

No. 871,823.

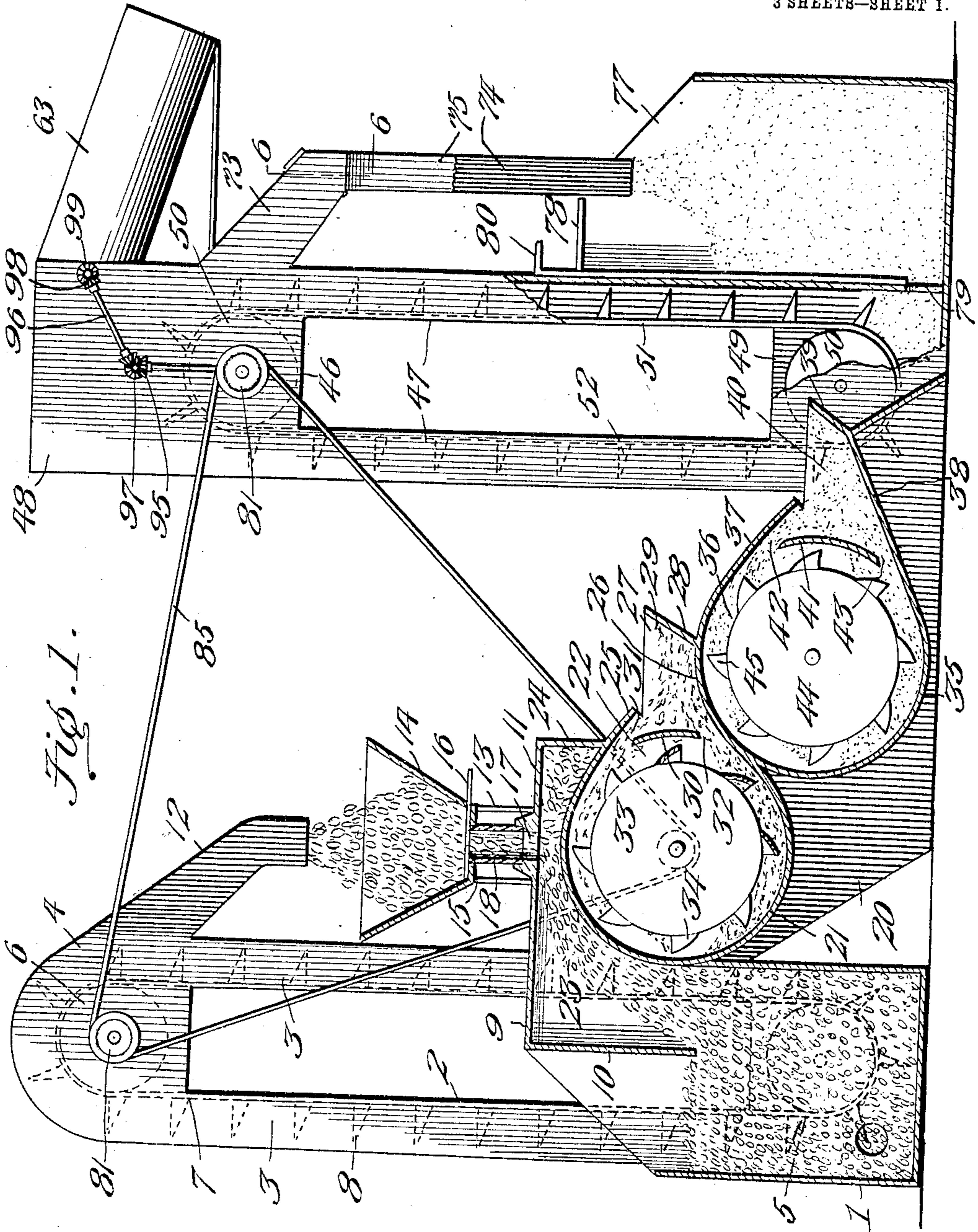
PATENTED NOV. 26, 1907.

H. M. ROBINSON.

TOY.

APPLICATION FILED DEC. 19, 1906.

3 SHEETS—SHEET 1.



Inventor

Henry M. Robinson,

Witnesses

Wm. Koertge

H. Allen

By Victor J. Evans

Attorney

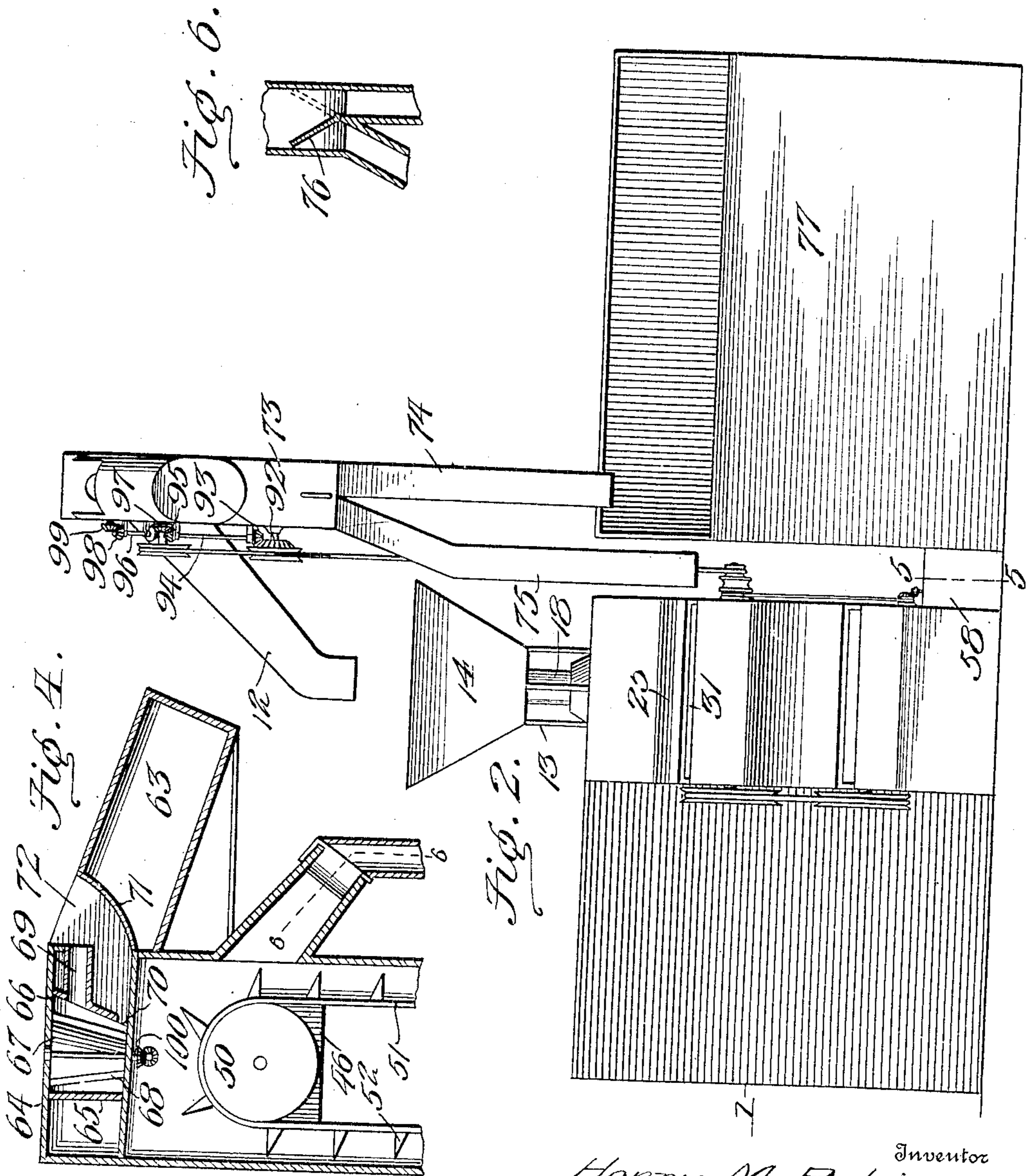
No. 871,823.

PATENTED NOV. 26, 1907.

H. M. ROBINSON.
TOY.

APPLICATION FILED DEC. 19, 1906.

3 SHEETS—SHEET 2.



Witnesses
Wm. Koerth
H. Allen

Inventor
Henry M. Robinson,

By *Victor J. Evans*
Attorney

No. 871,823.

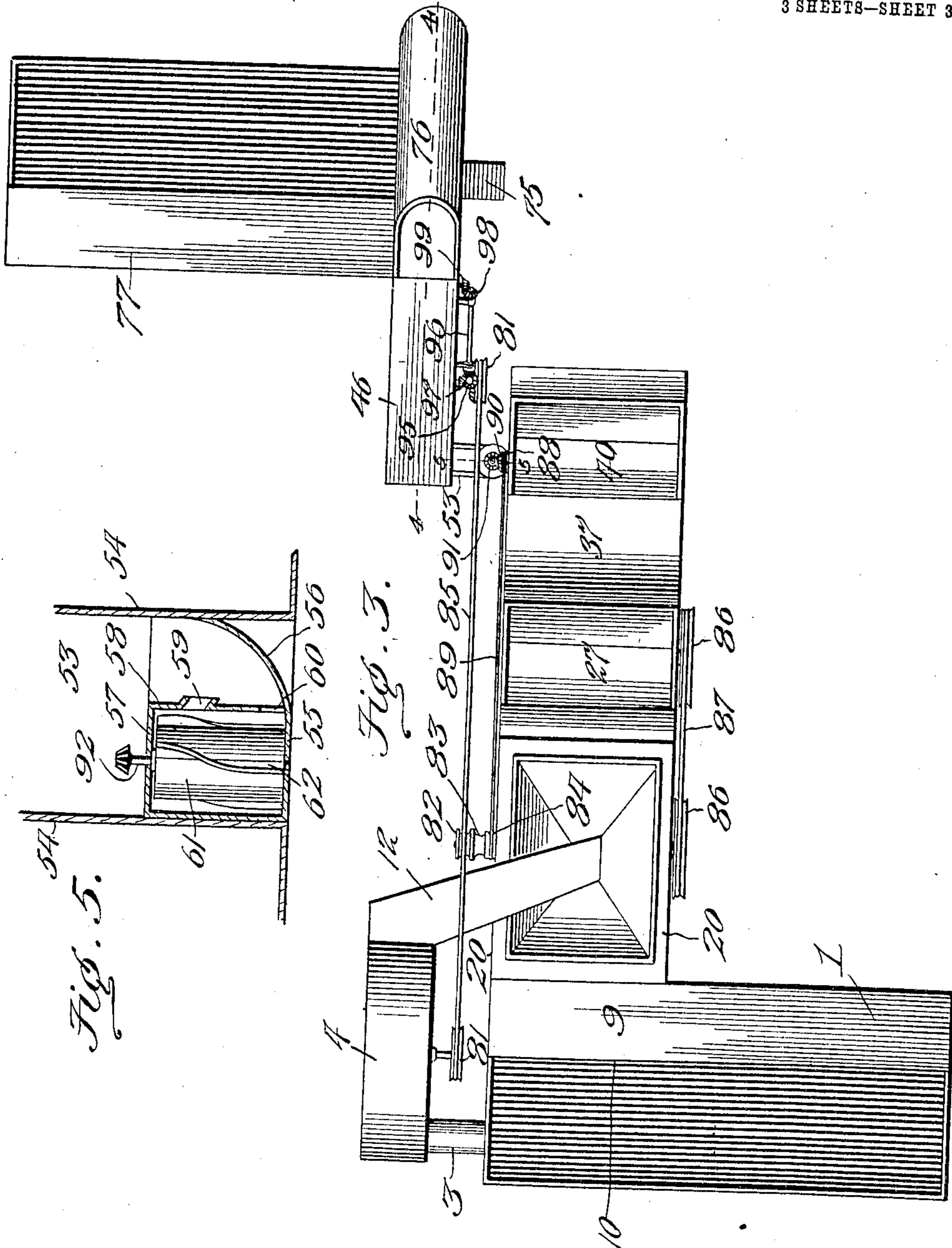
PATENTED NOV. 26, 1907.

H. M. ROBINSON.

TOY.

APPLICATION FILED DEC. 19, 1906.

3 SHEETS—SHEET 3.



Witnesses

Wm. Koerth
H. Allen

Inventor

Henry M. Robinson

By

Victor J. Evans

Attorney

UNITED STATES PATENT OFFICE.

HENRY MORGAN ROBINSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

TOY.

No. 871,823.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed December 19, 1906. Serial No. 348,600.

To all whom it may concern:

Be it known that I, HENRY MORGAN ROBINSON, a citizen of the United States, residing at the city of Washington, in the District of Columbia, have invented new and useful Improvements in Toys, of which the following is a specification.

The invention relates generally to an improvement in toys, and particularly to a toy constructed and arranged to simulate in structure and operation a grinding mill.

The main object of the present invention is the production of a toy simulating in appearance and operation a grinding mill adapted for the reduction of grain, the construction including the successive series of compartments in which the grain is to be treated in the transition from the kernel to the final product, each of said compartments being closed against the remaining compartments, and each adapted to contain a quantity of material in the condition usual to such compartment in the actual grinding operation, such operating means being arranged in each compartment as will so affect the material therein as to indicate to the observer the actual transfer of the material from one compartment to another.

The preferred embodiment of the details of construction of the present invention will be specifically described in the following specification, reference being had particularly to the accompanying drawings, in which:—

Figure 1 is a view in side elevation, partly in section, illustrating the construction of the improved toy, Fig. 2 is an end elevation of the same, Fig. 3 is a plan view of the same, Fig. 4 is a broken vertical section on the line 4—4 of Fig. 3, Fig. 5 is an enlarged vertical section, partly broken off on the line 5—5 of Fig. 2, Fig. 6 is a broken vertical section on the line 6—6 of Fig. 1.

Referring particularly to the drawings, wherein similar reference numerals indicate like parts throughout the several views, my improved toy grinding mill comprises a rectangular box-like structure 1, hereinafter termed the feeding compartment, and designed to receive the grain in the original or kernel form. The feeding compartment, except as hereinafter noted, is open at the top, and is in communication adjacent its bottom with an elevator casing 2, the medium of communication being in the form of a pipe connection 3.

The elevator casing 2 may be of any usual or preferred construction, the form shown including spaced rectangular side sections 3, in communication with and connected to the upper and lower end sections 4 and 5. In the respective end sections are mounted carrier wheels or rollers 6, over which travels an endless carrier belt 7, provided at determinate spaced intervals with buckets 8.

The relatively forward portion of the feeding compartment is closed by a cover section 9, connected to and supported by the end walls of the compartment, said cover section extending forwardly beyond the relatively forward wall of the feeding compartment. The rear end of the cover section, or that end overlying the feeding compartment is provided with a depending section 10 extending at right angles to the cover section and terminating at its lower end within the compartment below the upper edges of the front and rear walls thereof. The cover section 9 extends forwardly beyond the relatively forward wall of the feeding compartment, as at 11, to provide a platform section, said platform being of materially less width than the normal width of the cover section and projecting from said section at the end thereof next the elevator 2.

The head section 4 of the elevator is in operative communication with a delivery spout 12, so arranged relative to the head section that the material elevated in the buckets 8 will be delivered to the spout. Beyond the elevator casing the spout 12 is deflected laterally to arrange its mouth centrally over and above the platform 11, and on said platform, supported by a framework 13, is arranged a hopper 14 underlying the mouth of the delivery spout 12 and adapted to receive the material therefrom. The hopper bottom is formed with an opening 15, through which the passage of the material is controlled by a manually operable valve plate 16, the material passing through the opening 15 being delivered through an opening 17 in the platform 11 by a tube conveyer 18.

The side edges of the platform 11 are connected by walls 20, forming with said platform a box-like structure, the walls 20 extending some distance in advance of the forward edge of the platform and terminating at their lower edge in alinement with the bottom of the feeding compartment to provide a supporting base for the structure.

Between the walls 20 and below the plat-

form 11 is secured an approximately circular wall 21 within which is included the initial grinding compartment 22. At the relatively rear portion the wall 21 coincides with the upper edge of the forward wall of the feeding compartment, the upper portion of said wall 21 being spaced from the platform 11, whereby to provide an entirely inclosed chamber 23 arranged between the platform and the wall 23, which chamber is closed at its forward end by a section 24 depending from the forward end of the platform and connected at the lower end to the wall 21. The compartment 23, as thus arranged opens directly into the feeding compartment, to permit the passage of material through the opening 17 in the platform to the feeding compartment, the rearward and downward curvature of the wall 21 serving to direct the material into the feeding compartment by gravity.

The upper section of the wall 21 is projected forwardly and downwardly in advance of the depending section 24 to provide a ledge 25, the lower section of the wall 21 being spaced from the terminal of the ledge 25 and projected in advance of said ledge in the form of an upwardly and forwardly curved section 26. The side walls 20 have their upper terminal edges at this point extended forwardly from the free edge of the ledge 25, thereby providing side walls 27 connected at their forward ends by an inclined wall 28, forming with the bottom 26 a hopper 29, fully open at the top. Supported by the side walls 20 and arranged between the upper and lower projected portions of the wall 21 is a partition plate 30, slightly curved in vertical section and having its upper and lower edges spaced respectively from the inner surfaces of the upper and lower projected portions of the wall 21. The partition is practically concealed by the ledge 25, and by its position provides upper and lower channels 31 and 32 through which the compartment 22 is in communication with the hopper 29. Within the compartment 22 is mounted a revoluble carrier 33, comprising a drum or roller upon the periphery of which is arranged a series of cups 34. The cups are so disposed and of such form that in the operation of the carrier they will elevate the material in the lower portion of the compartment 22 to the upper portion thereof, operating to so discharge the material in the upper portion of the compartment that it will be directed through the channel 31 into the hopper.

In advance of the initial grinding compartment 22 is arranged a second circular wall 35, practically identical with the wall 22 and serving to inclose a final grinding compartment 36. The rear portion of the wall 35 is arranged beneath the hopper 29, a portion of the wall 35 preferably coinciding with the bottom 26 of the hopper. Beyond the hopper the wall 35 is extended to form a ledge

37, the lower portion of the wall being projected forwardly and upwardly beyond the forward edge of the ledge, as at 38. The side walls 20 at this point terminate coincidentally with the forward edge of the ledge 37, and are connected at the end of the wall 38 with an inclined wall 39, forming with the side walls 20 and the bottom 38 a hopper 40. Beneath the ledge 37 is arranged a partition plate 41, spaced at its upper and lower edges from the projected portions of the wall 35, thereby providing upper and lower channels 42 and 43 to establish communication between the hopper 40 and the compartment 36. Within the compartment 36 is revolvably mounted a carrier 44, similar to the carrier 33, and peripherally provided with a series of cups 45 adapted in operation of the carrier to elevate material from the lower portion of the compartment 36 to and discharge the same through the upper channel 42 into the hopper 40.

Laterally of the hopper 40 is arranged a second elevator casing 46, practically identical with the casing 2, and including spaced side sections 47, and upper and lower end sections 48 and 49. Within the end sections are mounted rollers 50 over which travels an endless belt 51 carrying buckets 52, whereby material accumulating in the lower end section 49 may be elevated and delivered to the upper end section 48.

A conveyer 53 is arranged between the adjacent side wall 20 and the proximate wall of the elevator casing, said conveyer being supported on the base plane of the structure, and, therefore, to one side of the hopper 40 and approximately in alinement therewith transverse the structure, as will be clear from Fig. 3. The conveyer comprises side walls 54 connected at their respective ends with the wall 20 and with the elevator casing wall. Immediately adjacent the wall 20 the relatively forward half of the bottom 55 of the conveyer is curved in a forwardly and upwardly direction, as at 56, the section of the bottom in rear of the curved portion supporting a box-like casing 57, the rear wall of which engages the rearwardly disposed side wall 54 of the conveyer, as shown. The forward wall 58 of the casing is formed with a discharge port 59 in its relatively upper portion and with an inlet opening 60. Within the casing is arranged for revoluble movement a cylinder 61, peripherally provided with approximately spiral blades 62, the function of which is in the revolution of the cylinder to elevate the material from the lower portion of the casing 57 and discharge the same through the outlet 59 onto the curved bottom 56.

Supported by and in advance of the forward wall of the elevator casing 46, at the extreme upper portion of the head section 48, is arranged a cylindrical body 63, preferably

of hollow construction and hereinafter termed the bolter. Supported upon the upper wall of the elevator casing is arranged a box-like casing 64 divided by transverse
 5 vertically disposed partitions 65 and 66. Between the partitions 65 and 66 within the casing 64 is mounted for revoluble movement a cylindrical body 67 having peripheral wings or blades 68. The forward partition 66 is provided near the relatively upper
 10 edge with a discharge spout 69 and at the lower edge with an inlet opening 70. The relatively rear wall of the bolter, as 71, projects forwardly from the upper wall of the elevator casing, being upwardly curved as
 15 shown, the forward edge of said wall meeting the relatively upper portion of the wall of the bolter at a point in advance of the forward edge of the casing 64. A chamber 72 is thus
 20 provided between the forward end of the discharge spout 69 and the relatively rear wall of the bolter, which chamber communicates through the discharge spout 69 and opening 70 with the chamber between the parti-
 25 tions 65 and 66 in which is mounted the cylinder 67.

The elevator casing 46 communicates at the upper end with a discharge trough 73, so arranged that the material elevated by the
 30 buckets 52 is discharged into said trough. At the lower end the trough communicates directly with the upper ends of two discharge spouts 74 and 75, being at the point of communication provided with a manually oper-
 35 able gate 76, by which the material may be deflected into either discharge spout, as will be apparent from Fig. 6. The lower end of the discharge spout 74 communicates with a storage compartment or bin 77, approxi-
 40 mately identical in size and shape with the feeding compartment 1. The upper portion of the storage bin is partially closed by a cover section 78, the remaining portion being open to the inspection of the operator.
 45 The bin 77 is connected directly to the elevator casing 46, a portion of the rear wall of the bin forming the forward wall of the casing. In this wall at the lower end is formed an opening 79, providing a communication
 50 between the bin and the lower end section 49 of the elevator casing, said opening being preferably controlled through a manually operable valve plate 80 slidably mounted in the cover section of the bin.

55 The shafts on which are mounted the rollers 6 and 50 in the relatively upper ends of the respective elevator casings, are projected beyond the side walls of said casings and provided with belt rollers 81, the shaft of the
 60 carrier 33 being similarly projected and provided with a series of three belt rollers 82, 83 and 84. A belt 85 operatively connects the belt rollers 81 of each elevator casing and the belt roller 82 of the carrier 33, the belt roller
 65 83 of said carrier being arranged to receive a

belt (not shown) from any suitable source of power, as a toy engine or the like. The shafts of the respective carriers 33 and 44 are also projected beyond one of the side walls 20 and provided with belt rollers 86 operatively
 70 connected by a belt 87, whereby to transmit power to said carriers. The side wall 20 immediately above the conveyer 53 is provided with an idler shaft on which is mounted a belt pulley 88 connected by a belt 89 with the
 75 belt roller 84, the outer face of the pulley 88 being provided with a bevel pinion 90 arranged to mesh with and drive a bevel pinion 91 mounted on the upper end of the shaft 92 of the cylinder 61 in said conveyer. The in-
 80 inner face of the belt pulley 81 fixed on the shaft of the elevator roller 50 is formed with a bevel pinion engaging a bevel pinion 93 on the end of a shaft 94 mounted on the side wall of the elevator casing, the upper end of
 85 said shaft having a bevel pinion 95 adapted to operate a second shaft 96 also mounted on the side wall of the casing through the medium of an interposed bevel pinion 97. The upper end of the shaft 96 is formed with a
 90 bevel pinion 98 arranged in mesh with a bevel pinion 99 formed on the lower end of the shaft 100 of the cylinder 67 in the casing 64.

As thus constructed it will be noted that
 95 the improved toy closely simulates a grinding mill, and includes a feeding compartment, an initial grinding compartment, a final grinding compartment, and a storage or delivery bin; that each of these compart-
 100 ments are entirely free of communication with each other; and that each compartment is so arranged as to indicate to the observer the delivery of material from one compartment to the next succeeding compartment.
 105

In the use of the toy the material in the original or kernel form is placed in sufficient quantity in the feeding compartment 1. The hopper 27 and the initial grinding compartment 22 is supplied with material in the
 110 form ordinarily incident to the initial grinding operation of an actual mill, that is, in a partially reduced condition. The hopper 40 and the compartment 36 is supplied with material in the condition incident to the final
 115 grinding operation of an actual mill, that is in a finally reduced condition. Material in this finally reduced condition is also delivered in desirable quantity to the conveyer 53, the bolter chamber 72, and material in-
 120 cident to the bolting operation is delivered in desirable quantity to the storage bin 77. In this condition the mill is ready for operation.

Under power the various movable parts described are operated, with the effect that
 125 the buckets 8 in the elevator casing 2 will pick up the material from the feeding compartment and deliver the same to the hopper 14, whence said material finds its way into the chamber 23 and thence directly into the
 130

feeding compartment. As the discharge passage from the hopper, however, is located directly above the initial grinding compartment it appears to the observer that the material is delivered from the hopper 14 directly into the initial grinding compartment 22. The partially reduced material in this initial grinding compartment, is, through the operation of the carrier 33 continually withdrawn from and delivered to the hopper 29 through the channels 31 and 32, but as said hopper is located directly above the final grinding compartment 36, the material in the hopper 29 is, apparently, delivered directly to the final grinding compartment. The material in the final grinding compartment is similarly withdrawn from and returned to the hopper 40, though in appearance, owing to the disposition of the hopper directly above the conveyer 53, said material is apparently delivered from the hopper directly to the conveyer. As the result of the agitation of the blade 62 on the cylinder 61 in the conveyer the material therein, through the medium of the inclined bottom 56 is continually drawn into the opening 60 and discharged through the opening 59, thereby agitating the material in the conveyer and apparently forcing the material from the conveyer into the elevator casing 46. The material in the chamber 72 is similarly agitated through movement of the cylinder 67, with the effect to simulate the delivery of the material from the elevator to the bolter, while as a matter of fact, said material is being delivered through the discharge spout 74 into the storage bin, the material accumulating in the latter serving through the opening 79 to recharge the lower end section of the elevator casing and continually serves the elevator buckets.

The effect of the operation described to the observer is that the material is delivered from the hopper to the initial grinding chamber, thence to the final grinding chamber, thence through the conveyer to the elevator casing 46, thence to the bolter 63, and finally through the discharge spout to the storage bin.

By proper operation of the gate 76, the material may be directed through the discharge spout 75, the terminal of which is disposed beyond the plane of the storage bin. The spout 75 is to be used when bags or other receptacles are to be filled with material, as might be desirable in some uses of the toy.

The toy as a whole is to be constructed in any size, or of any material, being preferably, however, made up of sheet metal which may be covered or ornamented to represent an actual grinding mill structure. A substantial base may be provided if desired, while preferring that the mill be driven by power, it is equally obvious that hand operation will produce the same results.

The construction described illustrates the preferred embodiment of the details of this invention, but it is to be distinctly understood that I contemplate as within the spirit of the present invention such variations and changes in the structural details, as may properly fall within the scope of the appended claims.

Having thus described the invention what is claimed as new, is:—

1. A toy constructed to represent a grinding mill and including a series of material containing compartments, each of said compartments being closed against the adjacent compartment, and means operative in each compartment to simulate the delivery of material from one compartment to the adjacent compartment.

2. A toy constructed to represent a grinding mill and including a plurality of material containing compartments, said compartments being closed against each other and open to expose the material and means respectively arranged in each compartment to indicate an actual delivery of material from one compartment to the other.

3. A toy constructed to represent a grinding mill and including a plurality of material containing compartments, each of said compartments being closed against the other, and open hoppers in communication with each compartment, and means arranged to indicate a delivery from each hopper to the next succeeding compartment.

4. A toy constructed to represent a grinding mill and including a plurality of material containing compartments, each of said compartments being closed against the other, and hoppers in communication with each compartment, and means arranged to indicate a delivery from each hopper to the next succeeding compartment, each of said hoppers being open at the upper end to expose the material to view in the apparent delivery from one compartment to the other.

5. A toy constructed to represent a grinding mill and comprising a feeding compartment, a grinding compartment and an elevator arranged between the feeding compartment and grinding compartment, a receptacle receiving material from the elevator and arranged to simulate the delivery of said material to the grinding compartment, an end closed chamber separating the receptacle and grinding compartment, said chamber opening into the feeding compartment and being closed against the grinding compartment, whereby material delivered to said receptacle is apparently fed into the grinding compartment but actually delivered to the feeding compartment.

6. A toy constructed to represent a grinding mill and comprising a feeding compartment, a grinding compartment arranged in advance of the feeding compartment, an ele-

vator in open communication with the feeding compartment, a hopper arranged above the grinding compartment and adapted to receive material delivered from the elevator, and a chamber arranged between the hopper delivery and the grinding compartment, said chamber being in communication with the hopper and with the feeding compartment and closed against the grinding compartment.

7. A toy constructed to represent a grinding mill and comprising a series of grinding compartments closed against each other, a hopper in direct communication with the initial grinding compartment, said hopper being arranged for apparent delivery therefrom to the succeeding grinding compartment but closed against the latter, and operative means arranged in the initial grinding compartment for agitating the material in the hopper, whereby to simulate the delivery of material from the hopper to the succeeding grinding compartment.

8. A toy constructed to represent a grinding mill and comprising a delivery compartment, a series of grinding compartments, a storage bin, and an elevator arranged between the final grinding compartment and the bin, the delivery compartment and respective grinding compartments being closed against each other and each adapted to contain a quantity of material in different degrees of fineness, and means to affect the material in each compartment to simulate its delivery to the succeeding compartment.

9. A toy constructed to represent a grinding mill and comprising a delivery compartment, an initial grinding compartment, and a final grinding compartment, each of said compartments being closed against the other, and means in communication with each compartment for influencing the material therein to simulate its delivery to the succeeding compartment.

10. A toy constructed to represent a grinding mill and comprising a plurality of compartments respectively arranged for the apparent successive reception of the material, and a plurality of operating means cooperating respectively with the compartments and adapted to influence the material therein to simulate its delivery from any one compartment to the succeeding compartment.

11. A toy representing a grinding mill and comprising a series of elements including a feeding compartment, an initial grinding compartment, a final grinding compartment, a delivery elevator, a bolter, and a storage bin, the feeding compartment and grinding compartments being closed against each other, and the bolter closed against the elevator, and means for causing an apparent circulation of material through said elements.

12. A toy representing a grinding mill and comprising a feeding compartment, an initial

grinding compartment, a final grinding compartment, a delivery elevator, a bolter, and a storage bin, the feeding compartment and grinding compartments being closed against each other, the bolter closed against the elevator, means arranged in each of the respective compartments and operative to simulate the feeding of material therefrom to the succeeding compartment, and means between the final grinding compartment and the delivery elevator to simulate the transfer of material in said compartment to the elevator.

13. A toy comprising a feeding compartment, an elevator in communication therewith, an initial grinding compartment, a hopper receiving material from the elevator, a concealed chamber receiving material from the hopper, said chamber being in communication with the feeding compartment and closed against the initial grinding compartment, a final grinding compartment, means arranged in the initial grinding compartment to simulate delivery of material therefrom to the final grinding compartment, a delivery elevator, an open conveyer between the final grinding compartment and the elevator and closed against each, means in the conveyer for simulating the delivery of material therethrough, and a storage bin in communication with the delivery elevator.

14. A toy comprising a feeding compartment, an elevator in communication therewith, an initial grinding compartment, a hopper receiving material from the elevator, a concealed chamber receiving material from the hopper, said chamber being in communication with the feeding compartment and closed against the initial grinding compartment, a final grinding compartment, means arranged in the initial grinding compartment to simulate delivery of the material therefrom to the final grinding compartment, a delivery elevator, an open conveyer between the final grinding compartment and the elevator and closed against each, means in the conveyer for simulating the delivery of material therethrough, a bolter carried by the delivery elevator and closed thereagainst, means for simulating the delivery of material from the elevator to the bolter, and a storage bin in communication with the delivery elevator.

15. A toy of the class described comprising a grinding compartment, means for apparently delivering material thereto, and means for apparently delivering material therefrom.

16. A toy constructed to simulate a grinding mill and having a plurality of material containing compartments, and means to simulate delivery of the material from one compartment to another, said compartments being arranged to prevent actual transfer of the material.

17. A toy constructed to simulate a grind-

ing mill and including a material containing compartment, and means for simulating the delivery of material from said compartment, said compartment being arranged to prevent
5 the actual delivery of material therefrom.

18. A grinding mill toy including a material containing compartment, a hopper in communication therewith, and means operative within the compartment for affecting
10 the material within the hopper to simulate the delivery of material from the hopper, said hopper being arranged to prevent actual delivery of material therefrom.

19. A toy constructed to simulate a grinding mill and including a material containing
15 compartment, an open hopper connected therewith, and means arranged within the compartment to draw the material from the lower portion of the hopper and deliver it to the upper portion, whereby to simulate the
20 delivery of material from the hopper to a point beyond the compartment.

20. A toy constructed to represent a grinding mill and comprising a feeding compartment, a grinding compartment, means for
25 delivering material from the feeding compartment, means for receiving said delivered material, said latter means being arranged for apparent delivery to the grinding compartment, and means to deflect the material delivered through the receiving means from the grinding compartment.

21. A toy constructed to represent a grinding mill and comprising a feeding compartment, a grinding compartment, means for
35 delivering material from the feeding compartment, means for receiving said delivered material, said latter means being arranged for apparent delivery to the grinding compartment, and means concealed between the
40 material receiving means and the grinding compartment to deflect the material from the grinding compartment and deliver the same to the feeding compartment.

In testimony whereof, I affix my signature
45 in presence of two witnesses.

HENRY MORGAN ROBINSON.

Witnesses:

JOHN L. FLETCHER,
D. W. GOULD.