Jan. 27, 1925. 1,524,356

T. HÜBNER

DRIVING GEAR FOR AUTOMATIC COAL FEEDING APPARATUS OF BOILERS

Filed Oct. 23, 1923 2 Sheets-Sheet 1

Fig. 1.

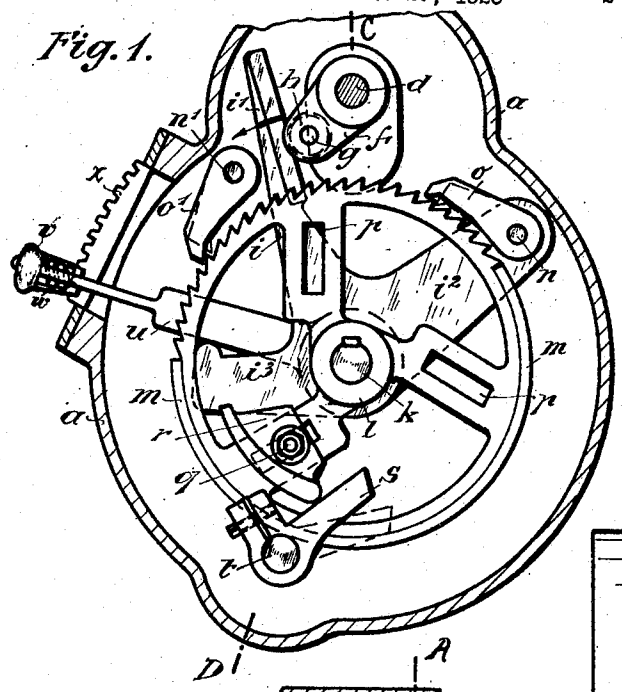
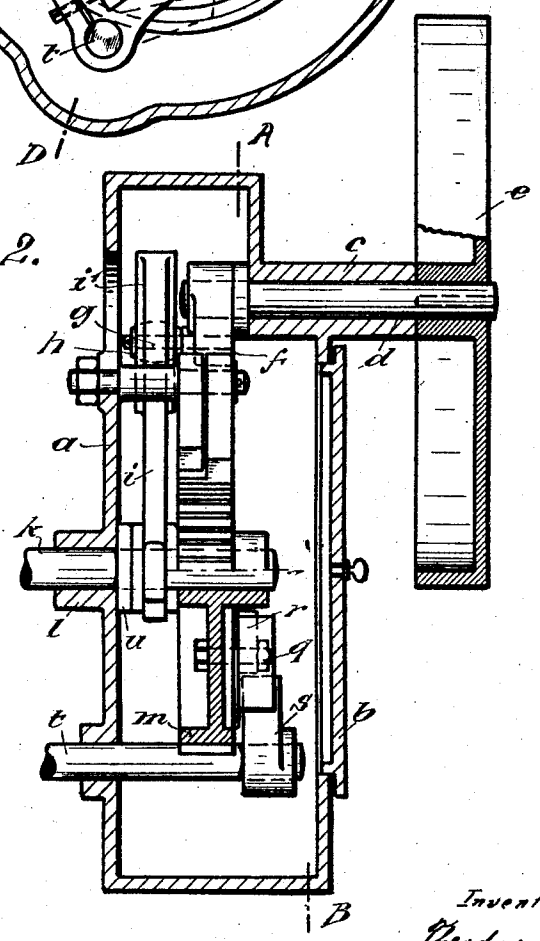


Fig. 2.



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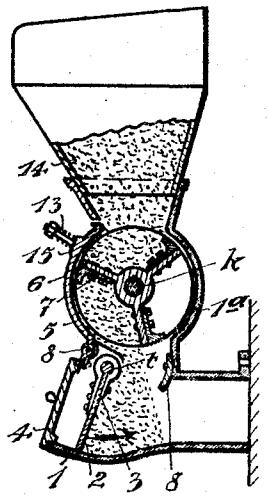


Fig. 3.

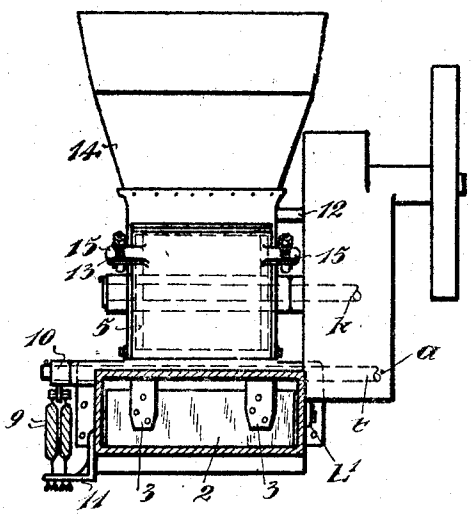


Fig. 4.

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Patented Jan. 27, 1925. 1,524,356

UNITED STATES PATENT OFFICE.

THEODOR HÜBNER, OF ZITTAU, GERMANY.

DRIVING GEAR FOR AUTOMATIC COAL-FEEDING APPARATUS OF BOILERS.

Application filed October 23, 1923. Serial No. 670,283.

To all whom it may concern:

Be it known that I, THEODOR HÜBNER, a citizen of Czechoslovakia, and a resident of Zittau, Saxony, Germany, have invented certain new and useful Improvements in a Driving Gear for Automatic Coal-Feeding Apparatus of Boilers, of which the following is a specification.

This invention relates to an automatic coal feeding apparatus of boilers, of that known kind in which the fuel is supplied to the boiler grate by means of mechanically operated projection shovels, and it consists in a particular driving mechanism for said shovels, which essentially comprises a ratchet wheel and adjustable tappets thereon acting upon the butt-lever of the shovel shaft, the rotation of said ratchet wheel being effected by the main lever which carries the pawl of said ratchet wheel being reciprocated from a rotary crank, said reciprocation being transmitted in one direction only by said pawl to said ratchet wheel. By means of an adjusting lever, the distance of said main lever from the crank and its oscillation can be varied, as can also the projection range of the shovel by an adjustment of said tappets.

The accompanying drawing represents the improved arrangement: Fig. 1 is a longitudinal section through the driving gear on the line A—B of Fig. 2, which is a cross section on the line C—D of Fig. 1, while Figs. 3 and 4 show the whole feeding apparatus in a cross section and in a side view respectively, with the driving gear arranged laterally therefrom.

Referring to Figs. 1 and 2:—

The driving gear is located within a casing *a* having a detachable cover *b*. In a boss *c* of said casing, a driving-shaft *d* is mounted, said shaft carrying on its outer end a belt pulley *e* and on its inner end a crank *f* having a crank pin *g*. The latter is fitted with a loose roller *h* carrying one arm i^1 of a three-arm lever *i*. The latter is fulcrumed on the coal supply shaft *k* mounted in a boss *l* of the casing *a* and on which a ratchet wheel *m* is keyed. The arm i^2 of the lever *i* carries on a bolt *n* a pawl *o*, which is in gear with said ratchet wheel by its own weight or by action of a spring (not shown).

Upon rotation of the crank *f* by means of the driving shaft *d*, the lever *i* is turned to the left in the direction of arrow on the shaft *k*, the ratchet wheel *m* participating in said rotation. To permit of the lever *i* returning together with the crank *f*, it is so constructed that the arm i^2 with the pawl *o* has overweight. Instead of this action by weight, of course, a spring (not shown) may be provided which acts to return the lever *i* together with the crank *f*. To prevent the ratchet wheel *m* participating in said return movement, a second pawl o^1 is in gear therewith and mounted on a bolt n^1 fixed in the casing *a*. The two pawls are so arranged that they differ for one-half of a tooth gap of the ratchet wheel.

The ratchet wheel *m* is carried by three spokes which are provided with longitudinal slots *p* for the reception of screws *q* carrying tappets *r* which project laterally from said spokes. Upon rotation of the ratchet wheel *m*, said tappets act on a butt-lever *s* which is adjustably fixed on the shovel shaft *t*. The latter is mounted in the casing *a* and at its outer end fitted with the projection shovel 2 (Fig. 3). By said action of the tappets *r* the butt-lever *s* is pressed aside until it slips off from said tappets and rebounds. By said slipping-off action of the butt-lever, the projection motion of the shovel 2 is fixed on the shaft *t* is produced. Owing to the three tappets being adapted to be differently adjusted, the range of the projection can be varied at will. Furthermore, the oscillations of the lever *i* can be varied by bringing the lever arm i^1 more or less near to the crank *f*. By said adjustment, the circumferential speed of the ratchet wheel *m* and thus the number of projections in a certain unit of time can be determined.

The adjustment of the lever *i* is effected by means of an adjusting lever *u* loosely mounted on the coal supply shaft *k* and having an axially movable springy head *v* influenced by a spring *w*. The casing *a* carries a toothed segment *x* in which engages said head *v*, a slot being provided in said casing and in said segment for a passage of the adjusting lever *u*. The third arm i^3 of the lever *i* serves as an abutment and is in normal contact with the adjusting lever *u* owing to the overweight of the lever arm i^2. Consequently, by an adjustment of the adjusting lever *u* also the normal or inoperative position of the lever *i* can be changed.

Referring to Figs. 3 and 4:—

The shaft *t* projecting from the casing *a*

carries the projection shovel 2 by means of lashes 3, said shovel being encased by an envelope 1 that is fixed on the face plate of the boiler to be fed. Said envelope has a detachable cover 4. Above said shovel, the coal supply cylinder 6 is located and keyed on the shaft *k*. Said cylinder is fitted with interchangeable breaking plates 7 and enclosed by an envelope 1^a having a hinged cover 5 and in which said shaft *k* is further mounted. Above said cylinder 6, a coal hopper 14 is arranged. In the interior of the envelope 1, coal chutes 8 are provided. The cover 5 has lateral lugs 15 with pressure-springs 13 adapted to keep the cover in its closed position. The shaft *t* carries a stretching lever 10 acted upon by springs 9 having a butt-bearing 11 fixed to the casing 1. The casing *a* is laterally attached to the casings 1 and 1^a by means of lower lugs L^1 and upper stays 12 in any convenient manner.

What I claim, is:—

1. In a driving gear for automatic coal feeding apparatus of boilers, in combination, a casing, a rotatable ratchet wheel, adjustable tappets thereon, a projection shovel shaft, an adjustably fixed butt-lever on the latter adapted to be acted upon by said tappets and to slip-off therefrom after said action, a three-arm lever, a driving crank adapted to reciprocate said latter lever, and a pawl on one arm of said lever adapted to transmit said reciprocation to said ratchet wheel in one direction only, substantially as set forth.

2. In a driving gear as specified in claim 1, a second pawl mounted in said casing and adapted to prevent said ratchet wheel from turning back, substantially as set forth.

3. In a driving gear as specified in claim 1, a coal supply shaft on which said ratchet wheel is keyed and said three-arm lever is loosely mounted, and an adjusting lever loosely mounted on said shaft, one of the lever arms of said three-arm lever located to be in normal contact with said adjusting lever, substantially as set forth.

4. In a driving gear as specified in claim 1, means to keep said three-arm lever in normal contact with said crank, substantially as set forth.

5. In a driving gear as specified in claim 1, slotted spokes carrying said ratchet wheel, and screws in said slotted spokes carrying said adjustable tappets, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THEODOR HÜBNER.

Witnesses:
U. ROEDER,
H. M. WINKLE.