

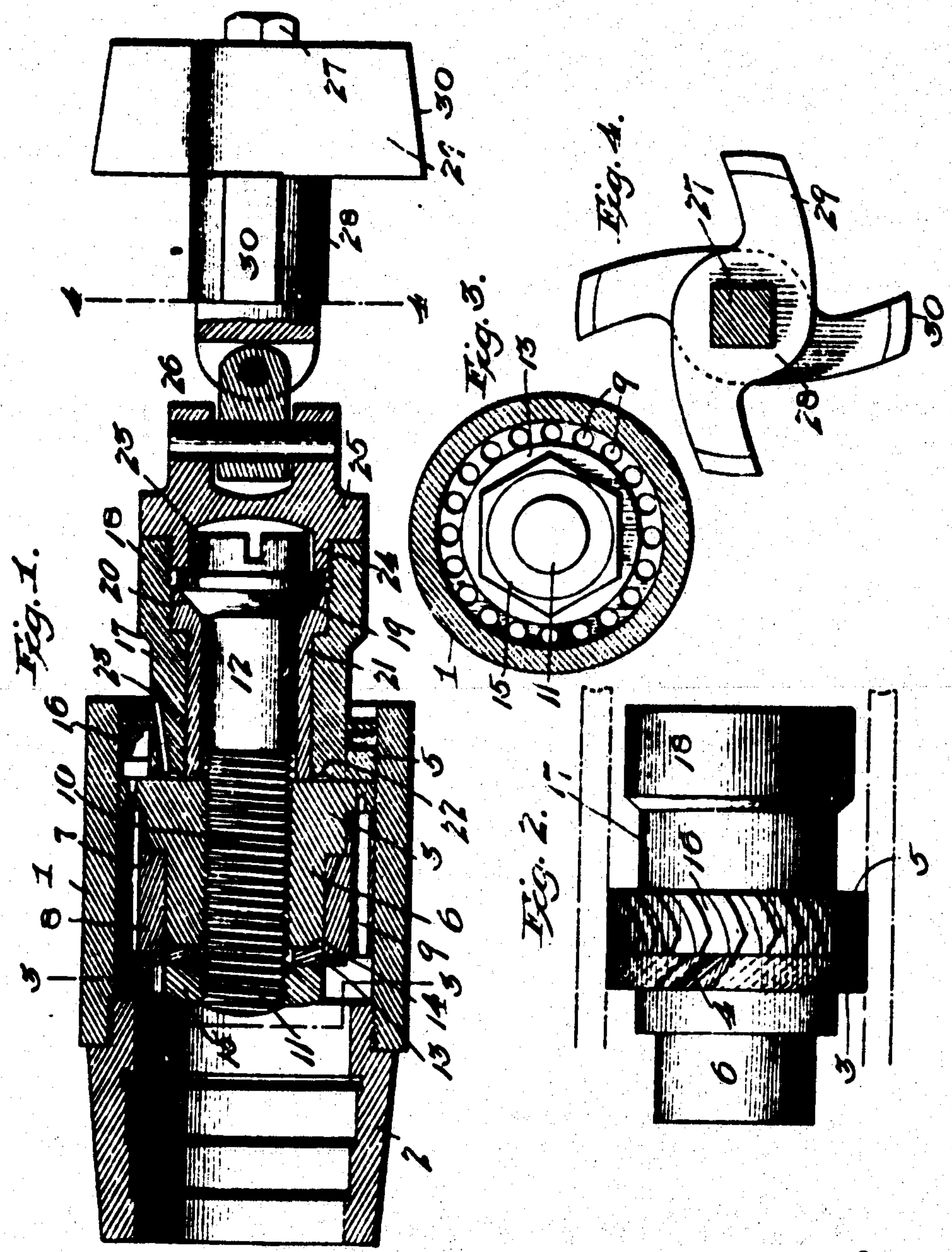
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No. 854,716.

PATENTED MAY 28, 1907.

T. COATES.  
TURBINE FOR FLUE CLEANERS.  
APPLICATION FILED JAN. 4, 1906.



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# UNITED STATES PATENT OFFICE.

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## TURBINE FOR FLUE-CLEANERS.

No. 854,716.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed January 4, 1906. Serial No. 294,545.

*To all whom it may concern:*

Be it known that I, THOMAS COATES, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented new and useful Improvements in Turbine-Mountings for Boiler-Flue Cleaners, of which the following is a specification.

This invention relates to that type of boiler flue cleaners wherein a driving turbine is employed to rotate the cleaning tool or cutter, said driving turbine being operated by fluid pressure. For this type of flue cleaner the present invention contemplates a novel and practical assemblage of elements which provide an improved bearing for the turbine or wheel element, and also simple and positive means for adjusting the wear of the bearing to regulate the play or loose motion.

A further object of the invention is to provide a strong and practical coupling connection between the turbine or wheel element and the cleaning tool or cutter.

In general the invention has in view an improvement in the structural arrangement and mounting of the operative parts of a flue cleaner of the turbine type whereby the tool is improved throughout and a thoroughly effective driving force is secured.

With these and many other objects in view, which will readily appear to the mechanic as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

The essential features of the invention involved in the bearing mounting of the turbine and the adjustable coupling thereof to the stationary feeding head are necessarily susceptible to structural change without departing from the scope of the invention but a preferred embodiment thereof is shown in the accompanying drawings in which:—

Figure 1 is an enlarged longitudinal sectional view of a pressure operated flue cleaner embodying the present invention. Fig. 2 is a detail plan view partly in section of the driving turbine and the adjacent feeding head showing the operative relation of the co-operating parts of these elements. Fig. 3 is a cross sectional view on the line 3—3 of

Fig. 1. Fig. 4 is a similar view on the line 4—4 of Fig. 1, showing in elevation the preferred type of cleaning tool or cutter, employed as a part of the apparatus.

Like references designate corresponding parts in the several figures of the drawings.

The cleaner embodies in its general organization a tubular casing 1 of a size to be conveniently handled in connection with the tube, and is adapted to accommodate therein the driving turbine and the parts immediately co-operating therewith. The casing has suitably fitted to one end thereof a coupling nipple 2 to which is connected the usual pipe or hose for supplying the steam or other motive agent, under pressure, to operate the driving turbine.

Within the casing 1 is arranged a stationary feeding head 3 provided, (in what may be termed the flange or diaphragm portion near the edge thereof next to the inner wall of the casing) with a circular series of oblique tangentially disposed feed ports 4 which serve to deflect the steam or other motive agent in the proper direction against the buckets of the driving turbine 5 to be presently referred to. In addition to having a main diaphragm or flange portion pierced by the feed ports 4, the said feeding head 3 is provided at one side with a projecting post extension 6 which is of an interiorly stepped formation to secure proper reinforcement, and is designed to be driven or otherwise rigidly secured within the counter-bored opening 7 of a rigid distributing ring 8 arranged within the casing and rigid with the inner wall thereof. This inner distributing ring, by reason of its counter bored opening registers perfectly with the exterior of the post 6, and said ring may be either separate from or integral with the casing 1, it only being necessary that these parts be rigid so that the ring 8 will constitute a part of the stationary feeding head for the steam or other motive agent.

It will be observed in the construction referred to, that the ring 8 is pierced near its periphery with a continuous circular series of lead openings 9 which serve as supply ports for leading an ample supply of steam or motive agent directly into the feed ports 4 of the feeding head. In this way the steam or mo-



tive agent is carried in direct lines to the various feed ports, thus securing a more effective supply for such ports than is possible where the latter are exposed directly to the body of steam in the supply pipe for the casing.

In addition to the features mentioned, the feeding head 3 and its post extension 6 are pierced by a bolt opening 10 provided with left hand threads receiving a correspondingly threaded coupling section 11 of a journal bolt 12. The threaded tip of the bolt section 11 which extends through and to the inner side of the feeding head 3, is designed to loosely receive thereon a binding washer 13 having a raised portion at its inner side fitting in the washer seat 14 recessed into the inner side of the feeding head, and said binding washer is designed to receive thereon the binding pressure of the jam or locking nut 15 which serves to secure the journal bolt rigid in its adjusted position. The nut 15 is threaded to correspond with the left hand threads of the section 11, thereby forming a thread lock to prevent the turning of the journal bolt during the rotation of the driving turbine or wheel element thereon.

The driving turbine or wheel element 5 essentially consists of a body proper with a circumferential series of piston buckets 16 shrouded within the open outer end portion of the casing 1 and lying next to the ported feeding head 3, said buckets 16 being disposed obliquely in reverse direction to the oblique ports 4.

The bucketed body of the turbine has projected from one side thereof an extended hub sleeve 17 preferably formed at its outer end with a bearing cup 18 accommodating the head of the bolt 12. This part of the bolt is constructed in the form of a conical bearing head 19 registering with a conical bearing seat 20 formed at one end of an interior bearing bushing 21 fitted tightly within the bore of the turbine body and its sleeve extension 17. This bearing bushing 21 is formed of Babbitt or equivalent metal suitable for the purpose and the seat 20 formed at one end thereof is housed entirely within the bearing cup 18 while the opposite end of the said bushing is exposed at the side of the turbine body next to the feeding head 3 and constitutes a bearing edge at such point. Immediately adjoining what may be termed the inner end of the bushing next to the feeding head 3, the turbine body is formed with a lubricating groove 22 closed in by the feeding head 3 and receiving a supply of lubricant through oiling holes 23 piercing the turbine body and exposed outside of the casing.

The bearing head 19 at the outer end of the journal bolt is housed entirely within the cup 18 and is provided at its outer side with a grooved adjustment boss 23 adapted to re-

ceive a screw driver or other tool for tuning the bolt to take up wear. The cup 18 is provided with interior threads receiving the exteriorly threaded flange 24 of a coupling cap 25. To the outside of the cap is connected a gimbal joint 26 carrying a tool supporting bolt 27.

On the tool supporting bolt 27 is preferably mounted an improved tool or cutter essentially consisting of a pair of right angularly related cross arms 28 arranged side by side on the bolt 27 and each provided with the oppositely projecting reversely arranged cutter bits 29 formed with beveled edges 30.

It will be observed that in order to take up wear or looseness at any time it is simply necessary to loosen the jam or lock nut 15, remove the cap 25 and turn the bolt 12 to the extent desired. The flange 24 of the cap 25 produces a recess within the cap receiving the adjustment boss 23, and at the same time fitting over the head of the bolt in such a way as to center the same within the turbine body.

From the foregoing it is thought that the construction and many advantages of the herein described flue cleaner will be apparent without further description.

What I claim is:

1. A turbine mounting comprising a casing having an interior stationary feeding head provided with a threaded bolt opening, a driving turbine arranged at one side of the head and provided with an extended hub sleeve having at its outer end a bearing cup, a bearing bushing rigidly fitted within the turbine and its sleeve and provided at one end within the cup with a conical bearing seat, a journal bolt having a conical bearing head confined within the said cup and engaging said conical seat, said bolt adjustably engaging the threaded opening of the feeding head, a nut locking device arranged on the threaded tip of the bolt at one side of the feeding head, and a coupling cap detachably secured to the bearing cup of the turbine sleeve over the bolt head therein.

2. A turbine mounting comprising a casing, a stationary feeding head within the casing, a driving turbine arranged at one side of and against the feeding head, said driving turbine being provided in the side next to the feeding head with an annular lubricating groove and with oiling holes leading through the top of said grooves, and a journal support for the turbine.

3. A turbine mounting comprising the casing, the stationary feeding head, the turbine provided in its side next to the feeding head with an annular lubricating groove, a bearing bushing fitted within the turbine and having an end exposed to the feeding head inside of the circle of said lubricating groove, and a journal bolt support for the turbine.



4. A turbine mounting comprising a tubular casing, a ported feeding head arranged within the casing and having an exterior stepped post extension, a rigid counterbored  
5 discharging ring locked within the casing and receiving said post extension, said ring having a series of supply ports, and a turbine.

In testimony whereof I affix my signature,  
in presence of two subscribing witnesses.

THOMAS COATES.

Witnesses:

JOHN McCARTY,  
ROY DRUMMOND.