D. W. COLBY.

ASSORTING AND DELIVERING MECHANISM.

APPLICATION FILED OCT. 31, 1910.

1,139,401.

Patented May 11, 1915.

2 SHEETS—SHEET 1.

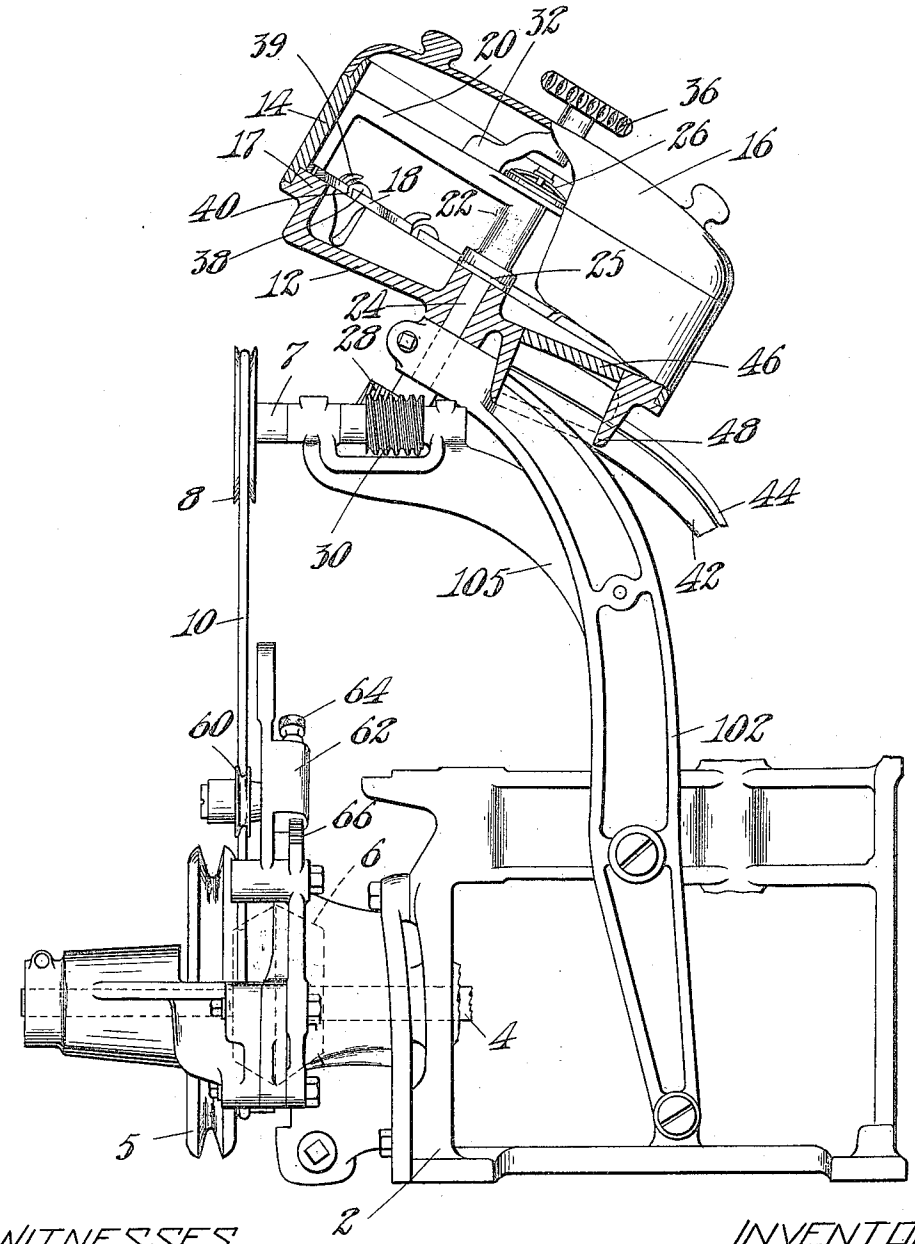


Fig. 1.

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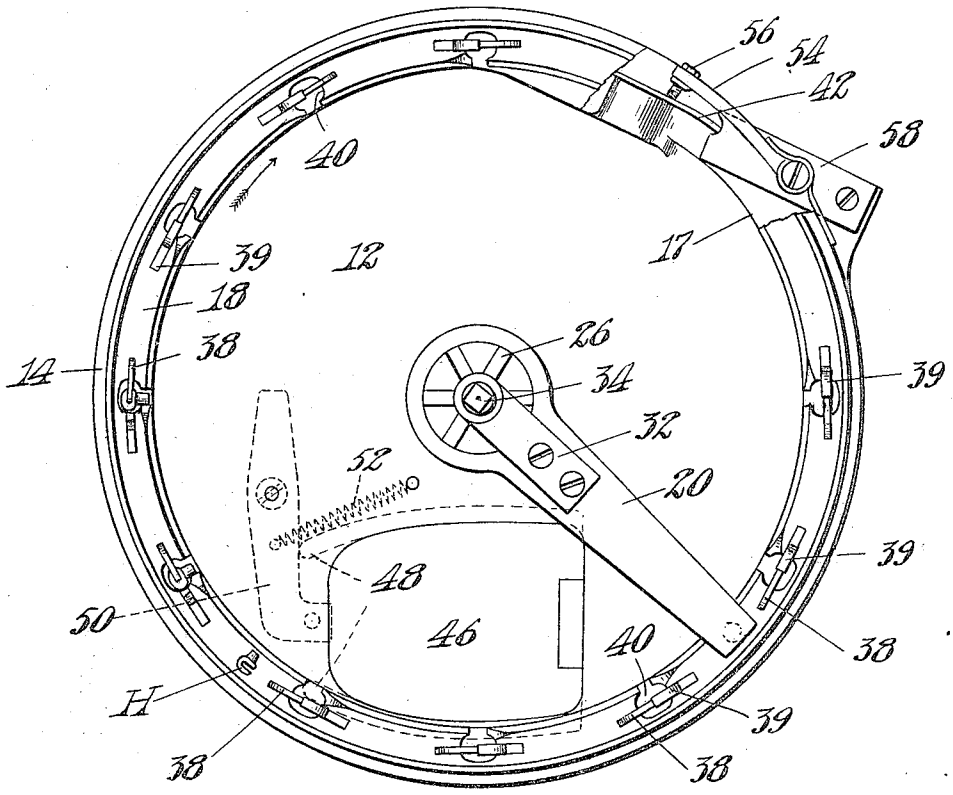


Fig. 2.

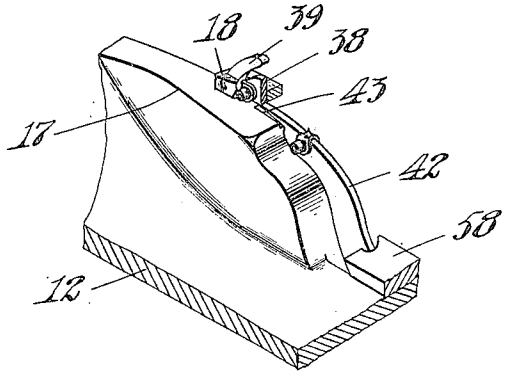


Fig. 3.

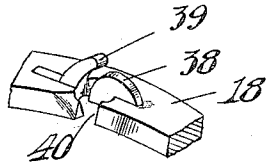


Fig. 4.

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ASSORTING AND DELIVERING MECHANISM.

1,139,401. Specification of Letters Patent. Patented May 11, 1915.

Application filed October 31, 1910. Serial No. 589,982.

To all whom it may concern:

Be it known that I, DANIEL W. COLBY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Assorting and Delivering Mechanisms, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to mechanism for assorting and delivering fasteners or similar articles and more especially to mechanism for separating lacing hooks from the mass contained in a hopper and supplying them to the raceway of a hook setting machine.

In order to avoid attrition of the hooks, which would result in damaging their finish, it is important that the mechanism should operate without causing undue agitation of the mass of hooks, and it is also important that the separating device should have large capacity in order that the raceway may be supplied with hooks even when the machine is operated continuously at high speed. It is, further, desirable that the separating device should be of such construction as to handle hooks varying from each other in dimensions within the limits encountered in dealing with hooks furnished in commercial quantities.

Accordingly, it is an object of this invention to provide a novel assorting and delivering mechanism which shall possess these qualities and embody certain other advantages in construction and operation which will be more particularly pointed out hereinafter.

Broadly considered my improved assorting and delivering mechanism comprises a hopper in which the fasteners are received in bulk and a flat separating device movable into and out of the pile of fasteners in the hopper, the separating device being so constructed and arranged as to receive those fasteners which are properly positioned, convey them to the raceway and deliver them thereto through its lower surface. As herein shown the hopper may be cylindrical in form and the separating device may comprise a flat annular plate or ring concentrically arranged for turning movement within the hopper in a path extending adjacent to the bottom of the hopper at the point to which the hooks naturally gravitate and having a plurality of pockets adapted to receive hooks from the upper surface and deliver them to the raceway through the bottom of the ring.

An important feature of the invention consists in the provision of means on the separator, such as projecting blades, cooperating with the hook receiving pockets for engaging hooks in the mass and guiding them to and into the pockets. The provision of such blades has been found to increase the capacity of the separator without appreciably agitating the mass of hooks. By extending the blades into the pockets the hooks may be maintained in a definite position during their conveying to the raceway and delivered to the latter in the desired position.

Another feature of the present invention relates to the manner of effecting a connection between the raceway and hopper for insuring the delivery of hooks by the separator to the raceway and providing for the disposition of superfluous hooks when the raceway is full.

An arrangement which gives satisfactory results consists in extending the upper end of the raceway for a short distance flush with the bottom surface of the separator and tangentially with respect to the path of the hooks so that the hook guiding blades of the separator shall register momentarily with the end of the raceway and thereby afford opportunity for the hooks to turn and settle securely on the raceway before they are entirely released from the pockets. In order to dispose of superfluous hooks after the raceway is full the point of connection between the raceway and the separator may be elevated above the hopper bottom so that superfluous hooks released at that point may return to the mass in the hopper.

In this connection a further feature of the invention consists in arranging the bottom of the hopper to lie at a less inclination than the plane of the separator thereby securing the required space for the superfluous hooks.

Still another feature of the present invention lies in the construction and arrange-

ment of the mechanism for driving the separator above described. In starting a machine when the raceway is empty or if for any reason the supply of hooks upon the raceway runs low, it is advantageous to set the separator in operation while the machine remains at rest, in order that the raceway may be filled with hooks. This expedient is permitted, in a preferred embodiment of my invention, by driving the separator from a continuously rotating member of the machine, such as the loose member of the clutch. Preferably the separator is belt driven, and in this case, the effective connection between the former and its continuously rotating driving member may be interrupted by an adjustably mounted idler, which, also serves to adjust the tension of the belt.

It is desirable to allow for obstruction and stoppage of the separator occasioned by a hook becoming wedged at the throat of the raceway or any other cause, and with this in view, it is a further object of the present invention to provide a frictional driving connection between the separator and its immediate actuating member. With such a connection it is possible to move the separator by hand independently of its driving mechanism in order to dislodge obstructing hooks.

The features and advantages above enumerated and others incident to the invention will be best understood and appreciated in connection with the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawings, in which,—

Figure 1 is a view in elevation showing the hopper partly in section; Fig. 2 is a plan view of the hopper with the cover removed; Fig. 3 is a view in perspective showing the connection between the raceway and the hopper; Fig. 4 is a fragmentary view of the separator.

In the accompanying drawings the assorting and delivering mechanism is illustrated as applied to the hook setting machine disclosed in co-pending application Serial No. 513,078, filed August 16, 1909, of which the present application is in part a continuation. While the assorting mechanism is well adapted for use in connection with this particular machine it will be evident that it is capable of general application.

The assorting and delivering mechanism may be mounted upon the frame 2 of the hook setting machine in any desired manner. As is shown in Fig. 1, the hopper is secured to the upper end of a bracket 102 attached to one side of the frame 2 and an auxiliary bracket 105 extending from the bracket 102 furnishes bearing for the shaft 7 which actuates the separator as will be hereinafter explained. The hopper comprises a bottom portion 12, a cylindrical casing 14 and a removable cover 16. The bottom of the hopper is inclined downwardly toward the front of the machine in order that the hooks contained therein may naturally gravitate toward that side. The bottom portion is provided with an annular shoulder or ledge 17 adjacent to the wall of the casing 14 which shoulder furnishes bearings for the separator 18. The plane of this shoulder is arranged at an inclination to the bottom of the hopper so that the separator will enter the pile of hooks at the lower side of the hopper but in other places will be elevated somewhat from the hopper bottom.

The separator itself comprises a flat annular plate or ring substantially rectangular in cross section with a beveled inner side and is provided at suitable intervals with a plurality of hook-shaped recesses 40 opening into the interior of the ring. In moving the separator through the mass of hooks those hooks which are properly positioned will fall into the recesses and thus be carried out from the mass and may be conveyed to the raceway. The upper end of the raceway 42 connects with the hopper at a point near its higher side and extends into the hopper for a short distance flush with the surface of the annular shoulder upon which the separator ring 18 rotates and tangentially with respect thereto. As the ring 18 carries successive hooks to this portion of the raceway they are allowed to drop from the bottom of the ring and settle themselves upon the raceway. This takes place before the hooks are released entirely from the pockets, thus minimizing the opportunity for them to become improperly located in the transfer.

Preferably the separator ring is provided with projecting blades 38 arranged to engage the throats of hooks properly positioned in the mass and guide them into the pockets 40. An oppositely disposed guide piece 39 is provided on the other side of each recess 40 to prevent the hooks from being carried over the recesses instead of into them. Each blade 38 is extended down into the recess 40 and serves to hold a hook in definite position while it is being conveyed to the raceway. The blades are arranged in the ring 18 at the same radial distance from the center as the upper end of the raceway so that they shall momentarily register therewith and allow each hook to engage the raceway before it is entirely released from the recess.

The separator is rotated in the direction indicated by the arrow in Fig. 2 and in passing through the mass of hooks a blade 38 will engage with the throat of such hooks as happen to be in the position of the hook H.

As the ring continues to rotate the hooks will slide rearwardly along the edge of the blade 38, on account of the retarding effect of the contiguous mass and will be turned over and guided downwardly into the pockets of the ring 18 by the guide piece 39. While contained in a recess each hook will rest upon the surface of the shoulder 17 being held in position on its side by the blade 38 and pushed along by engagement with the rear wall of the recess. When a hook has been conveyed to position above the end of the raceway 42 it settles itself upon the straight end thereof being allowed to turn through 90° and engage the raceway by its throat. This turning movement is permitted by a slot 43 in the shoulder 17 near the raceway which slot receives the flange of the hook.

After extending flush with the surface of the shoulder 17 for a short distance the raceway extends downwardly through an aperture in the bottom of the hopper. For convenience in construction, the aperture is made larger than necessary to permit the passage of a hook and a throat plate 58 is secured to the bottom of the hopper and serves to prevent the escape of any hooks except those properly located upon the raceway. On leaving the hopper, the raceway is extended to the setting instrumentalities in the usual manner and provided with the usual guard rail 44.

It will be noticed that the point of connection between the separator and the raceway is considerably elevated above the bottom of the hopper. This construction permits superfluous hooks, dropped from the recesses of the separator 18 after the raceway is full, to find their way back to the mass contained in the hopper. Such hooks instead of settling on the raceway will be carried over the backs of those already located thereon, falling freely when the steeper part of the raceway is reached.

The separator 18 is rotated at a uniform speed from any continuously actuated part of the setting machine, such as the loose member of the driving clutch. In the machine of said co-pending application the main shaft 4 is suitably journaled in the frame 2 and provided with a loose driving pulley 5 which may be clutched to the shaft by shifting a friction member 6. Preferably the separator may be driven from the loose member 5. To this end the separator is connected to an angular arm 20 frictionally mounted on the upper end of a shaft 24 journaled in the bottom portion of the hopper. The shaft 24 at its lower end is provided with a worm wheel 28 meshing with a worm 30 on the shaft 7. This shaft is journaled in the auxiliary bracket 105 above mentioned and is provided at its rear end with a grooved pulley 8. The pulley 8 is driven by a belt 10 from the loose member 5 of the clutch on the main shaft 4. When it is desired to operate the separator the belt 10 is placed under sufficient tension by a belt tightener comprising an idle pulley 60 mounted on a pivoted arm 62 which may be moved into desired position and locked by a spring pressed detent 64 coöperating with a toothed rack 66. This construction permits the continuous operation of the separator when the hook setting machine as a whole is at rest so that the raceway may be rapidly supplied with hooks independently of the operation of the machine.

In order to allow for obstruction and stoppage of the separator in case a hook should become wedged between it and the raceway it is desirable to provide a frictional connection between the separator and its actuating mechanism. To this end the arm 20 is provided with a hub 22 which is frictionally held upon the shaft 24 between the collar 25 and a spring washer 26. An upwardly extending arm 32 is attached to the arm 20 and is provided with a square spindle 34 which extends through the cover of the hopper where it may be provided with a small hand wheel 36. In this way it is possible to move the separator ring independently of its actuating mechanism to dislodge an obstructing hook.

In order to permit the discharge of the contents of the hopper there is provided a trap door 46 forming part of the bottom of the hopper adjacent to its lower side. The door 46 is normally held closed by a pivoted latch 50. The end of the latch 50 is beveled on its under side so that the door 46 may displace the latch against the action of a spring 52 in being closed. Downwardly projecting wings 48 are formed on the bottom of the hopper at either side of the trap door and constitute the walls of a chute, the bottom of which is formed by a trap door when opened. One wing 48 acts as a stop to limit the inward movement of the latch 50. The contents of the hopper may be quickly and completely discharged into any convenient receptacle by turning the latch 50 to permit the trap door to fall and form a chute, the door in its lower or open position resting against the bracket 102.

The point in assorting mechanism of this character at which obstruction is likely to occur is where the raceway passes out of the hopper and in order to make this point readily accessible there is provided a gate 54 normally closed by a spiral spring but capable of being swung outwardly to permit inspection of the end of the raceway. The gate 54 is provided with an adjustable stop 56 whereby its normal position may be accurately determined and varied in accordance with hooks of different sizes.

The operation of assorting and delivering

mechanism will be readily understood from the foregoing description. It will be noticed that the separator is capable of handling hooks within a wide range of lengths as their barrels are allowed to extend indefinitely toward the center of the hopper from the recesses 40. Furthermore, the distance between the rear edge of a blade 38 and the rear face of a recess 40 is made greater than the width of the rear part of the throat of the largest possible hook to be set so that access of a hook to the recesses is dependent only on the proper width of the throat of the hook. Notwithstanding the latitude of the separator in regard to the size of the hooks, it will be seen that each hook, when once engaged by the separator, is constantly and precisely controlled in its position so that there is no opportunity given for a hook to escape being delivered to the raceway in the proper position.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine of the class described, the combination of a hopper with a separator, said separator comprising a ring having a beveled inner surface and a plurality of recesses extending through the ring from its upper to its lower surfaces and opening into the interior of the ring.

2. In a machine of the class described, the combination of a hopper with a separator comprising a flat ring arranged to rotate with a flat side uppermost and being provided with a plurality of recesses extending from its upper side to its lower side and having the general outline of the fasteners to be handled, and a raceway for receiving fasteners successively as they pass out of the ring through said recesses.

3. In a machine of the class described, the combination of a hopper with a separator comprising a ring provided with a plurality of recesses, each recess having a portion with substantially circular walls which at one point project inwardly and a narrow neck opening into the interior of the ring, said recess being so proportioned as to contain the entire hook body.

4. In a machine of the class described, the combination of a hopper and a raceway extending therefrom, together with a separator located within said hopper and comprising a rotatable ring provided with recesses for receiving hooks from a mass, each recess having an opening through one edge of the ring and a larger inclosed portion within the ring.

5. In a machine of the class described, the combination of a hopper and a raceway extending therefrom, together with a separator located within said hopper and comprising a flat ring having an unobstructed inner edge, the ring being constructed and arranged to receive fasteners at its upper surface and deliver them to the raceway through its lower surface.

6. In a machine of the class described, the combination of a hopper and a separator, said separator comprising a flat ring provided with recesses, and blades extending above the upper surface of the ring to engage fasteners and into the recesses for maintaining the fasteners in the desired position within the recesses.

7. In a machine of the class described, the combination of a hopper and a separator, said separator comprising a ring provided with recesses opening through its lower surface, and a plate within each recess to engage the throat of a hook and maintain the same in the desired position.

8. In a machine of the class described, the combination of a hopper with a separator, said separator comprising a recessed ring having a picker blade and guide plate adjacent to and coöperating with each recess to engage and position each hook.

9. In a machine of the class described, the combination of a cylindrical hopper with a separator, said separator comprising a recessed ring, and being provided with means for engaging a hook above the upper surface of the ring and delivering a hook through its lower surface with the barrel of the hook coinciding in direction with a radial line of the hopper.

10. In a machine of the class described, the combination of a hopper with a separator, said separator comprising a recessed ring, a hook engaging blade located on one side of each recess, and a hook guiding plate having a concave guiding surface located upon the opposite side of each recess.

11. In a machine of the class described, the combination of a cylindrical hopper, a separator arranged to carry fasteners along a curved path, and a raceway, said raceway at its upper end having a rail which engages directly with the bottom of the separator, extending tangentially with respect to the path of the fasteners in the separator for a short distance and then downwardly below the plane of the bottom of the separator.

12. In a machine of the class described, the combination of a hopper, a ring shaped separator arranged to carry fasteners along a curved path and a raceway, said raceway at its upper end having a rail extending tangentially with respect to the path of the fasteners in the separator ring for a short distance and then downwardly from a point of engagement with the separator to below the plane of the lower surface of said separator.

13. In a machine of the class described, the combination of a hopper, a ring shaped separator having picker blades and being movable to carry fasteners along a curved path, and a raceway, said raceway at its

upper end extending tangentially with respect to the path of the fasteners in the separator ring and being located at the same radial distance from the center of the ring as said picker blades.

14. In a machine of the class described, the combination of a hopper for lacing hooks, a separator ring rotatable therein above the hopper bottom, and a raceway having a single rail disposed with its edge toward the bottom of said ring arranged between the bottom of the hopper and the bottom of the ring.

15. In a machine of the class described, the combination of a hopper comprising a cylindrical casing with an upwardly extending axis and a bottom, together with a raceway, and a separator ring rotatable in a plane perpendicular to the axis of said casing, said separator at a point adjacent to said raceway being arranged to carry fasteners along a path elevated above the bottom of said hopper.

16. A machine of the class described having, in combination, a hopper for containing fasteners, and a movable separator therein having pockets and means for guiding fasteners into said pockets and axially turning them while they are being guided into the pockets.

17. A machine of the class described having, in combination, a hopper for lacing hooks, a movable separator therein having pockets and means mounted thereon for engaging hooks in one position, guiding them into said pockets and axially turning them into another position.

18. A machine of the class described having, in combination, a hopper for containing fasteners, a raceway, and a movable separator constructed and arranged to convey fasteners in a predetermined axial position to said raceway, the separator and raceway being so relatively disposed as to permit axial turning of a fastener to engage the raceway before it is released by the separator.

19. A machine of the class described having, in combination, a hopper for lacing hooks, a raceway, and a movable separator having pockets shaped to receive a hook lying on its side, said separator and raceway being so relatively disposed as to permit turning of a hook to engage the raceway before it is released by the separator.

20. In a machine of the class described, the combination of a hopper and a separator, together with a clutch having a continuously rotatable member and a casing, belt connection between the continuously rotatable member of the clutch and the separator, and means mounted on the clutch casing for adjusting the tension of the belt.

21. In a machine of the class described, the combination of a hopper and a rotatable shaft, together with a separator, and means for frictionally connecting said shaft and separator, said means comprising a collar and friction disk on the shaft, an intermediate sleeve, and an arm carried thereby.

22. In a machine of the class described, the combination of a hopper with a rotatable shaft, a sleeve frictionally mounted on said shaft, a separator ring rotatable within the hopper, and a connection between said sleeve and ring comprising an angular arm.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DANIEL W. COLBY.

Witnesses:
HERBERT W. KENWAY,
JAMES R. HODDER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."