the casting, the returning of the sand to a higher level to be utilized for the making of new molds is continuously performed by any suitable number of workmen.

While I have shown in the drawing, two endless tracks, two endless conveyers for the sand, two series of hoppers and pattern or molding devices with two series of cars on the track, two series of furnaces, etc., it is to be understood that I do not thus limit my invention, as the same is equally useful in a single series. In fact the invention would not be complete as I contemplated,



except by the use of one series, and while I have shown and described two series, the same is only done as an indication of the extent to which the invention may be carried  
5 for a large output.

I claim as my invention:

1. A method or system of casting articles in metal, comprising an endless track, a series of cars movable thereon, devices for  
10 melting and pouring metal, devices for preparing the patterns for casting in series and in line with said track, series of hoppers for supplying casting sand to the latter devices arranged on a higher level and above the  
15 same, a conveyor for elevating molding sand from the casting level to a higher level, a trough for receiving the same from the conveyor and means for progressively moving the sand along through the trough to supply  
20 the hoppers and means for manually actuating the hoppers to deliver the sand.

2. A method or system of casting articles in metal, comprising an endless track, a series of cars movable thereon, devices for  
25 melting and pouring metal, devices for preparing the patterns for casting, in series and in line with said track, series of hoppers for supplying casting sand to the latter devices arranged on a higher level and above the  
30 same, a pit for receiving sand upon the removal of the casting and in which the sand is broken up, a conveyor dipping into this pit and extending to a higher level progressively elevating the sand, a hopper receiving and  
35 delivering the said sand, a trough receiving said sand from the hopper, an endless conveyor and forwarding blades attached thereto for progressively moving the sand as delivered to the trough along through the same  
40 and supplying the hoppers.

3. A method or system of casting articles in metal, comprising an endless track, a series of cars movable thereon, devices for  
45 melting and pouring metal, devices for preparing the patterns for casting, in series and in line with said track, series of hoppers for supplying casting sand to the latter devices arranged on a higher level and above the  
50 same, a pit for receiving sand upon the removal of the casting and in which the sand is broken up, a conveyor dipping into this pit and extending to a higher level progressively elevating the sand, a hopper receiving and  
55 delivering the said sand, a trough receiving said sand from the hopper, an endless conveyor and forwarding blades attached thereto for progressively moving the sand as delivered to the trough along through the same  
60 and supplying the hoppers, a platform on a higher level upon which said trough is built, with openings therein forming mouths to the hoppers of the series, which openings are graduated in size with the object of supplying  
65 sand, and manually actuated devices by

which the sand is removed from the hoppers as required for the pattern molding devices.

4. A method or system of casting articles in metal, comprising an endless track, a series of cars movable thereon, devices for  
70 melting and pouring metal, devices for preparing the patterns for casting, in series and in line with said track, series of hoppers for supplying casting sand to the latter devices arranged on a higher level and above the  
75 same, a pit for receiving sand upon the removal of the casting and in which the sand is broken up, a conveyor dipping into this pit and extending to a higher level progressively elevating the sand, a hopper receiving and  
80 delivering the said sand, a trough receiving said sand from the hopper, an endless conveyor and forwarding blades attached thereto for progressively moving the sand as delivered to the trough along through the same  
85 and supplying the hoppers, a platform on a higher level upon which said trough is built, with openings therein forming mouths to the hoppers of the series, which openings are graduated in size with the object of supplying  
90 all the hoppers with the same quantity of sand, and manually actuated devices by which the sand is removed from the hoppers as required for the pattern molding devices, and means for regulating the size of the open-  
95 ings in the trough into said hoppers.

5. A method or system of casting articles of metal, comprising parallel spaced apart endless tracks, series of cars thereon, means  
100 for melting and pouring metal located between the parts of the companion tracks, series of devices for forming the pattern and molding devices between the respective endless tracks, an over-head platform structure above the latter, a series of hoppers agreeing  
105 in number with the pattern molding devices and located directly above the same, means for closing the lower contracted ends of said hoppers and means for manually actuating the same, series of elevating conveyers  
110 placed at right angles to the tracks and for conveying molding sand to a higher level, troughs along the platform on a higher level, endless conveyers and means for actuating the same above said troughs, means connect-  
115 ed to said conveyers for progressively moving along through the troughs the molding sand delivered into the troughs from said elevating conveyers, the delivery platform having openings into said hoppers through  
120 which the sand passes to supply the hoppers, and means for regulating the extent of said openings.

6. A method or system of casting articles of metal, comprising parallel spaced apart  
125 endless tracks, series of cars thereon, means for melting and pouring metal located between the parts of the companion tracks, series of devices for forming the pattern and molding devices between the respective end-  
130



less tracks, an overhead platform structure above the latter, a series of hoppers agreeing in number with the pattern molding devices and located directly above the same, means  
5 for closing the lower contracted ends of said hoppers and means for manually actuating the same, pits for receiving the molding sand, series of elevating conveyers placed at right angles to the tracks and for conveying mold-  
10 ing sand to a higher level and into which pits said elevating conveyers dip, troughs along the platform on a higher level, endless conveyers and means for actuating the same

above said troughs, means connected to said conveyers for progressively moving along 15 through the troughs the molding sand delivered into the troughs from said elevating conveyers, the delivery platform having openings into said hoppers through which the sand passes to supply the hoppers, and means 20 for regulating the extent of said openings.

Signed by me this 15th day of May 1908.

SOLOMON BARNES.

Witnesses:

C. W. TAYLOR,

STUART R. W. ALLEN.