Feb. 25, 1958 J. L. WILLIAMS 2,824,715

NON-CLOG STOCK VALVE

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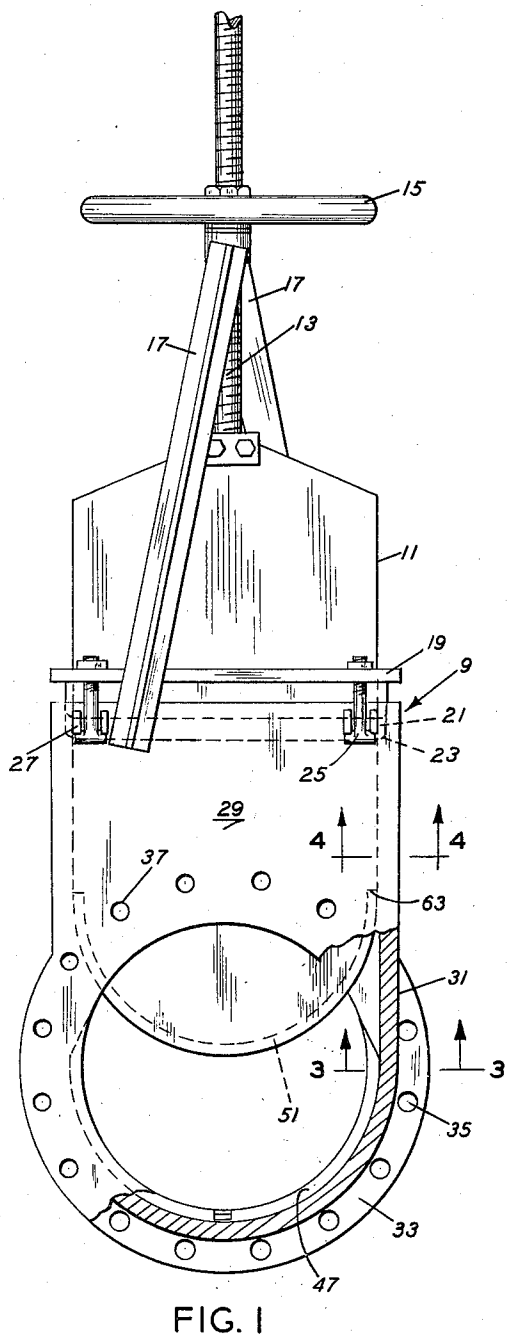


FIG. 1

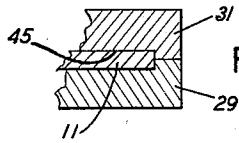


FIG. 4

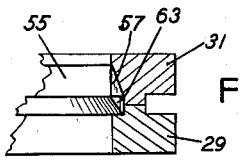


FIG. 3

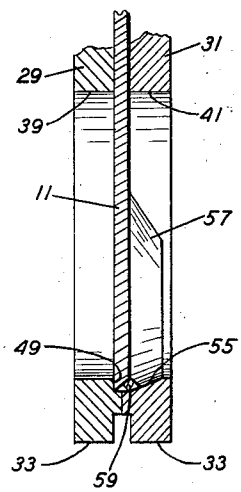


FIG. 2

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NON-CLOG STOCK VALVE

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1 Claim. (Cl. 251—329)

This invention relates to gate valves and particularly to gate valves for handling paper stock.

A common type of stock valve is one including a valve body having a through cylindrical flow passage and a gate blade having a semicircular end movable across the passage to a closed position where the semicircular edge of the blade rests in a pocket in the valve body. For handling some stock concentrations, this valve functions fairly satisfactorily. However, for many stock concentrations, especially heavy ones, it has been found that stock fibers are trapped and compressed within the pocket. The fibers thus build up and soon the blade cannot fully close and the stock is dewatered to form a pulp log in the line on the inlet side of the valve.

Build up of stock fibers is particularly prevalent in gate valves in which the blade has a semicircular end which moves across a cylindrical passageway into a pocket in the walls of the flow passageway. This is so because the stock fibers may be compressed between the entire length of the semicircular edge of the blade and the valve body. In a square bladed valve, build up could occur only between the straight lower edge of the blade and the body. Nevertheless there are numerous reasons, not necessary here to mention, for desiring a valve having a cylindrical passageway and a blade having a semicircular end.

It is a main object of the present invention to provide a gate valve of the type under consideration in which build up or collection of stock fibers in pockets of the valve is avoided.

A further object of the present invention is to provide a valve of the type just described in which the gate blade has a cleaning action on stock fibers which temporarily accumulate in the channel which receives the gate blade.

The gate valve of the present invention is characterized by including a gate blade with a semicircular end portion in which valve the entire semicircular end of the gate blade is uniformly beveled on its side remote from the valve seat to provide a space between such side and the valve body throughout the entire semicircular portion of the blade. The gate valve body also has the edge thereof remote from the valve seat relieved for 180 degrees symmetrically and coextensive with the beveled edge of the gate blade so as to place the space in comunication with the flow passage of the body.

Various other objects of the present invention will be apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is an end view of a gate valve embodying the concepts of the present invention, showing the gate blade in a partially raised position, parts being broken away for convenience in illustration;

Fig. 2 is a vertical fragmentary midsectional view through the valve disclosed in Fig. 1, showing the gate blade in its closed position;

Fig. 3 is a fragmentary horizontal sectional view taken along line 3—3 of Fig. 1; and

Fig. 4 is a fragmentary horizontal sectional view taken along line 4—4 of Fig. 1.

The valve includes a valve body 9 slidably receiving a gate blade 11 which has a threaded stem 13 cooperatively and threadedly extending through a handwheel 15 journaled on the yoke arms 17 which are secured to the valve body. A suitable packing gland 19 surrounds the gate blade 11 and compresses packing 21 around the blade 11, the packing being received within a pocket 23 formed in the upper end of the body. The packing gland 19 is held down against the packing 21 by the T-bolts 25 which fit under projecting lugs 27 formed on the body.

The body 9 consists of a pair of substantially similar body halves 29 and 31 which are welded or otherwise suitably secured together at their mating edges. The body halves have integral bolting flanges 33 which are formed with through bolt holes 35, and suitable blind threaded holes 37 are formed in the body portions of the body halves and effectively from a continuation of the through bolt holes 35. Thus the valve body may be secured to the pipe flanges of a pair of adjacent pipes in a pipeline.

Body half 29 is the inlet body half and body half 31 is the outlet body half. The inlet body half 29 is formed with a through cylindrical passage or opening 39 and the outlet body half 31 is formed with a through passage or opening 41 which is essentially cylindrical with certain exceptions presently to be pointed out. Thus, the two body halves 29 and 31 provide a substantially cylindrical through passageway for the flow of stock through the valve when the valve is open.

The body halves 31 and 29 are recessed on their inner faces at 45 to provide a U-shaped channel to slidably receive the blade 11, see Fig. 4. The channel 45 symmetrically intersects the flow passageway of the body and is wider than the passageway and has a semicircular lower end which is concentric to but spaced outwardly of the flow passageway to form a semicircular groove or pocket 47 in the lower walls of the through flow passageway. Referring to Fig. 2, the left-hand wall portion of the channel 45 which surrounds the passageway forms an annular seat 49 against which the blade 11 seats in the closed position of the blade.

In order to prevent the build up, accumulation or collection of stock fibers in the groove 47, the blade 11 has the lower semicylindrical edge thereof, which is disposed within the groove when the valve is closed, beveled at approximately 45 degrees uniformly thereabout and for a complete 180 degree arcuate extent, as is apparent from Fig. 1. This provides a space between the entire extent of the semicircular edge of said blade and the opposed surfaces of the valve body.

Gate blades having beveled lower ends are not in themselves new, but heretofore the bevel has not been uniform and has tapered off to merge into the side lower edges of the gate blade and thus the stock fibers have been compressed by such tapered portions as well as the unbeveled semicircular edge portions against the walls of the groove and thus build up of stock fibers within the groove has occurred and eventually has prevented the valve blade from properly closing to leave a crack between the edge of the blade and the seat. When this occurs, the liquid in the stock is strained or filtered through the crack to dewater the stock and cause the formation of a pulp log in the line which has to be removed before continued operation of the pipeline in which the valve is located can occur.

Beveling of the full extent of the semicircular edge of the blade relieves the situation somewhat. However, this feature alone would not be sufficient to cure the problem. The valve has a second feature cooperating

with the above feature to achieve the desired result. The second feature comprises relieving the valve body at **55** at the edge thereof opposite the seat **49** for a full 180 degree arcuate extent coextensive with the bevel on the blade, as is apparent from Fig. 1, thus to place the entire space, provided by the beveling of the blade end, in communication with the flow passageway so that stock fibers cannot be compressed and caught between the end edges of the gate blade and the valve body and thus build up of stock fibers cannot occur. Above the 180 degree line, the recess **55** tapers off at **57**.

A wedge **59** is fixed to the walls of the recess **55** in position to engage the lower beveled end of the blade **11** and press the blade tightly against the seating surface **49** when the gate blade is moved to its lowered or closed position.

Another feature of the invention is the provision of abrupt downwardly directed faces or portions **63** at the ends of the bevel **51**. These faces **63** function to scrape along the end walls of the channel **45** during closing movement of the blade to remove stock fibers which may temporarily have adhered to such walls. Thus the third feature cooperates with the above two features to provide a self-cleansing valve.

Having described the invention in what is considered to be the preferred embodiment thereof, it is desired that it be understood that the invention is not to be limited other than by the provisions of the following claim.

I claim:

A stock valve comprising a valve body having a cylindrical flow passageway therethrough, said body providing a channel symmetrically intersecting said flow passageway and being wider than said flow passageway and having a semicircular end spaced from but concentrically disposed relative to said cylindrical flow passageway to

provide a groove in the wall of said passageway, a gate blade within said channel having a semicircular end movable transversely across said passageway to a closed position with the edge of said semicircular end disposed within said groove, said body providing an annular seating surface surrounding said passageway and against which said gate blade seats in the closed position thereof, the semicircular edge of said gate blade being uniformly beveled at the side thereof remote from said seating surface for a full 180 degrees of said edge to provide a space between said side of said semicircular edge and said body, said body being tapered on the portion thereof adjacent the semi-circular beveled edge of said gate blade in the closed position of said gate blade for a full 180 degrees solely in an axial direction relative to said flow passageway and in coextensive relation to the bevel of said gate blade thus to place the space between said beveled edge and said valve body in communication with said passageway so that stock fibers cannot be trapped and compressed between the semicircular edge of said blade and the valve body, the amount of taper being uniform throughout said full 180 degrees to facilitate the escape of stock fibers in a uniform manner, the valve body at the upper ends of the tapered portion being tapered in a radial direction so that the recesses formed by the tapering merge unabruptly into the adjacent surfaces of the valve body to avoid the formation of crevices in which stock fibers could collect.

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