This invention relates to new and useful improvements in door structures and the primary object of the present invention is to provide a shuttle door for mines that may be moved to its open position in response to lateral pressure thereagainst by a mine car.

Another important object of the present invention is to provide a mine door structure including a flexible wall member and novel and improved means for swingably attaching the wall member to the roof of a mine.

A further object of the present invention is to provide a device of the aforementioned character wherein the attaching means includes a pair of vertically adjustable screws having upper pointed ends for penetrating the roofs of mines.

A still further aim of the present invention is to provide a mine door structure supported on skids, whereby the same may be moved to a desired location in a mine and which structure is simple and practical in construction, strong and reliable in use, small and compact in structure, inexpensive to manufacture, install and service, and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, in which:

Figure 1 is an elevational view of the present invention installed in a mine;

Figure 2 is a vertical sectional view taken substantially on the plane of section line 2—2 of Figure 1;

Figure 3 is a horizontal sectional view taken substantially on the plane of section line 3—3 of Figure 1;

Figure 4 is an enlarged vertical sectional view taken substantially on the plane of section line 4—4 of Figure 1;

Figure 5 is an enlarged detail vertical sectional view taken substantially on the plane of section line 5—5 of Figure 1;

Figure 6 is an enlarged detail vertical sectional view taken substantially on the plane of section line 6—6 of Figure 2;

Figure 7 is a fragmentary view of Figure 2 and with parts broken away and shown in section for the convenience of explanation;

Figure 8 is a view similar to Figure 7 but showing the screw guide holder inverted for additional vertical adjustment of the screws;

Figure 9 is an enlarged detail vertical sectional view taken substantially on the plane of section line 9—9 of Figure 2; and

Figure 10 is an enlarged horizontal sectional view taken substantially on the plane of section line 10—10 of Figure 2.

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the numeral 10 represents a tubular horizontal pivot shaft whose central portion is received in a sleeve 12 having a mounting plate 14 fixed thereto. The plate 14 is formed with an aperture that receives a fastener 16, whereby the plate may be anchored to the roof R of a mine M. Means is provided for supporting the shaft 10 and for anchoring the ends of the shaft to the mine roof R. This means comprises a pair of end supports 18 each having an A-frame including a pair of vertically inclined tubes 20 whose lower portions are joined by a cross-bar 22. The upper ends of the tubes 20 have a vertical guide holder sleeve 24 fixed theretwixt and the lower ends of the tubes 20 are fixed by welding or the like to skids 26 having upturned ends 28.

An internally threaded guide tube 30 extends downwardly through each sleeve 24 and flanges 32 at the upper ends of the tubes 30 rest upon the upper ends of sleeves 24. Vertically adjustable screws 34 are receivably engaged in the tubes 30 and are provided with upper pointed ends 36 that project upwardly through transversely disposed vertical apertures 38 in the ends of the shaft 10. The ends 36 are fixed to the shaft 10 by welding or the like.

Means is provided for adjusting the screws 34 vertically within their guide tubes 30. This means comprises collars 40 rotatable on the upper ends of the tubes 30 and having depending skirts 42 that encircle the upper ends of the tubes 30. Nipples 44 formed with the skirts 42 are provided with openings 46 that register with peripheral grooves 48 in the upper ends of tubes 30.

Spring urged pawls or dogs 50 are slidably received in the openings 46 and springs 52 urge these pawls into engagement with ratchet teeth 54 formed in the grooves 48. The collars 40 are provided with tool accommodating openings 56, whereby the collars may be swung back and forth to rotate the tubes 30 and adjust the screws vertically.

A flexible wall or curtain 58, preferably of rubber, is swingably mounted on the shaft 10 and its upper edge is vertically adjustably secured by fasteners 60 to a rigid strip 62. Longitudinally spaced sleeves 64 are fixed by welding or the like.
to the upper edge of the strip 62 and rotatably receive the shaft 10 therein.

Vertical attaching arms 66 are fixed to the tube 30 and have flexible sealing strips 68 secured thereto. The free edges of the sealing strips 68 are removably anchored to the sides of the mine by anchoring pins 70.

Tubular extensions 72 are held on the lower ends of the guides 30 by set screws 74 as shown in Figure 7. When additional height for the shaft 10 is required, the extensions 72 are placed over the sleeves 24 and the flanges 32 rest upon the upper ends of the extensions 72, thereby raising the screws initially.

In view of the foregoing description taken in conjunction with the accompanying drawings it is believed that a clear understanding of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention the same is susceptible to certain changes fully comprehended by the spirit of the invention as herein described and the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. A mine door structure comprising a horizontal pivot shaft, means engaging the ends of the shaft for supporting the shaft and for anchoring the shaft against the roof of a mine, a flexible wall member swingably mounted on the shaft, and a sealing strip between said means and the sides of a mine.

2. A mine door structure comprising a horizontal pivot shaft, end frames engaging and supporting the ends of the shaft and having means for anchoring the shaft to the roof of a mine, a flexible wall member hanging from the shaft, and means swingably mounting the wall member on the shaft.

3. A mine door structure comprising a horizontal pivot shaft, end frames engaging and supporting the ends of the shaft and having means for anchoring the shaft to the roof of a mine, a flexible wall member hanging from the shaft, a rigid attaching strip secured to the upper edge of said wall member, and a plurality of longitudinally spaced sleeves fixed to said strip and embracing the shaft.

4. A mine door structure comprising a horizontal pivot shaft, end frames engaging and supporting the ends of the shaft and having means for anchoring the shaft to the roof of a mine, a flexible wall member hanging from the shaft, a rigid attaching strip secured to the upper edge of said wall member, and a plurality of longitudinally spaced sleeves fixed to said strip and embracing the shaft.

5. A mine door structure comprising a horizontal pivot shaft, vertically adjustable screws attached to the ends of the shaft and having upper pointed ends extending upwardly from the shaft for penetrating the roof of a mine, a support for each screw including means for selectively raising and lowering the screws, and a vertically swingable flexible wall attached to the shaft.

6. A mine door structure comprising a horizontal pivot shaft, vertically adjustable screws attached to the ends of the shaft and having upper pointed ends extending through and upwardly from the shaft for penetrating the roof of a mine, a support for each screw including means for selectively raising and lowering the screws, and a vertically swingable flexible wall attached to the shaft, said supports including an internally threaded tube in which the screws are threaded, said screws raising and lowering means including rotatable collars supported on the tubes, spring urged pawls carried by the collars, said tube having peripheral grooves and teeth therein receiving the pawls.

7. A mine door structure comprising a horizontal shaft having means at the center thereof for attaching the shaft to the roof of a mine, a pair of end members including vertically adjustable screws having upper pointed ends extending upwardly through the shaft for penetrating the roof of a mine, said screws being carried by the end members, a flexible wall member, and means swingably securing the wall member to the shaft.

ANTHONY SHACIKOSKI.

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