Aug. 31, 1965 F. L. CARSON 3,203,601

ROTARY AIR LOCK DISPENSER

Filed July 5, 1962

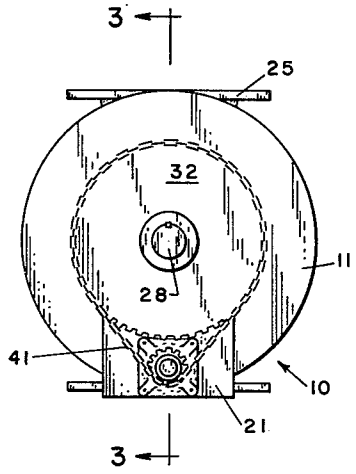

Fig. 1

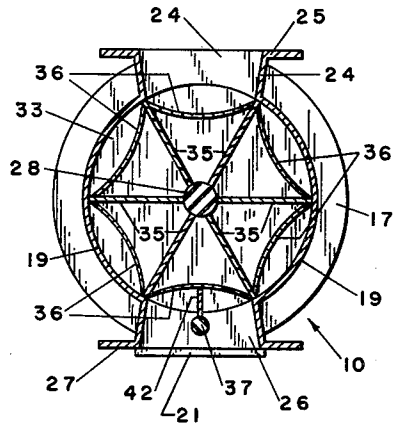

Fig. 2

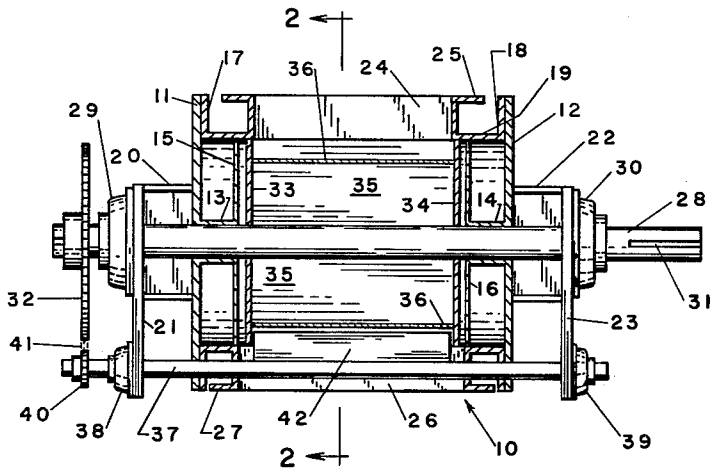

Fig. 3

INVENTOR

FORREST L. CARSON

BY Brown & Rosen

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ROTARY AIR LOCK DISPENSER

Forrest L. Carson, Borger, Tex., assignor to J. M. Huber Corporation, Locust, N.J., a corporation of New Jersey

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1 Claim. (Cl. 222—220)

The present invention relates to a rotary air lock particularly for discharging powdered material while preventing passage of air therethrough.

The primary object of the invention is to provide a rotary air lock which is self cleaning to prevent caking of powdered material within the rotary portions of the lock.

A further object of the invention is to provide a rotary air lock which will effectively prevent passage of air through the lock while moving powdered material therethrough.

Other objects and advantages will become apparent in the following specification when considered in light of the attached drawings in which:

FIGURE 1 is an end elevation of the invention;

FIGURE 2 is a vertical sectional view taken along the line 2—2 of FIGURE 3, looking in the direction of the arrows; and

FIGURE 3 is a vertical sectional view taken along the line 3—3 of FIGURE 1, looking in the direction of the arrows.

Referring now to the drawings in detail wherein like reference characters indicate like parts throughout the several figures, the reference numeral **10** indicates generally a rotary air lock constructed in accordance with the invention.

The air lock **10** includes a pair of circular end plates **11, 12** arranged in spaced apart parallel axially aligned relation. The end plates **11, 12** are provided, respectively, with centrally positioned axially aligned sleeves **13, 14** extending inwardly therefrom. A circular plate **15** is rigidly secured to the inner end of the sleeve **13** in spaced apart parallel relation to the plate **11** and axially aligned therewith. A circular plate **16** is rigidly secured to the rigid end of the sleeve **14** in spaced apart parallel relation to the plate **12** and in axially aligned relation thereto.

A flat ring **17** is secured to the inner face of the plate **11** at the peripheral edges thereof as can be seen in FIGURES 2 and 3. A similar ring **18** is secured to the end plate **12** on the inner face adjacent the peripheral edges of the plate **12**. A cylindrical body **19** is positioned between the end plates **11, 12** and is secured thereto in axially aligned relation therewith. The cylindrical body **19** has its outer end edges secured to the rings **17, 18**, respectively, as can be clearly seen in FIGURE 3.

A spacer bracket **20** is secured to the outer face of the end plate **11** and has an elongated bearing plate **21** mounted on the outer edges thereof parallel to the end plate **11**. A second spacer bracket **22** is secured to the outer face of the end plate **12** and has a bearing plate **23** secured to the outer edge thereof in spaced parallel relation to the end plate **12**.

A conduit **24** is secured to the cylindrical body **19** at the upper portion thereof with the lower portion of the conduit **24** opening through the cylindrical body **19** communicating with the interior thereof. A horizontal outwardly extending flange **25** is formed on the upper edge of the conduit **24** for securing the conduit **24** in sealed relation to a hopper (not shown).

An outlet conduit **26** is secured to the cylindrical body **19** at the bottom thereof in diametrically opposed relation to the conduit **24**. The outlet conduit **26** has a horizontal outwardly extending flange **27** secured to the lower edge thereof for fastening the conduit **26** in sealed relation to a conveyor (not shown).

An elongated horizontal shaft **28** extends through the sleeves **13, 14** and through the bearing plates **21, 23** as can be seen in FIGURE 3. The shaft **28** is mounted in a bearing **29** at one end supported on the bearing plate **21** and in a bearing **30** at the other end supported on a bearing plate **23**. The shaft **28** is splined at **31** for connection to a drive system (not shown) in a conventional manner. A relatively large sprocket wheel **32** is mounted on the opposite end of the shaft **28** in fixed relation thereto for rotation therewith.

A pair of circular plates **33, 34** are rigidly secured to the shaft **28** in spaced parallel relation to each other and in axially aligned relation to the shaft **28**. A plurality of radial partitions **35** of generally rectangular configuration are arranged in equispaced relation about the shaft **28** between the plates **33, 34** and are secured to the plates **33, 34** as well as the shaft **28** for rotation therewith. For purposes of illustration, applicant has shown six of the radial partitions **35** whereas it should be understood that any desired number may be used.

An arcuate concave plate **36** has its opposite ends connected to the circular plates **33, 34** and its opposite side edges connected to the outer edges of a pair of adjacent partitions **35**. The arcuate plates **36** form pockets which are capable of being positioned beneath the conduit **24** and in communication with a conduit **26** both as illustrated in FIGURE 2.

A shaft **37** is arranged beneath the shaft **28** and parallel thereto extending through the circular plates **11, 12** and the bearing plates **21, 23** as is shown in FIGURE 3. The shaft **37** is journaled in a bearing **38** at one end supported on the bearing plate **21** and in a bearing **39** at the other end supported on the bearing plate **23**. A sprocket **40** is fixed to one end of the shaft **37** in aligned relation to the sprocket **32**. The sprockets **32** and **40** have a six to one relationship so that the sprocket **32** will drive the sprocket **40** by means of a chain **41** six revolutions for each one revolution of the sprocket **32**. A generally rectangular scraper blade **42** is fixedly secured to the shaft **37** and extends from the circular plate **33** to the circular plate **34**. The scraper blade **42** rotating with the shaft **37** has its outer edge moving across each of the concave plates **36** to scrape powdered material therefrom which may have become caked therein. The scraper blade **42** moves through each of the pockets formed by the concave plates **36** during the revolution of the air lock **10**.

The proportions of the scraper blade **42** and the concave plates **36** are such that no actual engagement therebetween takes place even though the separation is quite narrow. In view of the lock of engagement between the blade **42** and the concave plates **36** obviously jamming cannot occur.

Prior to applicant's invention, air locks were made with the partition walls **35** but the concave plates **36** and scraper blade **42** were not used. In such prior art devices, the powdered material (in this case, carbon black) often packed so tightly between the partitions **35** that it remained caked in the pockets and did not discharge through the conduit **26** as the air lock rotated. With the present invention, all the powdered material is removed as each pocket comes into registry with the conduit **26** so that the air lock **10** can be operated at a much higher speed than would otherwise be possible.

The rotation of the shafts **28, 37** in the same direction has several advantages. The scraper blade **42** moves oppositely to the material being removed from the pocket and hence a much shorter blade **42** can be used than would otherwise be possible. The resistance to rotation of the blade **42** by the material being removed is directly related to the length of the blade **42** so that the present relatively short blade **42** meets with limited resistance to rotation. Furthermore the use of a short blade **42**

and the rotation of the shafts **28, 37** in the same direction permits the use of a greater number of pockets in the wheel so that no more than **2** pockets are ever opened to the inlet or outlet simultaneously.

Having thus described the preferred embodiment of the invention, it should be understood that numerous structural modifications and adaptations may be resorted to without departing from the scope of the appended claim.

I claim:

An air lock comprising a hollow cylindrical body, means for connecting said body to, and affording communication with, a hopper, means opposite said first named means for connecting said body to, and affording communication with, a conveyor, a shaft journalled in said body intermediate the means for connecting said body to a hopper and the means for connecting said body to a conveyor, a pocketed wheel mounted on said shaft for rotation therewith with the pockets therein being adapted to successively and respectively align with the means for securing said body to said hopper and to said conveyor, said pockets each including an arcuate plate convexly curved with respect to said shaft and concavely curved with respect to the circumference of said wheel, a second shaft journalled in said body centrally of the means for connecting said body to a conveyor, said second shaft

arranged parallel to said first shaft, means connecting said shafts to rotate said second shaft upon rotation of said first shaft in the same direction as said first shaft, a single scraper blade secured to said second shaft in a radially outwardly extending direction, the curvature of said arcuate plate and the radial length of said scraper blade permitting said scraper blade to move respectively through each of said pockets during rotation of said wheel with a wiping relation to said plate, said scraper blade having a radial length of substantially less than the opening in said means for connecting said body to a conveyor whereby upon rotation of said scraper blade said means for connecting said body to a conveyor will remain continuously open.

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LOUIS J. DEMBO, *Primary Examiner.*

RAPHAEL M. LUPO, *Examiner.*