June 17, 1924. 1,498,281

S. JONES

OVERLOAD RELEASE COUPLING

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Fig. 1.

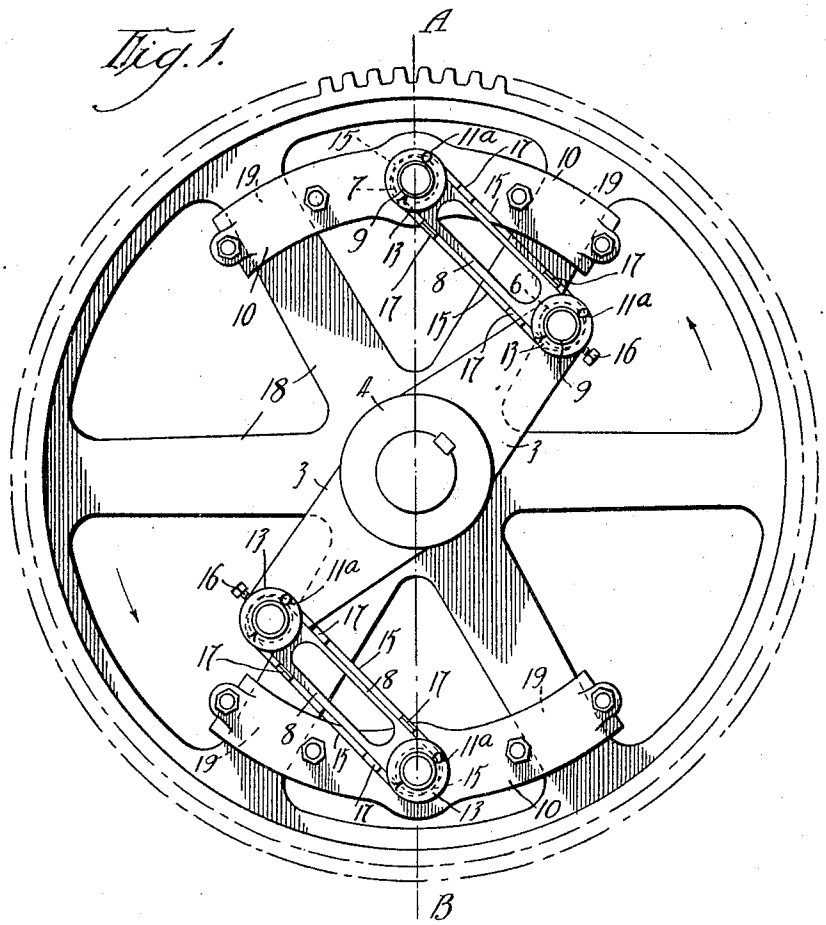


Fig. 8.

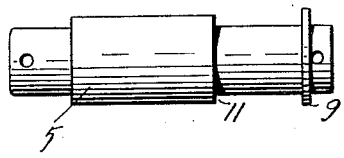
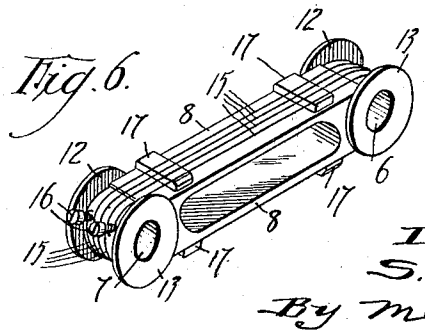


Fig. 6.



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Fig. 3.

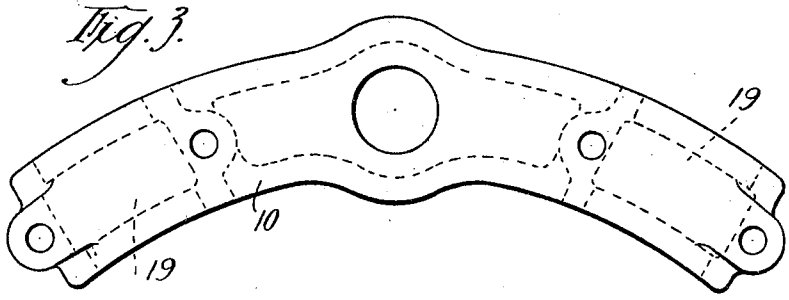
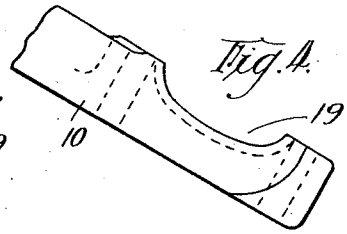


Fig. 4.



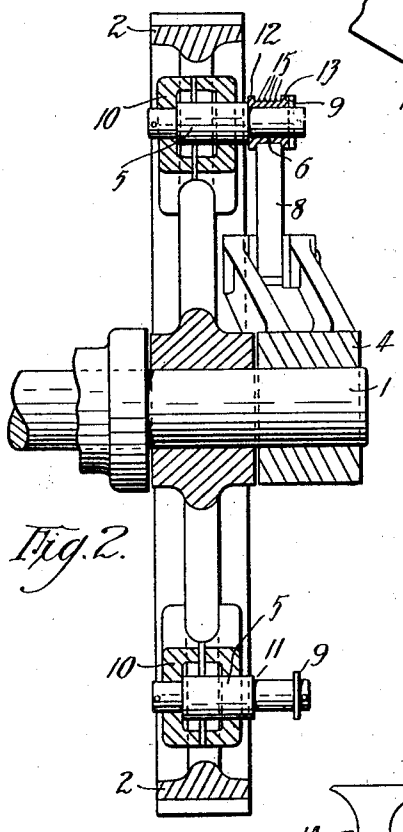


Fig. 2.

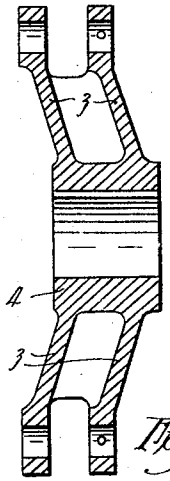


Fig. 5.

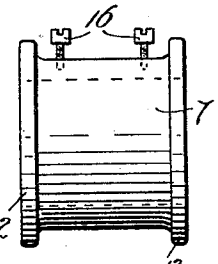


Fig. 9.

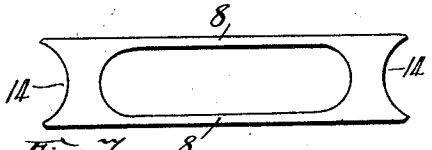


Fig. 7.

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Patented June 17, 1924. 1,498,281

UNITED STATES PATENT OFFICE.

STANLEY JONES, OF HOBART, TASMANIA, AUSTRALIA.

OVERLOAD RELEASE COUPLING.

Application filed December 1, 1923. Serial No. 678,075.

To all whom it may concern:

Be it known that I, STANLEY JONES, subject of the King of Great Britain, residing at Hobart, in the State of Tasmania, Commonwealth of Australia, have invented certain new and useful Improvements in Overload Release Couplings; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has been devised to provide a method of and means for automatically releasing driving power, when a predetermined maximum load is reached, and is particularly useful for crushing mechanism where lumps of material are to be crushed, and in doing so will be reduced in size for the purposes desired. In describing this invention I shall refer to that type of crushing mechanism employed for treating coal for gas producing purposes, but it is to be understood that the invention is not limited thereto, but may be employed wherever it is desired to release driving power when a predetermined maximum load is reached.

As before stated this invention by way of example will be described in reference to coal crushing mechanism comprising crusher-rolls through which the coal is passed. It has often been found during such operations that a piece of iron, wood or other obstruction finds its way into the coal, and on feeding the latter to the crusher, the obstruction attempts to pass between the crusher-rolls and in doing so develops a load greater than the maximum normal load. This has the effect of placing an enormous pressure on the gearing and crusher-rolls, with the result that something has to give, causing serious injury to the apparatus forming the crusher.

My invention overcomes the foregoing disadvantages in a simple and efficient manner, one of which is to provide a method of and means whereby should an over-load occur on the crusher greater than which the breaking element is designed to bear, the releasing action will take place permitting the driving apparatus to continue to operate without transmitting its motion to the driven apparatus.

Another object of this invention is to provide a method of and means for automatically releasing the driving power when a predetermined maximum load is reached consisting of a breaking element having its elastic limit approximately coinciding with its ultimate breaking strength.

A further object of this invention is to provide a method of and means for automatically releasing driving power when a predetermined maximum load is reached, consisting of apparatus including a breaking element, all arranged so that the stress on the latter is tension only, and there are no bearing or other stresses to effect the reliability of the breaking element.

A further object of this invention is to provide a method of and means for automatically releasing driving power when a predetermined maximum load is reached consisting of a breaking element capable of being arranged to vary the load, at which it will fracture and carry out the releasing operation.

Again a further object of this invention is to provide means for automatically releasing driving power when a predetermined maximum load is reached, capable of being simple and expeditiously installed, and at a low cost.

In order that my invention may be the more easily understood, reference will be made to the accompanying sheet of drawings in which—

Fig. 1 illustrates a driving medium with apparatus included in my invention disposed thereon, such driving medium being on the shaft of one of the crusher-rolls.

Fig. 2 is a part section on line A—B of apparatus shown in Fig. 1.

Fig. 3 is a side view of a detachable segment hereinafter described.

Fig. 4 is a sectional plan view of portion of such segment.

Fig. 5 is a sectional view of a fixed arm hereinafter referred to.

Fig. 6 illustrates a distance piece with bobbins, and also the breaking element disposed thereon.

Fig. 7 illustrates the distance piece hereinafter referred to.

Fig. 8 shows the bearing pin for the bobbins while

Fig. 9 shows a side elevation of the bobbins.

In the accompanying drawings 1 is a shaft of a crusher-roll, not shown, mounted on such shaft is a free spur driving wheel 2, also mounted on the shaft, and adjacent to the said spur wheel, but keyed to the shaft

1 is a double arm 3 each member of which projects diagonally and outwardly from the boss 4. At the extremity of each member a bearing pin 5 is provided for a bobbin 6 comprising portion of the releasing apparatus consisting of a second bobbin 7 hereinafter referred to, each bobbin 6 and 7 is separated by a wooden distance piece 8, the ends of which are grooved to correspond with the external contour of the bobbins. To keep each bobbin on the respective bearing pin 5, the latter is reduced in diameter in comparison with the bearing portion for a segment 10 and arm 3 respectively. This construction provides so to speak a shoulder 11 in contact with the interior flange 12 of the respective bobbin, disposed on each pin 5 is a loose ring 9 held by a split pin 11^a in a manner to come into contact with the exterior flange 13 of the respective bobbin, at the same time not retard its movement when required. Both of the bobbins 6 and 7 are maintained in engagement with the grooves 14 of the distance piece 8, by the aid of a breaking element consisting of preferably one or more strands of hard drawn steel wire 15 which owing to the process of its manufacture i. e. drawn through hardened steel die plates has its elastic limit artificially raised, and by passing the wire 15 through the die plates, several times without annealing, it can be made so that its elastic limit coincides with its ultimate breaking strength. The wire 15 is coiled around each bobbin 6 and 7 and over and under the distance piece 8, each end of the wire 15 being securely fastened to the set screws 16 on one of the bobbins. To obtain the desired initial tautness of the wire 15, suitable wedges 17 may be employed, being disposed at convenient intervals apart on the distance piece 8 between it and the wire 15 (see Fig. 6) the number of turns or strands or size of the wire 15 required is calculated on the individual strength of one strand divided into the tensile strength which would occur at the centre line of the two respective pins 5 on the arm 3 and segment 10 hereinafter referred to, assuming a certain maximum over-load. It will be seen that the stress on the wire on the above arrangement is tension only, and further there are no bearing or other stresses which would effect its reliability. The second bobbin 7 before referred to is mounted on the bearing pin 5 of the segment 10 fixed on each end to a spoke 18 of the driving wheel 1, such segment is preferably bolted to the spokes 18 which nestle in a correspondingly shaped recess 19 in the segment 10. In operation as the crusher-rolls not shown, rotate, they derive their motion from the respective spur wheels gearing with each other, such motion is generated and imparted to the wheels in any suitable manner. Should by chance an obstruction get into the crusher, causing an excessive load to be applied, it will place an excessive stress load on the crusher-rolls, which will in turn be transmitted from the shaft to the fixed arm, and from the ends thereof, it will be taken up by the releasing apparatus before referred to, and in doing so will effect the breaking element i. e. the margin allowed; this will cause the wire of the releasing element to break, resulting in the wedges 17 being released and with them the distance piece 8, both falling, the latter away from its connection with the bobbins 6 and 7, this has the effect of cutting off the driving power of the spur wheel 2, permitting it to rotate without driving the shaft 1. The pins 5 of each segment 10 and arms 3 respectively will clear each other as the wheel 1 continues to rotate as the distance of the pins 5 on each segment 10 is greater than the pins 5 on the arm 3 from the centre of the shaft 1.

I would have it understood that I do not arbitrarily confine myself to the hereinbefore mentioned arrangement of parts, as same may be amplified or modified according to the particular type of mechanism on which this invention is adopted, without departing from the nature of my invention.

Claims:

1. In combination, a driving element, a driven element, a spacing element engaged at its opposite ends with adjacent portions of the driving and driven elements, and a breakable element binding said portions of the driving and driven elements together with the spacing member therebetween whereby to establish a breakable driving connection between the driving and driven elements.

2. In combination, a driving element, a driven element adapted to be driven by the driving element, a spacing element, members on the driving and driven elements engaging the opposite extremities of the spacing element and a breakable member binding the first mentioned members together with the spacing elements therebetween.

3. In combination, a driving element, a driven element, a spacing element, members on the driving and driven elements engaging the opposite extremities of the spacing element, and a breakable connection binding said members together, said breakable connection including a flexible member wrapped about said members and the spacing element.

4. In combination, a driving element, a driven element, a spacing element, members on the driving and driven elements engaging the opposite extremities of the spacing element, and a breakable connection binding said members together, said breakable connection including a flexible mem-

ber wrapped about said members and the spacing element, and means for fastening the ends of the flexible element.

5. In combination, driving and driven elements, a spacing element, members on the driving and driven elements engaging the extremities of the spacing element, a flexible element arranged about said members and binding the latter together with the spacing element disposed therebetween, and means for tensioning the flexible element.

6. In combination, driving and driven elements, pins carried by the driving and driven elements, a breakable connection between said pins, said breakable connection including a spacing element, sleeve-like members engaged with the opposite ends of the spacing element, and a flexible breakable element wrapped about the sleeve-like members and confining the spacing element therebetween.

7. In combination, driving and driven elements, pins carried by the driving and driven elements, a breakable connection between said pins, said breakable connection including a spacing element, sleeve-like members engaged with opposite ends of the spacing element, a flexible breakable element wrapped about the sleeve-like members and confining the spacing element therebetween, and flanges carried by the sleeve-like members.

8. In combination, driving and driven elements, pins carried by the driving and driven elements, a breakable connection between said pins, said breakable connection including a spacing element, sleeve-like members engaged with opposite ends of the spacing element, a flexible breakable element wrapped about the sleeve-like members and confining the spacing element therebetween, flanges carried by the sleeve-like members, and a spacing element having its ends recessed to partially accommodate the sleeve-like members.

9. In combination, driving and driven elements, pins carried by said elements, and a breakable connection between said pins, said breakable connection including a spacing element, sleeve-like members engaged with the opposite ends of the spacing element, a flexible element binding the sleeve-like members against the ends of the spacing elements, and means for tensioning the flexible element.

10. In combination, driving and driven elements, pins carried by the driving and driven elements, flanged sleeve-like members mounted on said pins, a spacing element engaged between the sleeve-like members, a flexibly connected member wrapped about the sleeve-like members between the flanges thereof and confining the spacing element between said members, means for fastening the ends of the flexible element, and wedges arranged between the spacing element and the flexible element to tension the latter.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

STANLEY JONES.

Witnesses:

JOHN ALFRED HALLAM,

ALFRED EDWARD MATTHEWS.