

March 12, 1935.

M. ANGERPOINTNER

1,994,032

STORING PLANT FOR PIECE GOODS

Filed July 10, 1931

4 Sheets-Sheet 1

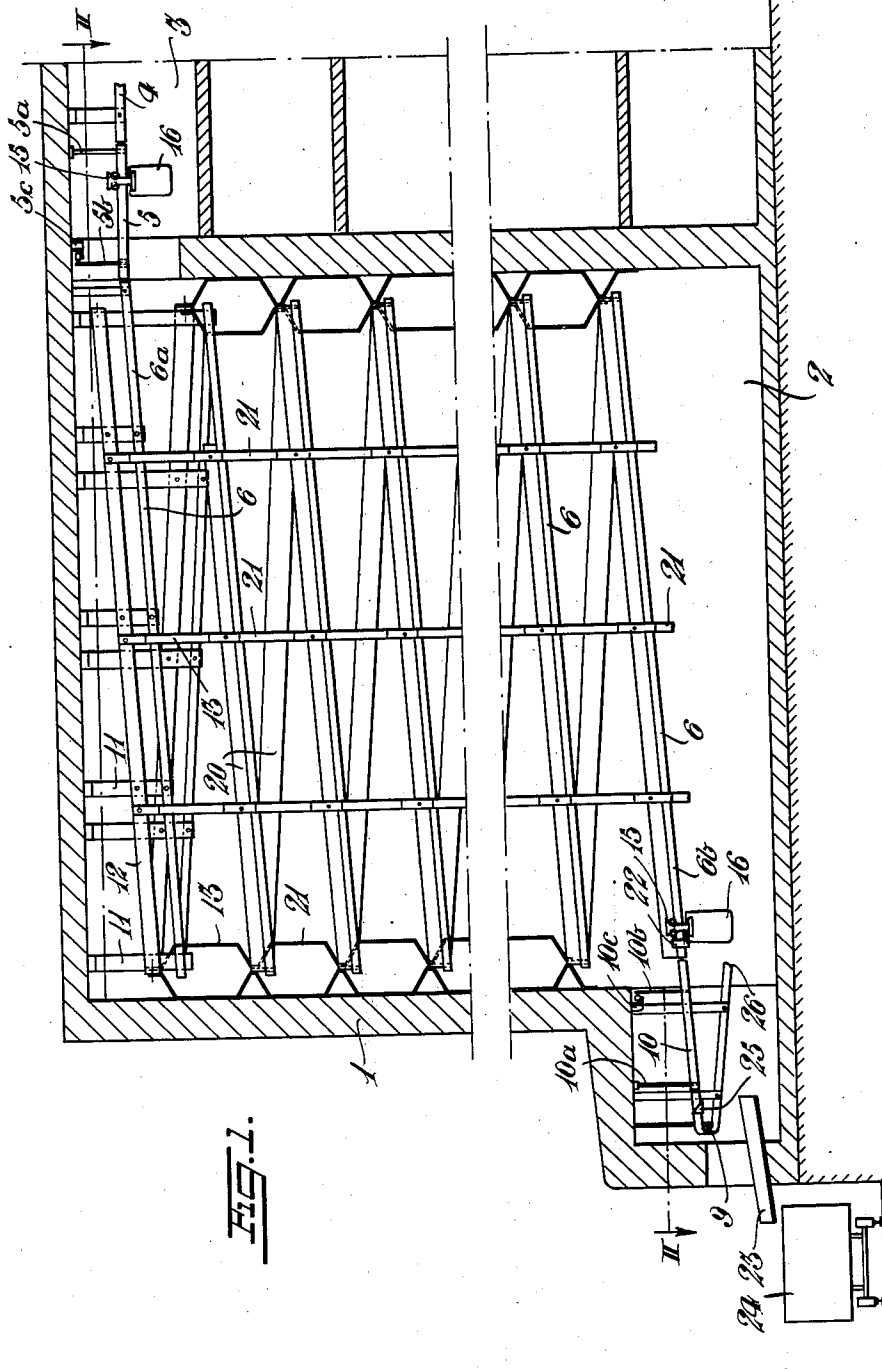


FIG. 1.

Inventor.
Matthias Angerpointner,
By Sommers & Young,
Attys.

March 12, 1935.

M. ANGERPOINTNER

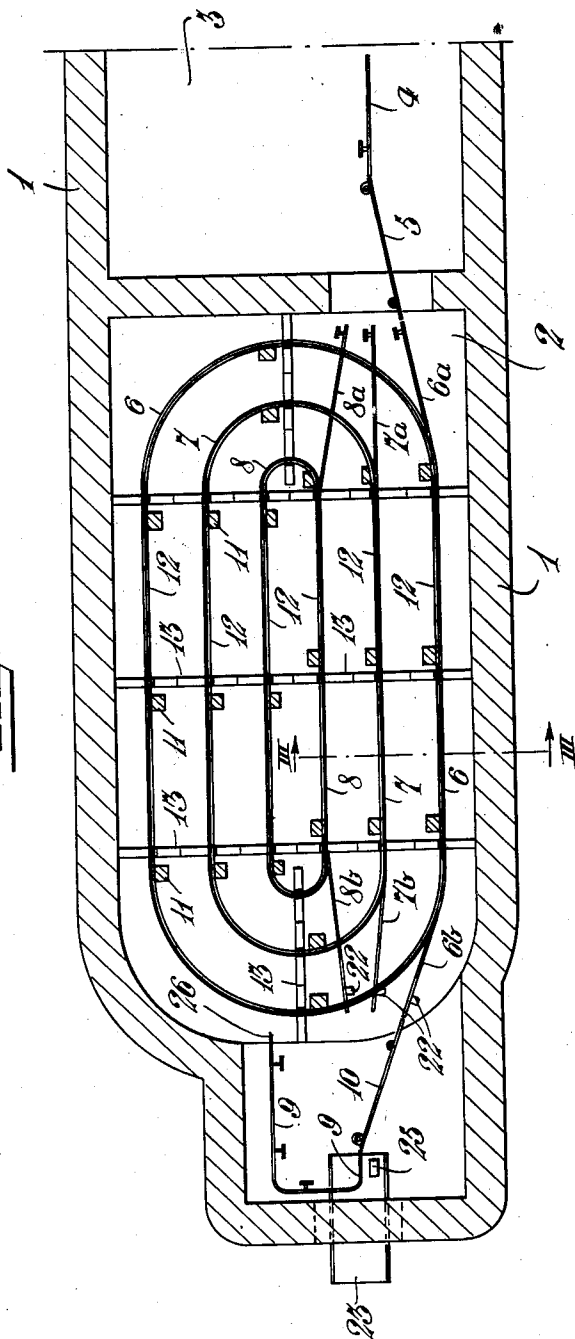
1,994,032

STORING PLANT FOR PIECE GOODS

Filed July 10, 1931

4 Sheets-Sheet 2

Fig. 2.



Inventor,
Matthias Angerpointner,
By *Sommers & Young,*
Attys.

March 12, 1935.

M. ANGERPOINTNER

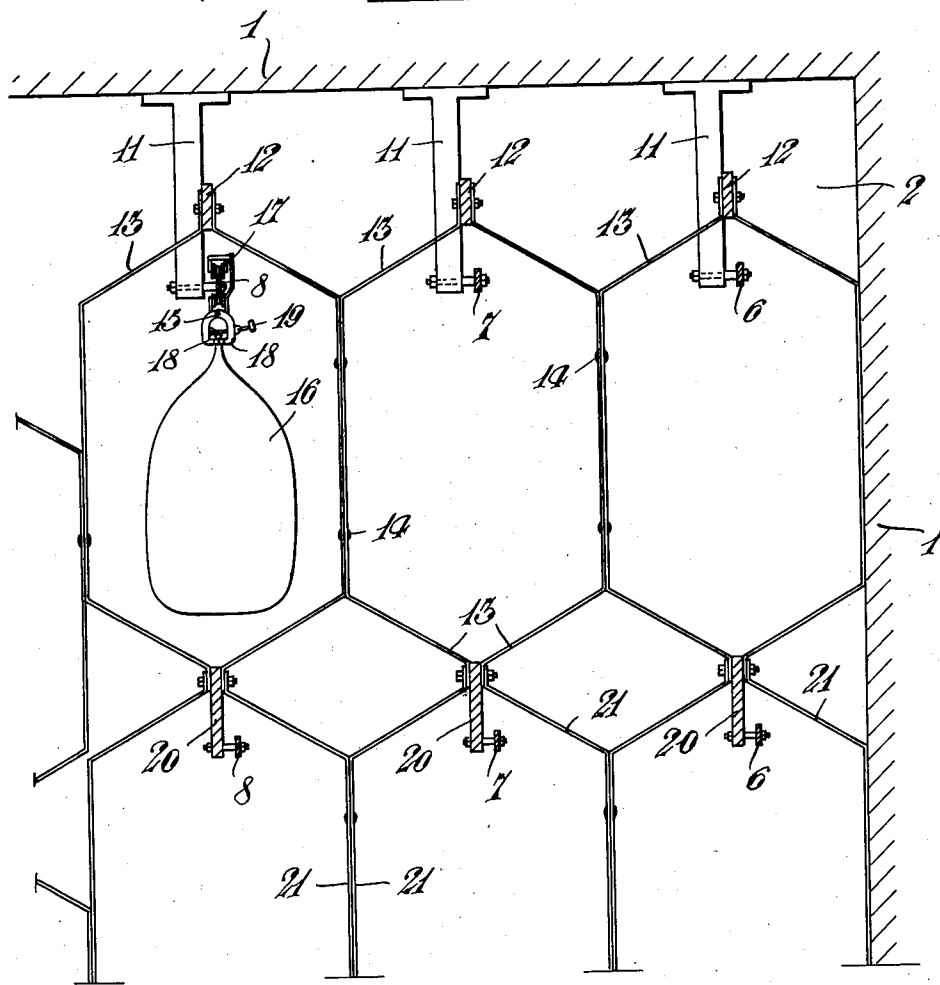
1,994,032

STORING PLANT FOR PIECE GOODS

Filed July 10, 1931

4 Sheets-Sheet 3

FIG. 3.



Inventor.
Matthias Angerpointner,
By *Sommers & Young*
Attys

March 12, 1935.

M. ANGERPOINTNER

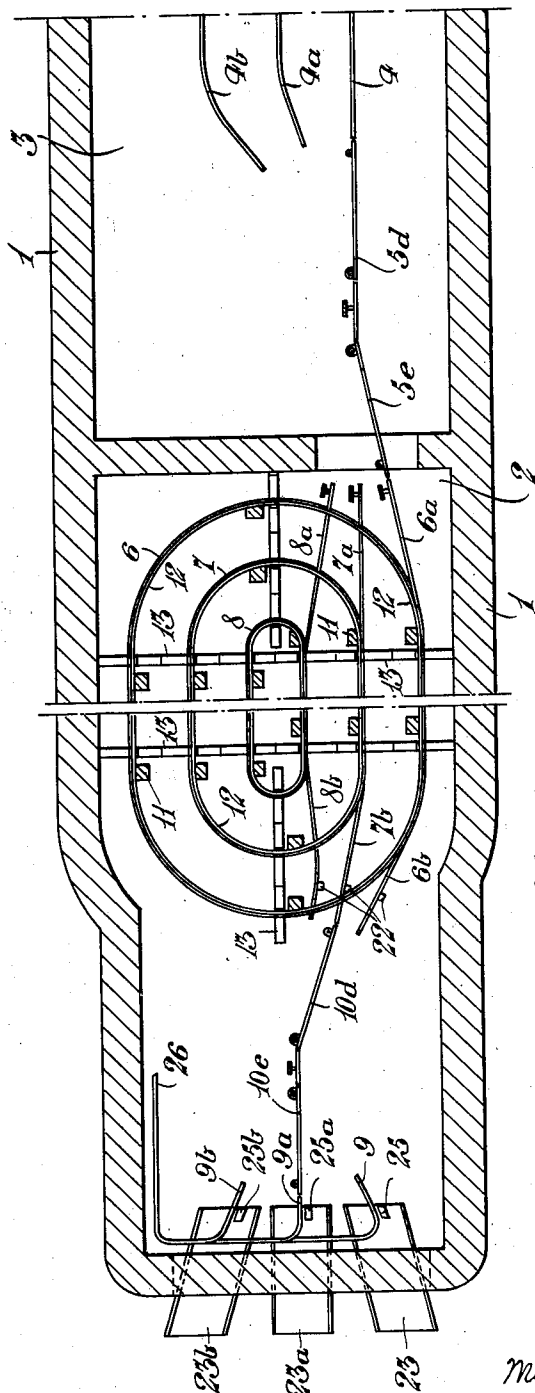
1,994,032

STORING PLANT FOR PIECE GOODS

Filed July 10, 1931

4 Sheets-Sheet 4

FIG. 4



Inventor,
Matthias Angerpointner,
By Summers & Young,
Attys.

UNITED STATES PATENT OFFICE

1,994,032

STORING PLANT FOR PIECE GOODS

Matthias Angerpointer, Djuron, near Norrköping, Sweden

Application July 10, 1931, Serial No. 550,022

2 Claims. (Cl. 104—91)

This invention relates to storing plants for piece goods. Such goods were heretofore generally stored in piles and most of the piling and transportation work was made by hand. For many kinds of goods, such as tobacco bales, it was then necessary to re-pile the pieces of goods very often, to admit the air also to those sides of the pieces of goods which in the piles rest against each other or against the floor. If not re-piled frequently, the tobacco in the bales will assume different quality, different taste and percentage of nicotine in those sides to which the air was admitted during the storing in piles as compared with those sides from which the air was then excluded. Similar facts prevail in other cases. Such re-piling which is substantially made by hand, is, of course, very expensive.

The chief object of this invention is to overcome these and other inconveniences and to provide for a storing plant for piece goods in which such goods are stored, entered and taken out substantially without any manual labour and in which the air has free admission to all sides of the pieces of goods stored. Further advantages of the invention will be evident from the following specification.

With these objects in view the invention consists, chiefly in this, that the pieces of goods to be stored are held by holders or carriers running on rollers on one or more slanting suspended tracks or rails having stoppers at or near their lower ends to which all pieces, with their holders automatically roll.

One embodiment of the invention is illustrated in the annexed drawings.

Fig. 1 shows a vertical section through a storing plant in accordance with the invention. For the sake of clearness only one of the three carrying rails is shown in this figure.

Fig. 2 is a horizontal section of the same plant, substantially on the broken line II—II in Fig. 1. In this figure, all the three carrying rails are shown.

Fig. 3 shows a detail on a larger scale in a vertical section on the line III—III in Fig. 2.

Fig. 4 is a horizontal section of a modification.

In the drawings 1 indicates the mill and storing building in which the storing space 2 proper has the shape of a vertical shaft extending through all stories of the building without any partition floors. The piece goods to be stored, such as flour-sacks, tobacco or coffee bales, etc., is on the uppermost story 3 placed into holders or carriers running on wheels or rollers on a

track 4 suspended from the ceiling of said story.

A suitable construction of such holders or carriers is shown in my U. S. Patent No. 1,864,114, though any other well-known or suitable carriers may be used.

The piece goods may be suspended in the holders either in a special operation or in connection with the weighing and packing of the goods. The piece goods holder may be moved on the rail 4 by a rope or chain carrying suitable catching devices. In this case the rail 4 may be a siding from a suspended railway by which the piece goods are transported through the story 3 from packing machines or the like, not shown, in this story.

The inlet rail 4 is by means of a switch 5 connected selectively with three continuous, substantially parallel rails 6, 7, 8 extending in spirals down through the shaft 2 from the top down to the bottom. The upper ends 6a, 7a, 8a of said rails converge and any of them may be connected with the rail 4 by use of the switch 5. In a similar manner the lower ends 6b, 7b, 8b of said rails 6, 7, 8 converge and may be connected with an outlet rail 9 by means of a switch 10. One end of the switches 5, 10 is rotatable on stationary vertical rods 5a, 10a while the other ends are carried by arms 5b, 10b having rollers rolling on tracks 5c, 10c, having the shape of circular segments, substantially as shown.

The detailed construction of the rail system is best seen from Fig. 3. From the ceiling of the building vertical beams 11 project downward supporting the carrying girders 12 and the uppermost turn of the spiral rails 6, 7, 8. From the girders 12 iron frames 13 are suspended, fixed to each other by means of rivets or bolts 14 to form closed loops, giving sufficient free space to let a piece goods carrier 15 with a suspended piece 16 of goods pass freely. The carrier 15 consists of a wagon 17 rolling on the corresponding rail, two gripping arms 18 and an operating lever 19 serving to open and close the gripping arms. A very good construction of the carrier is shown in my U. S. Patent No. 1,864,114.

At their lower ends the frames 13 carry girders 20 analogous to the girders 12. Said girders 20 carry the next lower turn of the spiral rails 6, 7, 8 and also carry frames 21 analogous to the frames 13. The frames 21 carry new carrying girders and new turns of the spiral rails etc. throughout the whole shaft. The outermost frames 13, 21 are secured to the walls of the building 1.

The frames 13, 21 serve to carry the rails 6, 7, 8 and at the same time to stabilize them in the lateral direction. By this simple construction the spiral rails get a very good stability without any use of partition floors, columns or the like in the store-room 2. The space available may thus be utilized very effectively.

At the ends 6b, 7b, 8b of the rails 6, 7, 8 stops 22 are provided serving to stop the goods carriers 15 running on said rails. The stops 22 may be removed or turned to an inoperative position by hand or by electrical or mechanical means permitting actuation of said stops selectively from a distant point. Below the outlet rail 9 a chute 23 is provided discharging into a railway car 24 or the like. Above this chute an oblique stationary rail 25 is provided serving to actuate the operating lever 19 of the carriers 15 to release automatically the goods from said carriers when they pass by said rail 25 at the discharge operation. The pieces of goods thus released fall down into the chute 23 and slide to the car 24.

The rail 9 is bent laterally and ends at a point 26, at which the empty carriers are taken off from the rail.

The gradient or incline of the rails 6, 7, 8 should be chosen so as to give the carriers with their loads a suitable constant and not too high velocity after they have been accelerated at the first portion of the rails. If steel rails are used and the carrier has ball bearings for its rollers a gradient of 1.9 to 2%, somewhat less on straight lines and somewhat more in the curves, is generally fit and gives a constant velocity of about 0.5 m/sec for normal carriers with bags weighing 100 kg. At this velocity the piece of goods is not swung out in the curves and the shock against the stops 22 or the preceding carriers, when the following carrier is stopped, is quite harmless.

The piece goods to be stored is entered on the inlet rail 4 suspended in carriers 15, as mentioned above, and said carriers are then switched to any of the rails 6, 7, 8. For instance, a certain quality of the piece goods may be switched to the rail 6, another quality to the rail 7 and still another quality to the rail 8. As soon as a carrier with its suspended load has been switched to one of said rails 6, 7, 8 it begins rolling automatically downward on the inclined rail and is first accelerated during a short period and then attains a constant velocity. The carrier with its load will continue rolling downwards until it is checked by the corresponding stop 22. If more than one carrier is switched to the same rail the carriers with their loads will be suspended in a spiral row above the stops 22. Each rail 6, 7, 8 can evidently carry a spiral row of such carriers to a length corresponding substantially to the total length of said rail.

When the goods is to be discharged from the store-house, the supervisor need only open one of the stops 22 after the switch 10 has been connected with the rail in question. Then the corresponding row of carriers automatically will move forwards and downwards. When the carriers pass the releasing device 25 they are opened automatically and let their loads fall down into the chute 23 to be transported to the transporting vehicle 24. The empty carriers fall down at 26 and are returned to the room 3 in any well-known manner, for instance by an elevator or the like. The discharge rail 9 may, however, have its end 26 connected with the rail 4. In such case

the empty carriers are lifted by a chain or rope with catchers or in any other manner.

The supervisor can easily control and count the pieces of goods passing the stop 22. When a sufficient number has passed, the stop 22 is again turned to its operative position to stop the carriers. It is evident that one single man may effect and control the distribution of goods from the store-house.

The store-plant described has many advantages not attained by the store-plants heretofore known. Thus, the distribution of goods from the plant may be effected by one man only who operates the stops 22 and simultaneously controls the number of pieces delivered and also regulates the number of pieces per unit of time to agree with the working capacity of the stowers stowing the goods in the vehicle 24. The pieces of goods on a certain rail which have been stored during the longest time in the plant, are always delivered first. During the storing the pieces of goods are surrounded by air on all sides and are not pressed against each other to any appreciable degree. This is very valuable, especially for storing tobacco bales and the like, which must be surrounded by air on all sides, as stated above. The cleaning and also the extermination of vermins, rats, etc. by use of poisonous gases is also highly facilitated, because the pieces of goods are suspended freely. The conditions of life for vermins, etc., are also per se very poor when the pieces of goods are suspended like this. For provisions, such as flour, such storing is ideal and very hygienic. The number of workmen required for the storing and distribution work and for taking care of the goods during the storing is consequently extremely reduced in comparison with that needed in the usual storing plants.

In the modification shown in Fig. 4, which is a horizontal section similar to that of Fig. 2, there are shown three individual inlet rails 4, 4a, 4b, which may selectively be connected with any one of the three parallel rails 6, 7, 8 by means of switches 5d, 5e. The opposite ends 6b, 7b, 8b of the rails 6, 7, 8 may in a similar manner be selectively connected with three individual outlet or discharge rails 9, 9a, 9b by means of switches 10d, 10e. The switches 5d, 5e, 10d, 10e may be actuated manually, or electrically, or mechanically from a distant point. To each of the outlet rails 9, 9a, 9b a discharge chute 23, 23a, 23b respectively is coordinated and said three outlet rails all end at 26, where the empty carriers fall down. Individual slanting rails 25, 25a, 25b are provided at each of the outlet rails to release the goods from the carriers. In other respects this embodiment is quite similar to that shown in Figs. 1-3 and corresponding parts carry the same reference characters. The mode of operation is analogous to that of the embodiment shown in Figs. 1-3, though in the embodiment of Fig. 4 pieces of goods may be taken in from different inlet rails and discharged on different outlet rails.

It is evident that the number of rails 6, 7, 8 is arbitrary. Only one or two rails may be used but also more than three rails, if desired. The store-house is preferably built with round corners, as shown.

The discharge devices 9, 10, 23, 25 may be modified after the actual need. For discharging into ships special arrangements may be made, as well-known in the art. In a single-rail system

the carrying rail can be directly connected with the inlet and outlet rails without any intermediate switches. In some cases straight rails 6, 7, 8 may be used. Also other modifications made
5 be made within the scope of my invention.

What I claim is:—

1. In a storing plant for piece goods, in combination, a building, beams projecting downwardly from the ceiling of said building, a number of interconnected iron frames forming loops,
10 girders attached to said beams, other girders attached to said iron frames, slanting rails attached to said beams and to said girders, carriers running on rollers on said rails, stoppers on said
15 rails substantially at the lower ends thereof and adapted to stop said carriers in rows on said rails and to let them pass, and releasable means

on said carriers to hold a load in suspension below said rails.

2. In a storing plant for piece goods, in combination, a building in several stories having a vertical shaft free from horizontal and vertical
5 partition walls, beams projecting downwardly from the ceiling of said building, a number of interconnected iron frames forming loops, girders attached to said beams, other girders attached to said iron frames, slanting rails attached to
10 said beams and to said girders, carriers running on rollers on said rails, stoppers on said rails substantially at the lower ends thereof and adapted to stop said carriers in rows on said rails and to let
15 them pass, and releasable jaws on said carriers to hold a load in suspension below said rails.

MATTHIAS ANGERPOINTNER.