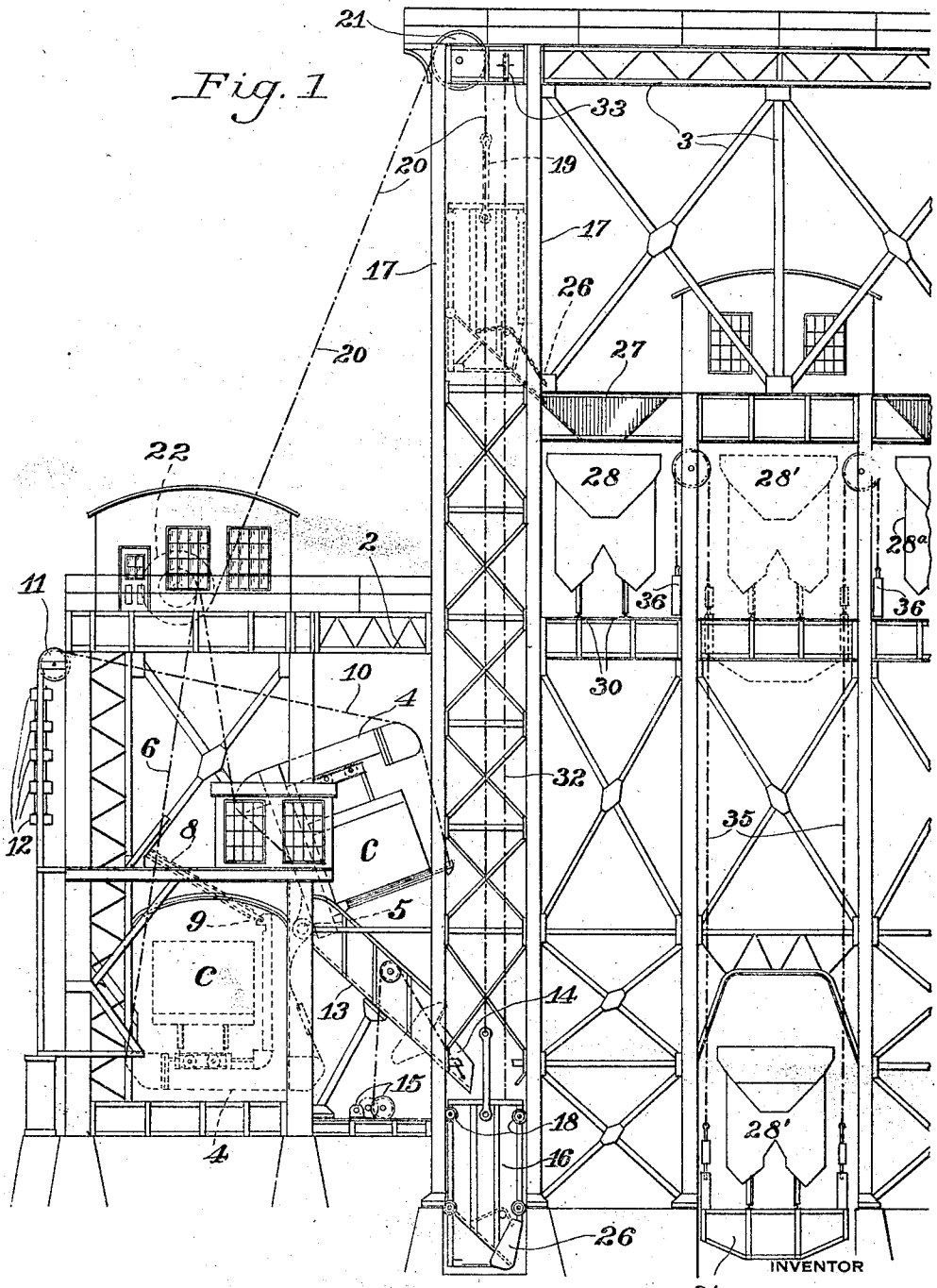
June 29, 1926. 1,590,826

F. E. HULETT

MATERIAL HANDLING APPARATUS

Filed June 23, 1923 3 Sheets-Sheet 1

Fig. 1



INVENTOR

Frank E. Hulett,

By Byrne, Rabbins Darmeles

his attys.

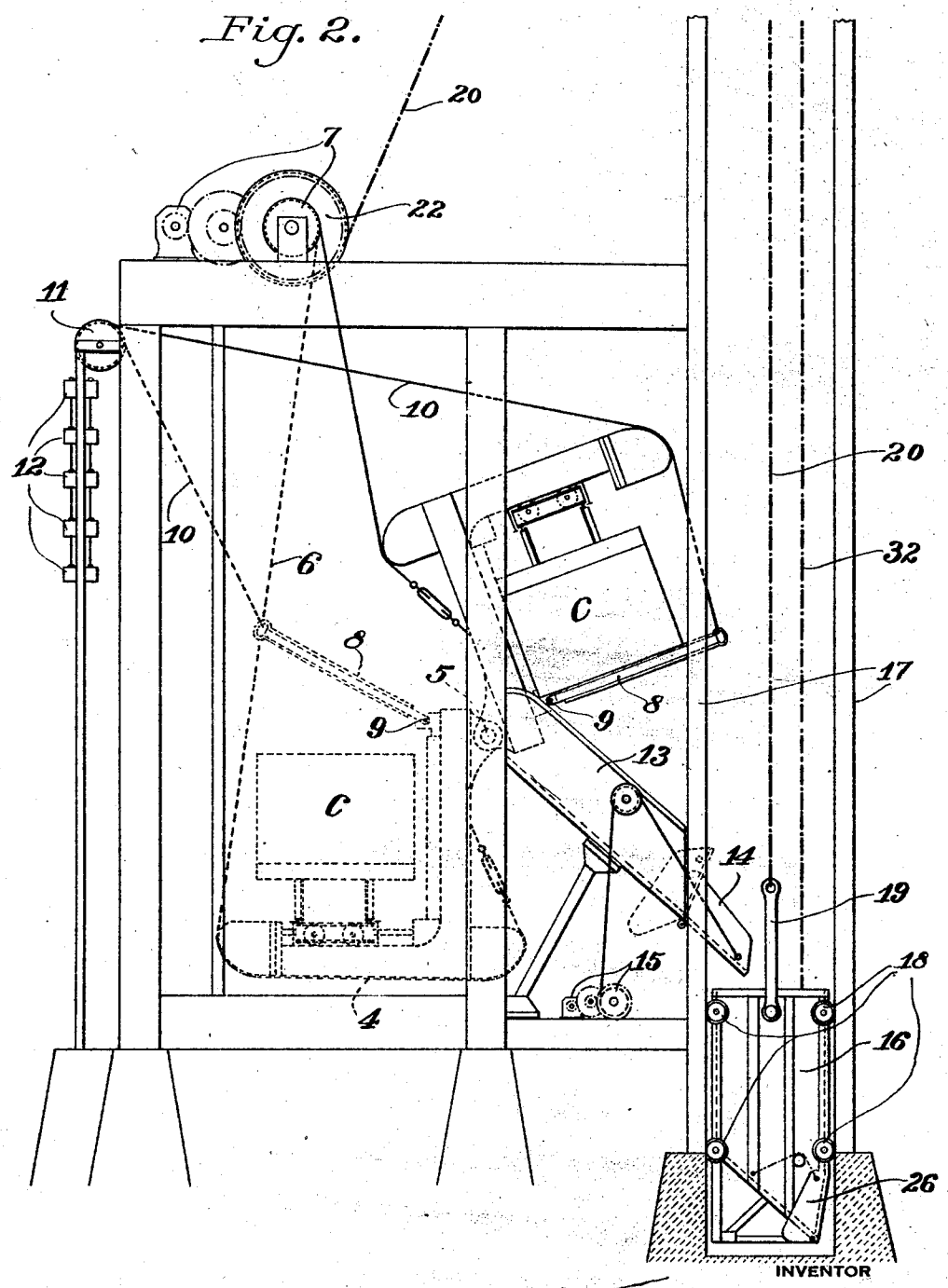
June 29, 1926. 1,590,826

F. E. HULETT

MATERIAL HANDLING APPARATUS

Filed June 23, 1923 3 Sheets-Sheet 2

Fig. 2.



INVENTOR

Frank E. Hulett,

By Byrnes, Jacobi & Parmelee

his attys.

BEST AVAILABLE COPY

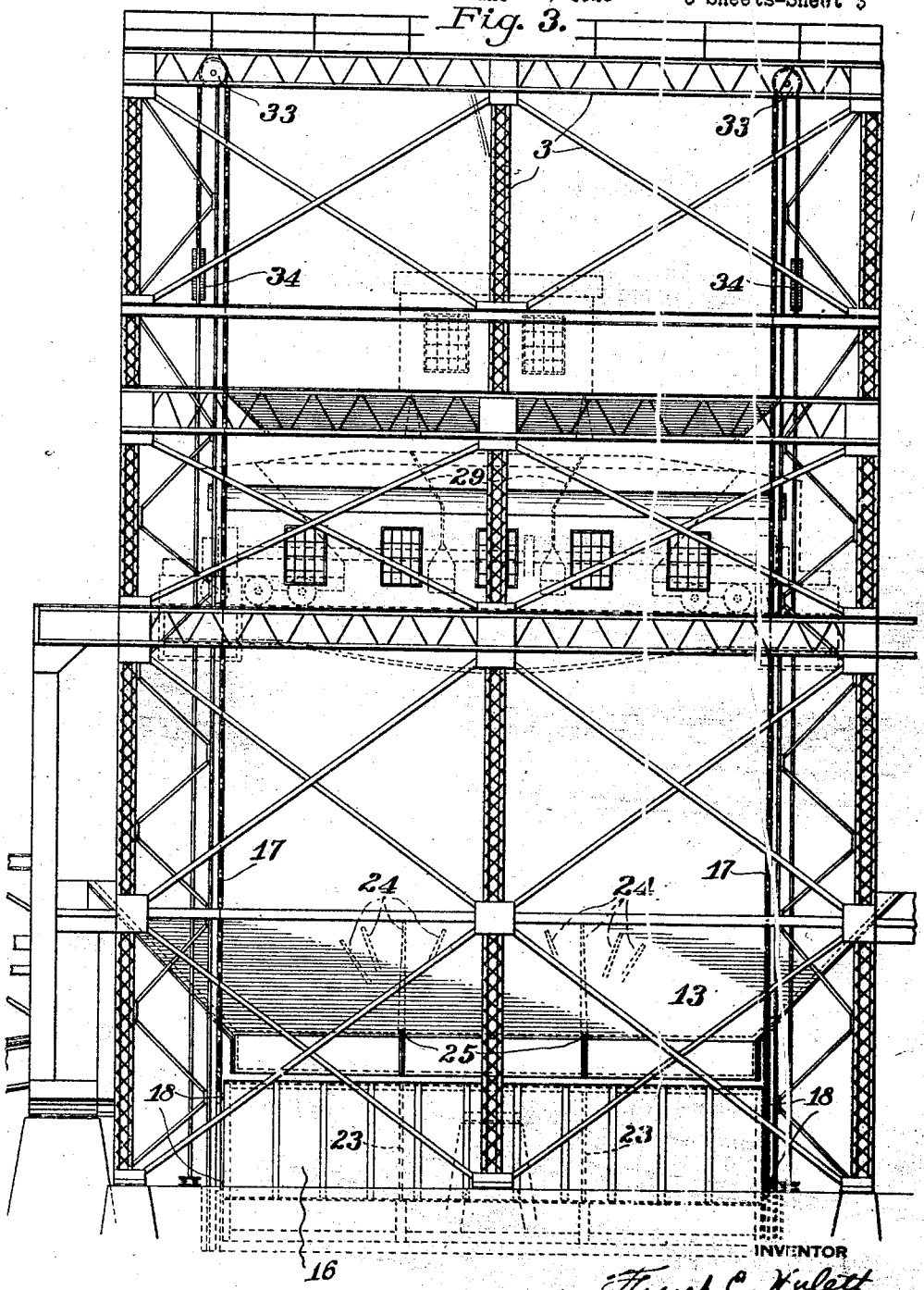
June 29, 1926. 1,590,826

F. E. HULETT

MATERIAL HANDLING APPARATUS

Filed June 23, 1923 3 Sheets-Sheet 3

Fig. 3.



INVENTOR
Frank E. Hulett,
By Byrnes, Kilburn & Parmelee,
his Attys.

Patented June 29, 1926. 1,590,826

UNITED STATES PATENT OFFICE.

FRANK E. HULETT, OF EAST CLEVELAND, OHIO, ASSIGNOR TO THE ALLIANCE MACHINE COMPANY, OF ALLIANCE, OHIO, A CORPORATION OF OHIO.

MATERIAL-HANDLING APPARATUS.

Application filed June 23, 1923. Serial No. 647,258.

The present invention relates broadly to material handling apparatus, and more particularly to apparatus of this character adapted for use in the transfer of material in bulk from standard cars to transfer cars delivering to ships, although it will be apparent that the use of the apparatus in this respect is not limited.

At the present time it is customary in the art of coaling ships, for example, to run the cars carrying coal into car dumpers, by means of which their contents are delivered to a motor driven transfer car stationed immediately in front of the car dumper. The transfer car is then run along the yard any desired distance to an elevator usually located near the bulkhead of a long elevated pier extending into the water. This elevator raises the transfer car to such an elevation that it can be run off the elevator onto the pier. The transfer car is in return discharged into pockets built as part of the pier structure and adapted to deliver the same into the holds of ships tied to the pier.

A system of the character described embodies the use of an entirely independent elevator mechanism for raising the transfer cars to the required level. As these transfer cars weigh about as mush as the material carried thereby, it will be apparent that a considerable amount of power is required to elevate the same.

In accordance with the present invention there is provided an improved system and apparatus in which the use of a separate elevating mechanism is obviated. It is also possible in accordance with the preferred embodiment of the invention to utilize lighter structures substantially counterbalanced, and to so operate the car dumping mechanism and the cars receiving the material therefrom that the movement of one assists in the movement of the other, thereby reducing the weight of moving parts, reducing the power consumption required and increasing the safe speed of operation. It will also be apparent that the apparatus makes it possible to provide an effective installation at a much reduced cost and involves a correspondingly large reduction in the cost of maintenance.

In the accompanying drawings there is illustrated more or less diagrammatically a preferred embodiment of the present invention, it being understood that the drawings do not define the limits of the invention, as changes may obviously be made therein within the scope of the appended claims, without departing from the spirit of the invention as defined therein.

In the drawings:—

Fig. 1 is an end elevation of a portion of the apparatus constructed in accordance with this invention.

Fig. 2 is a view, similar to Fig. 1, but on an enlarged scale with a portion of the structural arrangement omitted, and illustrating the operation of the car dumper mechanism; and

Fig. 3 is a vertical sectional view on the line III—III of Fig. 1 looking in the direction of the arrows, some of the structural part being omitted for the sake of clearness.

In accordance with the present invention and having reference more particularly to Fig. 1 of the drawings, there is provided a material handling apparatus comprising a car dumping frame structure 2 and an elevator and transfer car supporting frame structure 3, the structural features of these respective frames being comparatively immaterial.

Mounted in the frame structure 2 is a car receiving and supporting cradle 4 having a suitable pivotal mounting 5, about which it is adapted to swing in moving a car C from the dotted line position to the full line dumping position indicated both in Figures 1 and 2. For effecting this dumping movement of the cradle 4, there may be provided a suitable arrangement of cables 6, as well understood in the art, passing from a hoisting mechanism 7 around the cradle and dead ended at suitable points thereon. As these cables are wound upwardly by the hoisting mechanism, it will be apparent that the car or cars carried by the cradle are moved to dumping position. For holding the cars in the cradle during this operation, there is provided a suitable number of clamping bars 8, each having at one end a pivotal connection 9 with the cradle 4 and secured at their opposite ends to cables 10 passing around pulleys 11 and adapted to cooperate with a series of counter weights 12. The arrangement of counter weights is such that as the cradle moves into dumping position, the counter weights are successively picked up, thereby exerting a gradually increasing clamping action on the

car for holding the clamps in tight engagement therewith, as indicated in full lines in Figures 1 and 2.

The contents of the dumped cars may be delivered to a chute 13 having its outlet normally closed by a pivotally mounted gate 14, which may be automatically or manually operated through a suitable motor and gear train 15.

When the gate 14 is in position to permit discharge from the chute 13, as indicated in full lines in Fig. 2, it projects into the frame structure 3 to such an extent that it is adapted to discharge the contents of the chute into a lifting pan or hopper 16, movably mounted within the frame structure and adapted to move vertically therein on rails 17, it being provided with suitable wheels 18 for this purpose.

Preferably, although not necessarily, the relationship between the lifting pan 16 and the car dumping mechanism is such that the return of the cradle 4 from dumping to normal position is adapted to assist in the vertical movement of the lifting pan 16 in the frame structure 3, and the return or lowering movement of the lifting pan is in turn adapted to assist in the movement of the cradle from normal to dumping position. This result may be obtained by providing the lifting pan with a carrying yoke 19 to which is secured a lifting cable 20 passing upwardly between the rails 17 and around a sheave 21 in the top of the frame structure 3 to a drum 22, constituting part of the hoisting mechanism 7. The gear ratio between that portion of the mechanism 7 which controls the movement of the cradle 4, and the drum 22 which controls the movement of the pan 16, may be such that the desired vertical movement of the pan is secured for each dumping movement of the cradle, the gear ratio being determined by the height to which the lifting pan must be raised. In usual constructions this distance will be about 90 to 95 feet, but it will be apparent that it may be varied in accordance with the requirements.

The lifting pan is preferably divided into three equal compartments by partition plates 23 located therein and extending transversely thereof, as indicated in dotted line in Fig. 3. In order to effect a corresponding division of the coal or other material being handled while passing through the chute 13, the chute is provided with deflectors 24 having a pivotal mounting 25 and adapted to be moved to different dotted line positions, as shown in Fig. 3. The deflectors 24 may be adjusted in accordance with the disposal of the material in the cars being handled, in order to secure the desired results.

In my prior Patent No. 1,285,713, of November 26, 1918, there is indicated a car dumping mechanism which is similar in some respects to that herein described. In that construction, however, the cars are discharged directly into transfer cars, which are then conveyed as herein described, or in some suitable manner as shown, for example, in the prior patent to George H. Hulett, No. 1,066,015, of July 1, 1913, and the prior patent to George H. Hulett and myself, No. 1,327,327, of January 6, 1920. In accordance with the present invention, however, the lifting pan 16 is not designed to be run along a surface track, but is adapted, as soon as loaded, to be raised by the elevator frame structure. In its raised position, as indicated in dotted lines in Fig. 1, its discharge gate 26 is moved to open position in any desired manner to discharge through the hopper 27 into the transfer car 28. This transfer car may be of any desired construction, as disclosed, for example, in my prior patent herein referred to, and having division plates 29. The transfer car 28 is carried by the elevator frame structure 3 on tracks 30 at the desired level, whereby it may run directly onto a pier.

While it is possible by interconnecting the lifting pan and car dumping mechanism, as described, to reduce the power consumption required to a minimum and correspondingly reduce the weight of the moving parts, which permits an increase in the safe speed of operation, it will be apparent that if desired, the various portions of the mechanism may be independently operated. Also it will be apparent that the transfer car 28 might be substituted for the lifting pan 16 and raised and lowered by the mechanism described and directly run onto the pier from its elevated position.

In Fig. 1 the frame structure 3 is indicated as provided with an intermediate elevating mechanism 31 carrying a transfer car 28′ adapted to be loaded in any desired manner, or adapted to receive material from a car dumper, as illustrated in my prior patent referred to. This permits apparatus constructed in accordance with this invention to be satisfactorily installed in existing systems to take care of such transfer cars as may be loaded at a distant point, and to also incorporate the advantageous features herein pointed out. This elevating mechanism also makes it posible to get the transfer cars down from the pier level as may be required for repairs.

The portion of the frame structure broken away may correspond exactly to that portion already described and embody a second car dumping mechanism and transfer car 28ª adapted to receive the material therefrom.

In the event that the weight of the lifting pans is greater than that required for use in cooperation with the desired movement of the dumping mechanism, each lifting pan

may be partially counter balanced by securing to each end thereof cables 32 passing around sheaves 33 and secured to counter weights 34. The transfer car 28′ may be similarly counter balanced by cables 35 and counter weights 36.

The advantages of the present invention arise from the provision of a material handling apparatus of this character in which the ease of handling material is increased with a compact high speed arrangement which may be installed at a minimum cost, operated with a minimum power consumption and at a minimum cost of upkeep.

I claim:—

1. In a material handling apparatus, means for emptying a car, means for receiving the contents of said car, an elevator frame supporting said last mentioned means during the loading thereof, means for moving said loaded means vertically, and means operatively connecting said first and last mentioned means whereby the weight of one assists in the operation of the other, substantially as described.

2. In a material handling apparatus, a car cradle, hoisting mechanism for tilting said cradle, means for receiving the contents of a car on the cradle, an elevator frame supporting said means during the loading thereof, means for moving said loaded means vertically, and means operatively interconnecting said last mentioned means and said cradle whereby the weight of one assists the movement of the other, substantially as described.

3. Apparatus for handling material including a car dumping cradle, an inclined chute for receiving material from cars dumped in the cradle, a lifting receptacle into which the chute delivers, the capacity of the lifting receptacle being sufficient to receive at one time the contents of any car that may be moved into the the cradle, and a driving means for dumping the cradle when the lifting receptacle is lowered and for restoring the cradle when the lifting receptacle is being raised and vice versa, substantially as described.

4. Apparatus for handling material including a car dumping cradle, an inclined chute for receiving material from cars dumped in the cradle, a lifting receptacle into which the chute delivers, the capacity of the lifting receptacle being sufficient to receive at one time the contents of any car that may be moved into the the cradle, a driving means for dumping the cradle when the lifting receptacle is lowered and for restoring the cradle when the lifting receptacle is being raised and vice versa, and connections for transferring energy from one to the other whereby their opposed motions tend to counterbalance one another, substantially as described.

5. Apparatus for handling material including a dumping cradle mechanism, a lifting receptacle mechanism adapted to receive material from the dumping cradle, and operating means for both mechanisms for operating one mechanism against gravity while the other is moved with gravity and wherein the opposite movement of the two mechanisms tends to counterbalance one another, substantially as described.

In testimony whereof I have hereunto set my hand.

FRANK E. HULETT.

Certificate of Correction.

It is hereby certified that Letters Patent No. 1,590,826, granted June 29, 1926, upon the application of Frank E. Hulett, of East Cleveland, Ohio, for an improvement in "Material-Handling Apparatus," were erroneously issued to "The Alliance Machine Company, of Alliance, Ohio, a Corporation of Ohio," as assignee of the *entire interest* in said invention, whereas said Letters Patent should have been issued to the inventor, said *Hulett*, and *The Alliance Machine Company, of Alliance, Ohio, a Corporation of Ohio*, said corporation being assignee of *one-half* interest only in said invention, as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3d day of August, A. D. 1926.

[SEAL.]

M. J. MOORE,
Acting Commissioner of Patents.