

June 18, 1940.

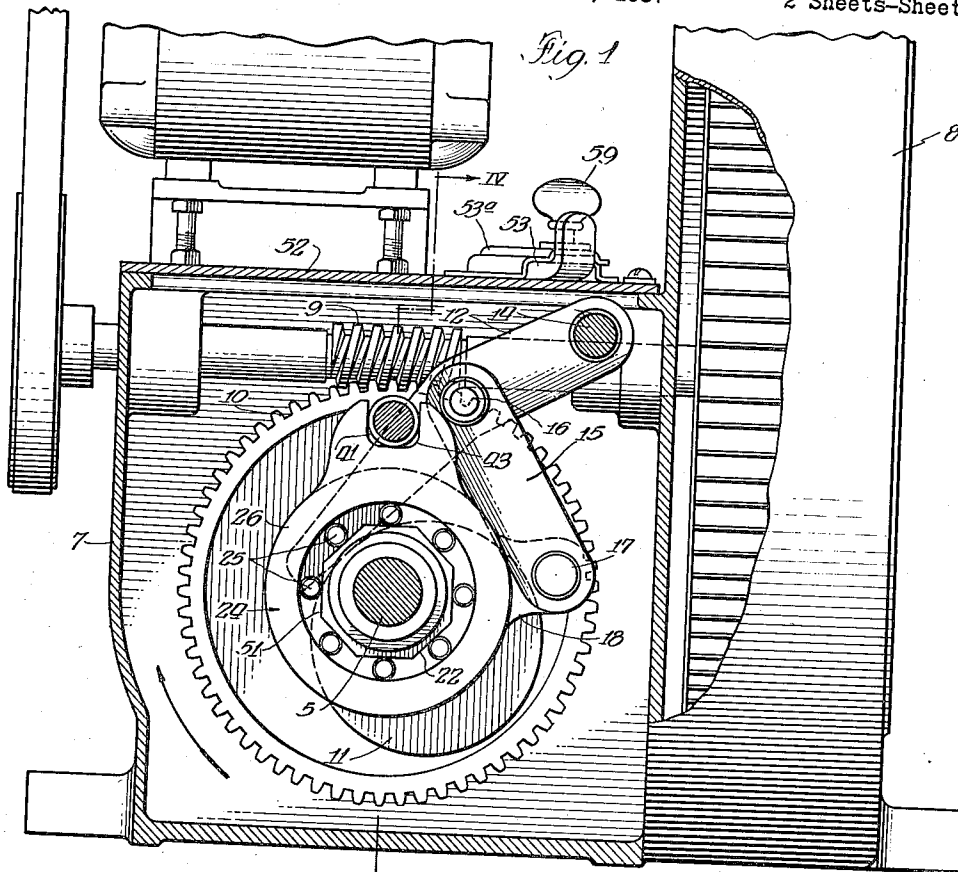
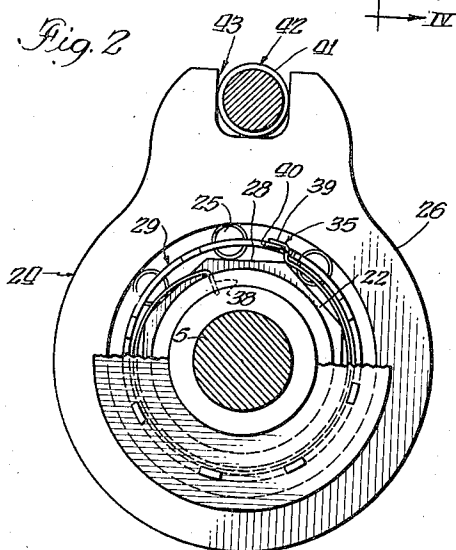
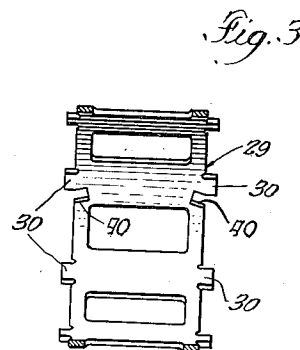
W. W. PECK

2,204,768

STOKER DRIVE

Filed Jan. 18, 1937

2 Sheets-Sheet 1



Inventor:
William W. Peck.
By: Edward C. Ditzbaugh
Atty.

June 18, 1940.

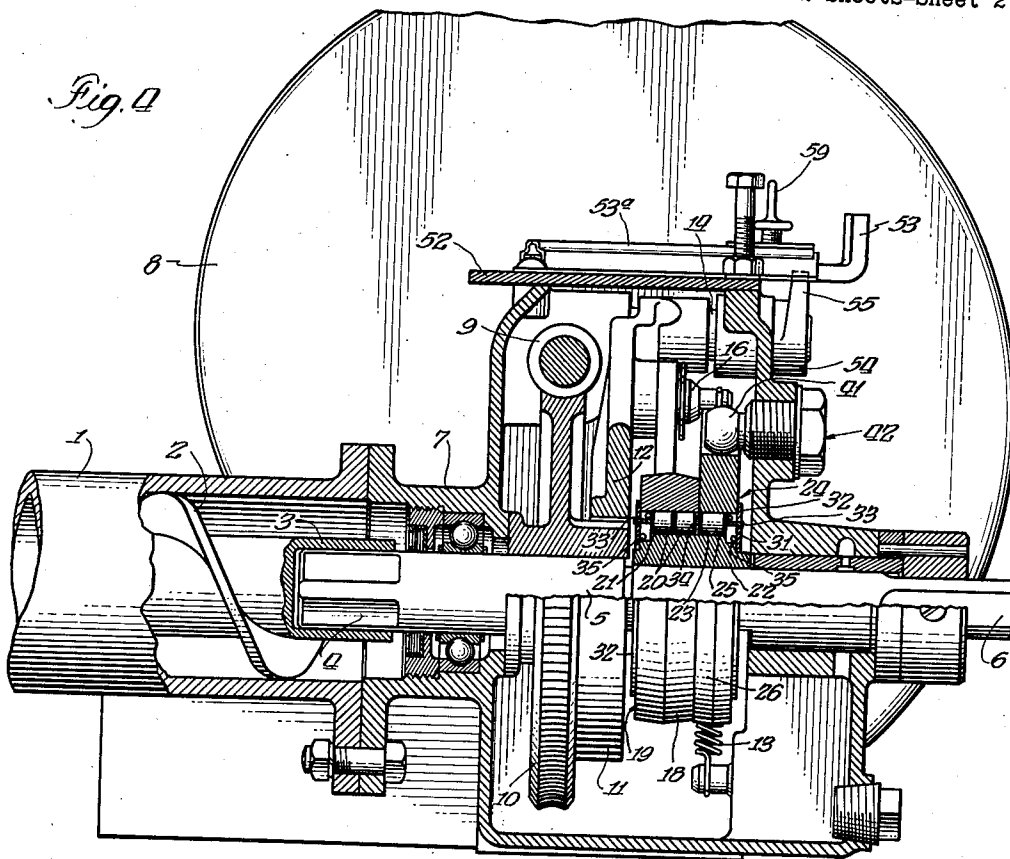
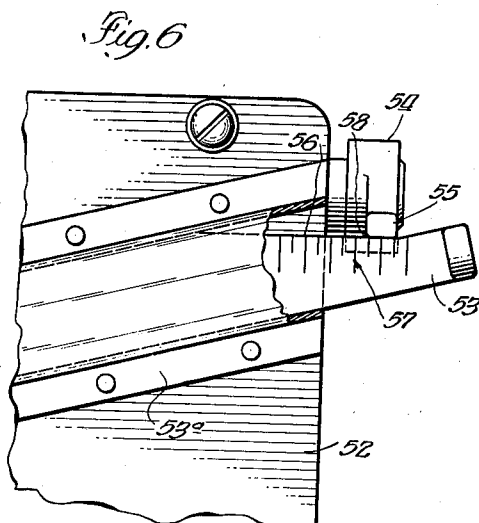
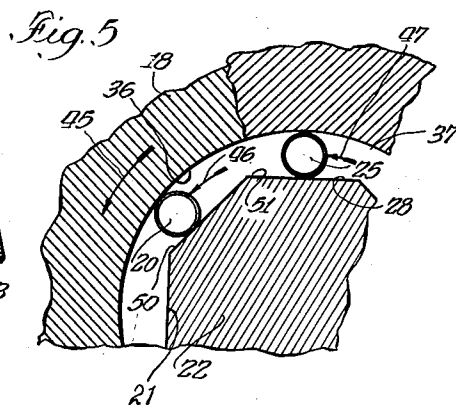
W. W. PECK

2,204,768

STOKER DRIVE

Filed Jan. 18, 1937

2 Sheets-Sheet 2



Inventor:
William W. Peck.
By: Edward C. Ditzbaugh
Att'y.

UNITED STATES PATENT OFFICE

2,204,768

STOKER DRIVE

William W. Peck, Auburn, Ind.

Application January 18, 1937, Serial No. 121,048

7 Claims. (Cl. 74—124)

This invention relates to stoker and other drives and is concerned more particularly with a drive of the intermittent type.

It is an object of the invention to provide an improved mounting for a race or shell of a roller clutch or bearing.

It is another object of the invention to provide improved roller cage and cam construction for one-way clutches and brakes.

It is a further object of the invention to provide an improved infinite adjustment of the rate of feeding of fuel by a stoker or the like.

It is also an object of the invention to afford means for ready determination of the rate at which a stoker or the like feeds conveyed material.

A further object of the invention resides in the provision of a readily visible means displaying information as to the rate at which the device is feeding the material conveyed.

Further objects and advantages of the invention will appear as the description proceeds.

The invention, in a preferred form, is illustrated in the accompanying drawings and hereinafter fully described.

Figure 1 is a fragmentary transverse section-elevation of a stoker drive embodying the invention.

Figure 2 is a section-elevation view showing details of the brake or noback construction of the invention.

Figure 3 shows a ratchet roller cage appearing in end elevation in Figure 2.

Figure 4 is a fragmentary sectional view taken substantially as indicated by the line IV—IV in Figure 1.

Figure 5 is a broken transverse sectional hybrid view showing features of both the clutch and brake of the ratchet mechanism.

Figure 6 is a broken plan view of the feed-adjusting and indicating mechanism appearing at the upper parts of Figures 1 and 4.

Referring now more particularly to the drawings, which illustrate for exemplary purposes part of a coal stoker installation, the coal conveyor tube 1, adapted at one end to communicate with a retort located at the firebox of a furnace or boiler (not shown), is disposed about a feed screw 2 having a polygonal socket 3 adapted to receive the correspondingly shaped end 4 of the screw actuating shaft 5, adapted to be rotated manually by the application of a wrench or other suitable tool at 6, or to be power driven by transmission mechanism embodying the invention and suitably encased within the housing 7. Suitable communication is afforded for the passage of

combustion-supporting air from a blower 8 or the like to the retort.

Journalled in the housing 7 is a driven wheel worm 9 arranged to drive a worm wheel 10 which is rotatably mounted on the shaft 5. The wheel 10 carries a cam 11 engageable by a follower 12 which is preferably spring pressed as shown at 13 into yielding engagement with the cam and which comprises a lever pivoted to the housing at 14.

A pivot link 15 having a crank connection at 16 with the follower and at 17 with the shell 18 of a one-way driving clutch 19 effects intermittent rotary motion of the shell in response to continuing rotation of the cam.

The shell 18 encircles rollers 20 which are disposed about the forward periphery 21 of the inner race or hub 22 splined or otherwise drivably connected to the shaft 5. The hub 22 extends laterally beyond the shell 18 to provide a rear hub periphery 23 of a second, oppositely operating one-way roller noback device or brake indicated generally at 24. Brake rollers 25 are disposed about the hub portion 23 and are in turn surrounded by the shell or outer race 26. The brake 24 thus provides a means for preventing backlash of the shaft 5 between driving strokes of the shell 18 of the driving clutch 19. Instead of employing relatively long and short rollers for the clutch and noback, I provide a plurality of drive rollers of the same size as the noback rollers, thus doing away with the need for different roller sizes.

A salient feature of the invention involves the ratchet or clutch-and-brake construction. The hub 22 has its outer surface preferably formed with facets in a regular polygonal series and is thus more simple than hubs of other clutch and noback constructions.

A roller cage 29 carries lugs 30 which are passed through corresponding holes 31 in end plates 32 and then riveted or headed over as at 33 to provide a unit whereby the rollers are held in proper cooperative relation with the hub 22 and the shells 18 and 26. A spacer ring 34 holds the rollers of the clutch and brake apart.

A spring 35 such as a torsion spring in the form of a split ring is employed to yieldably urge the rollers into wedging engagement with the respective facets of the hub 22 and the curved surface 36 of the shell 18 or curved surface 37 of the shell 26, as the case may be. Each spring ring has an end 38 anchored to the hub 22 and another end 39 offset outwardly and extending through a slot 40 in the retainer sleeve, the arrangement being such that the springs exert equal pressure so as

to oppose biasing of the rollers, while urging all of the rollers in the same direction. It will be observed that the driving shell 18 turns in a direction to wedge the rollers 20 between it and the hub 22 and thus drives the latter, which drives the shaft 5. The hub 22, turning in the direction in which the rollers 25 are spring pressed, tends to draw away from the rollers 25, the shell 26 being held against turning by the ball-end 41 of the stud 42 fitting in the socket 43 in said shell. Thus the shell 26 does not interfere with rotation of the hub 22. When, however, the hub 22 tends to reverse its direction of movement at the completion of its driving stroke, that is, to have a back lash motion, the rollers 25 tightly wedge between the shell 26 and the hub 22, thereby instantly preventing such retrograde motion of the latter.

The advantages of the universal connection between the shell 26 and the stud 42 will be manifest when it is considered that any burrs or non-uniformity or irregularity in the engaging surfaces of the various parts included and associated with the clutch and/or brake structure tend to cant or bias the rollers so as to interfere with proper operation of the ratchet mechanism. The ball and socket arrangement enables the brake shell 26 to assume, by hunting, any position without interference with the ball stud so that the shell will adapt itself to the proper co-operative relation with the remaining structure including the rollers, as the conditions of assembly and operation may require.

The cam 11, follower 12 and the driving connection between the clutch shell 18 and the follower are so designed as to effect a drive of the shaft 5 and consequently of the feed screw 2 at substantially uniform rotary speed upon each stroke.

Inasmuch as the brake shell 26 is held stationary by the stud 42, it will be observed that, during the driving portion of the rotation of the cam 11, the clutch shell 18 will be turned as indicated by the arrow 45, for example, and, due to the load resistance offered by the hub 22 and the fact that the rollers 20 are urged by the springs 35 in the same direction as the clutch shell 18, as indicated by the arrow 46, the rollers 20 are wedged tightly between the shell 18 and the hub 22 so as to cause the latter to be driven by the shell 18. During this time, the rollers 25 are urged by the springs 35 in the direction of rotation of the hub 22, as shown by the arrow 47, the hub tending to occupy a released position relative to the rollers 25, so that the hub turns freely independently of the brake shell 26.

However, during the return stroke of the clutch shell 18, it will be readily appreciated that the rollers 20 will be in non-obstructing relation to the shell 18 and hub 22, the latter being wedged against the rollers 25 upon any tendency of the hub to turn in the reverse direction. Accordingly it is evident that the brake shell 26 instantaneously and positively prevents backlash of the hub 22 without resisting the return stroke of the clutch shell 18, and also permits free driving movement of the shell 18 and hub 22.

With this ratchet construction I am enabled to employ an inner race of extreme simplicity. The leading facet portions 50 of the clutch portion of the hub 22 cooperate with the associated clutch rollers 20 and clutch shell 18 to provide a driving connection whereby the hub is driven by the shell. The leading facet portions 51 of the brake portion of the hub likewise cooperate

with the brake rollers 25 and the brake shell 26 to provide a wedging engagement so as to prevent reverse movement of the hub. The hub thus lends itself to simple and economical manufacture without requirement of the machining of special curves for roller-wedging purposes.

The top or cover plate 52 of the transmission housing 7 carries a slidable bar 53 in a housing 53a. The bar serves as a stop to limit the return of the cam follower 12 and thereby adjusts the throw or length of stroke of the follower in response to movement of the cam 11. This is effected by fixing on the pivot shaft 14 a collar 54 having a lug or boss 55 whose path of rotation may be obstructed by the bar. The side of the bar engageable with the lug is tapered at 56 so that by adjusting the bar transversely of the plane of rotation of the lug, the lug may be stopped by the bar at different points. This tapered edge may be calibrated as shown at 57 to indicate visually the rate of feed in, say, pounds per hour according to the proximity of the lug edge 58, for example, to the nearest graduation.

The height of the incline of the bar is preferably such that in one limiting position the follower is located out of the path of the cam 11 so as to be unaffected by the cam, and in such event the feed screw is stationary. When the bar is so adjusted as not to interfere with the lug, the follower and consequently the feed screw receives its maximum length stroke, determined by the maximum throw of the cam. A thumb screw 59 or the like may be employed to hold the sliding bar in any of an infinite number of adjustments. The unit may be employed to take care of the largest home or the smallest cottage, and in one installation which has been received with favor by the trade the unit is capable of feeding from 50 lbs. per hour down to a pound or less per hour. This invention accordingly obviates the need for employing units of different sizes such as would be necessary where one installation has only a few pounds per hour capacity and a different installation is required for a substantially larger capacity.

I claim:

1. In a stoker drive mechanism, a feed screw drive shaft, power drive means including a driven oscillating member, means associated with said oscillating member and with said drive shaft for translating oscillatory movement of said oscillating member to intermittent rotative movement of said drive shaft, a stop member on said oscillating member adapted to move through an arc during oscillation of said member, and an adjustable abutment for said stop member, including a bar mounted for longitudinal sliding movement along an axis inclined angularly at an angle other than 90° relative to the plane of said arc, said bar having a surface perpendicular to the plane of said arc, comprising an abutment surface for said stop, whereby movement of said bar along its longitudinal axis may shift the position of said abutment surface with respect to said stop member thus to vary the amplitude of oscillatory movement of said oscillating member.

2. In an intermittent drive mechanism, a housing, driving and driven torque transmitting members, an overrunning clutch adapted to establish a one-way driving connection with said driven member, means driven by the driving member for oscillating an element of said overrunning clutch, a one way break for preventing reverse movement of the driven member, said brake including a hub connected to the driven

member, a shell encircling said hub, rollers interposed between said shell and hub, and means anchoring said shell to said housing comprising a universal joint connection between the shell and housing permitting the shell to be self-aligning with respect to the hub and rollers.

3. In an intermittent drive mechanism, a housing, driving and driven torque transmitting members, an overrunning clutch adapted to establish a one-way driving connection with said driven member, means driven by the driving member for oscillating an element of said overrunning clutch, manually adjustable stop means for controlling the amplitude of oscillation of said element, a one way brake for preventing reverse movement of the driven member, said brake including a hub connected to the driven member, a shell encircling said hub, rollers interposed between said shell and hub, and means anchoring said shell to said housing comprising a universal joint connection between the shell and housing permitting the shell to be self-aligning with respect to the hub and rollers.

4. In an intermittent drive mechanism, a housing, driving and driven torque transmitting members, an overrunning clutch adapted to establish a one-way driving connection with said driven member, means driven by the driving member for oscillating an element of said overrunning clutch, and a one way brake for preventing reverse movement of the driven member, said brake including a hub connected to the driven member, a shell encircling said hub, clutch rollers interposed between said shell and a hub, and means anchoring said shell to said housing comprising a stop member fixed in the housing and having a spherical head, and a fork on the shell embracing said head, said anchoring means permitting the shell to be self-aligning with respect to the hub and rollers.

5. In an intermittent drive mechanism, driv-

ing and driven torque transmitting members, a housing in which said members are rotatably mounted in axial alignment, an overrunning clutch for transmitting rotation to said driven member, means for effecting oscillation of an element of said clutch for transmitting rotation to another element thereof, said means comprising a lever pivoted at one end to the housing, a cam on said driving member engaging the other end of the lever for causing the lever to swing in one direction around its pivotal connection to the housing, spring means for effecting return movement of the lever, and a link pivoted at one end to an intermediate region of the lever and at its other end to said first mentioned clutch element so as to transmit oscillating movement thereto from the lever.

6. In an intermittent driven mechanism, driving and driven torque transmitting members, an overrunning clutch for transmitting drive to said driven member, said clutch including an element connected to said driven member and another element which is adapted to be oscillated, and means for effecting the oscillation of said oscillatable element comprising a lever, a support to which one end of the lever is pivoted, eccentric means driven by the driving member, and cooperating with the other end of the lever for swinging the lever about its pivotal connection to the support, and a link connecting said oscillatable clutch element with an intermediate region of said lever for transmitting oscillating movement from the lever to said oscillatable element.

7. An intermittent drive mechanism as defined in claim 5, including adjustable stop means for limiting the return movement of the lever whereby to limit the extent of oscillation of the clutch element.

WILLIAM W. PECK. 40