

W. G. STEVENSON.
 ROCK CRUSHER ROLL.
 APPLICATION FILED JAN. 10, 1920.

1,377,370.

Patented May 10, 1921.

Fig. 1.

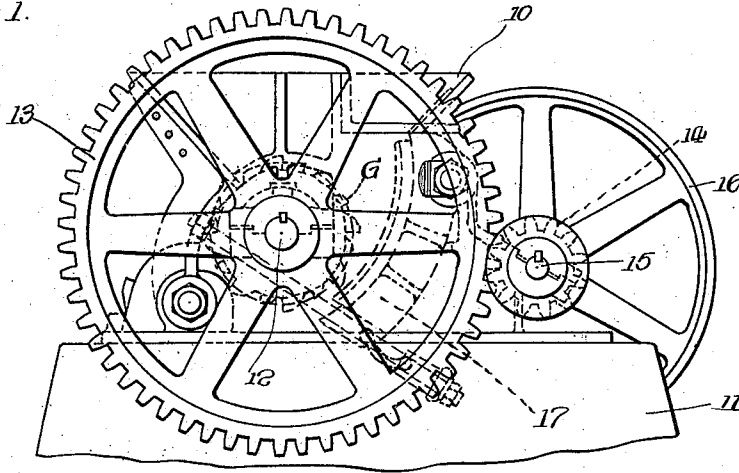


Fig. 2.

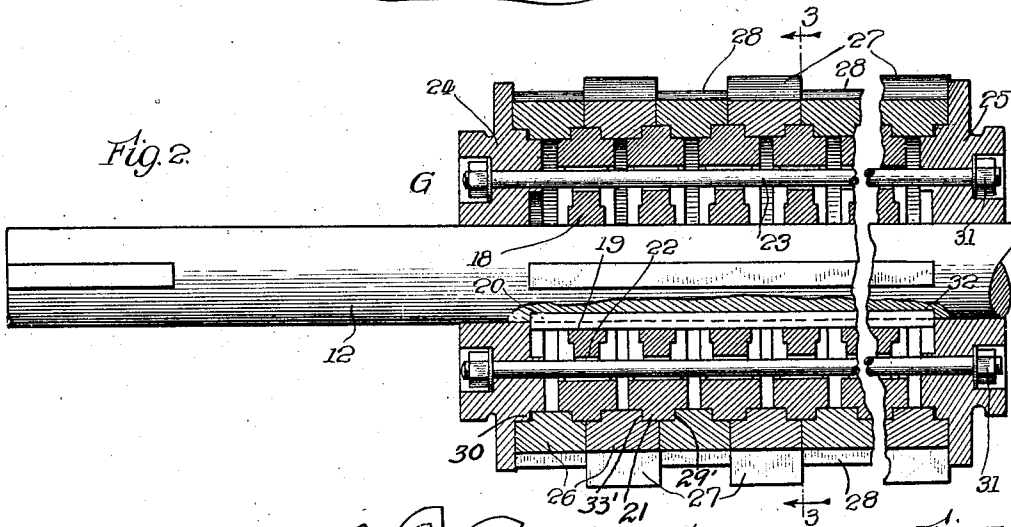


Fig. 3.

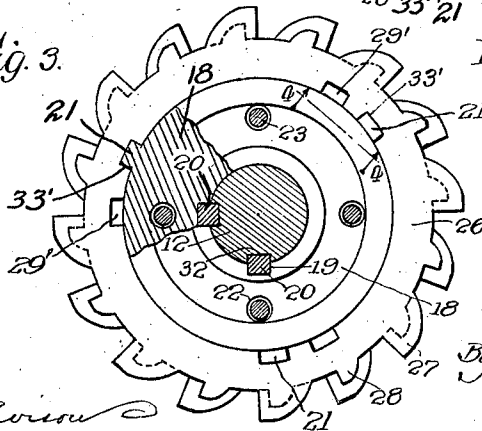


Fig. 4.

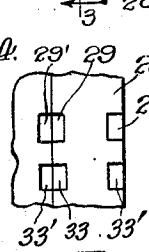
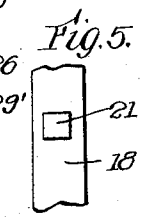


Fig. 5.



Inventor:

William G. Stevenson,

By Schmidt & Hanson,

Attys.

Witness:

Ed. G. Brown

UNITED STATES PATENT OFFICE.

WILLIAM G. STEVENSON, OF CHICAGO, ILLINOIS.

ROCK-CRUSHER ROLL.

1,377,370.

Specification of Letters Patent.

Patented May 10, 1921.

Application filed January 10, 1920. Serial No. 350,598.

To all whom it may concern:

Be it known that I, WILLIAM G. STEVENSON, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rock-Crusher Rolls, of which the following is a specification.

My invention relates to crushing rolls, particularly rolls for heavy rock crushing machinery.

Among the important objects of the invention are to produce a core which can be readily built up to any length; to provide a construction involving supporting core laminations and crushing laminations or members secured on the core; to provide an improved arrangement in which the core laminations are rigidly secured on a shaft against longitudinal or rotational displacement and improved means for interlocking the core laminations with the crushing laminations; to provide the crushing members with long and short teeth or lugs and improved means for readily rotationally offsetting adjacent members on the core structure; and in general to provide a simplified, substantial and practical crusher roll structure built up of any number of crusher members or laminations which can be readily replaced when worn or broken.

On the accompanying sheet of drawing,

Figure 1 is a side elevational view of a type of crushing machine in which my improved roll can be efficiently utilized,

Fig. 2 is a vertical diametral sectional view of my improved roll,

Fig. 3 is a view from plane 3—3, Fig. 2, showing a core member partly in section,

Fig. 4 is a fragmentary view from plane 4—4, Fig. 3, and

Fig. 5 is an outer edge view of a section of a core lamination.

Fig. 1 illustrates a type of machine to which my invention is applied. It is a rock crusher. The rock receiving hopper frame 10 is mounted on a foundation 11, the shaft 12 extending through the frame and suitably journaled in the sides thereof. One end of the shaft carries the gear wheel 13 which is in mesh with the pinion 14 of the shaft 15 which may be driven by a belt engaging the pulley 16. Within the hopper frame and between the side walls thereof, the grinding roll structure G is mounted on the shaft 12, the material to be crushed

passing between such roll structure and the anvil member 17, the operation being well understood in the art.

The crushing roll structure comprises a core element and a crushing element together with means for clamping and locking such elements together and to the shaft. The core element is built up of a number of core members 18 which fit the shaft 12 and which have keyways 19 for receiving keys 20 of which there may be any number, two being shown. The core members have cylindrical peripheral surfaces and from each a number of lugs or teeth 21 project radially, the teeth shown being three in number and rectangular. The core members have also the openings 22 therethrough for receiving the clamping bolts 23, the members being held with their lugs 21 alined in horizontal rows. The bolts extend at their ends through the clamping plates or headers 24 and 25 which also fit the shaft 12.

The crushing member is built up of a row of annular members 26 whose inner cylindrical surfaces fit the outer cylindrical surfaces of the members 18 of the core element. Each crusher member 26 has extending from its periphery the high and low teeth 27 and 28. In the arrangement shown, these high and low teeth alternate. On the inside each crusher member 26 has sets of notches 29 and 29' cut in its opposite edges and spaced angularly to accord with the spacing of the lugs 21 on the core members 18. In building up the crusher roll structure, one of the end plates, for example number 24, is first slipped on the shaft 12, then alternately members 26 and 18 are slipped on. Engagement of the keyways 19 of the core members 18 with the keys 20 will properly aline the members on the shaft, and the crusher members 26 are applied to bring their notches 29 and 29' in registration with each other to form pockets for receiving the rectangular lugs 21. The lateral depth of the notches is such that when the members 26 are brought into engagement with each other the pockets formed by the notches will just fit the lugs 21. The end plates 24 and 25 are provided with teeth or lugs 30 for receiving the notches of the adjacent members 26. When the bolts 23 are now drawn up by means of their nuts 31, the core members 18 and the crusher members 26 will be securely clamped together between the end plates. The keys 20 are of a length to re-

ceive only the core members 18, and do not connect with the end plates. However, the shaft key troughs 32 are of the same length as the keys and the keys therefore form a firm abutment for the end plates so that the built up pressure roll structure is held against axial displacement on the shaft as well as being rigidly secured to the shaft against rotational displacement.

As before stated, short and long teeth extend alternately from the periphery of each crusher member 26. It may be desired to also arrange the teeth in longitudinal rows on the roll with the short and long teeth alternating in each row. I therefore provide a second set of notches 33 and 33', adjacent each set 29 and 29', displacement of the sets being equal to the relative displacement between the long and short teeth on each member 26. In building up the roll, crusher members 26 are alternately offset circumferentially as shown to bring the notches 29 or 33 on one member into registration with the notches 29' or 33' on the adjacent member to form the pockets for receiving the lugs 21 of the core members 18. By thus staggering or alternating the short and long teeth in the longitudinal rows, very efficient crushing results are produced. More sets of notches could be provided if desired and the members arranged in any suitable manner to give the desired tooth arrangement.

With my improved construction and arrangement, a roll of the desired length can be quickly built up and clamped on its supporting shaft. After assembly of the core and crusher members and the end plates, the roll structure is rigidly secured on the shaft against rotational or longitudinal displacement. The core members 18 can be made of ordinary metal such as cast iron which can be readily machined. The crusher members 26 are preferably of hard substance, such as manganese steel and these members being cylindrical, they can be very readily ground to the proper dimension. As soon as any crusher member is broken or teeth are worn, it can be readily replaced by a fresh disk on account of the simple built up construction which I use. Thus, the owner of a machine need buy only one or a few members instead of being required to buy an entirely new roll construction as would be necessary with constructions heretofore used.

Having described my invention, I desire to secure the following claims by Letters Patent:

1. A roll structure for rock crushing machines, comprising a shaft, end plates receiving said shaft, a key secured on said shaft forming an abutment for said end plates, a row of core members on said shaft having slots for receiving said key, a row

of crusher members surrounding said core members and alternating therewith, there being interlocking pocket and lug connection between said core members and said crushing members, and clamping bolts extending through said end plates for clamping said core members and crusher members intimately together.

2. A roll structure for rock crushing machines comprising a shaft, a row of core members surrounding said shaft, a row of crusher members surrounding said shaft outside of said core members and alternating therewith, said core disks having lugs and said crusher members having notches for receiving said lugs whereby said members are interlocked, end plates receiving said shaft, clamping bolts extending through said end plates and core members for compressing said disks between the end plates, a key on said shaft receiving said core members, said key forming abutment at its ends for said end plates to prevent longitudinal displacement of said roll structure on said shaft.

3. In a roll structure for rock crushing machines, the combination of a shaft, a core structure keyed on said shaft, lugs on said core structure, a row of crusher rings surrounding said core structure, each of said rings having alternately long and short teeth on its periphery and each ring having pairs of notches with the notches of each pair angularly displaced a distance equal to the angular displacement between a long and a short tooth, engagement of said lugs in one set of said notches causing the long and short teeth to be respectively arranged in longitudinal rows, and engagement of said teeth in the other set of notches causing long and short teeth to alternate in longitudinal rows when said rings are applied to said core, engagement of said lugs in said notches locking said rings against rotation on said core, and means for locking said rings against longitudinal movement on said core.

4. In a roll structure for rock crushing machines, the combination of a cylindrical shaft having keyways, keys for engaging in said keyways, a core structure comprising a row of core members receiving said shaft and having key notches for receiving said keys to be thereby locked against rotational movement on said shaft, said core members being spaced apart on said shaft and having lugs extending radially from their cylindrical surfaces, a crusher structure comprising a row of crusher members having an internal diameter for receiving the core members, said crusher members having registering notches in their adjacent edges whereby to form pockets for receiving the lugs on said core members, end plates on said shaft engaging against the ends of

the crusher structure, and clamping bolts extending through said end plates and through the core members.

5 5. In a roll structure for rock crushing machines, the combination of a cylindrical shaft having longitudinally extending key-ways, keys engaging in said ways, a core structure comprising a row of core mem-
10 bers receiving said shaft and having notches for receiving said keys to be thereby held against rotational movement on said shaft, a crusher structure comprising a row of crusher members receiving the core mem-
15 bers, said core members having lugs extending radially from their cylindrical surfaces, said crusher members having registering notches at their edges forming pockets for receiving said lugs, end plates on said shaft abutting against the ends of the crusher
20 structure, clamping bolts extending through said plates and through said core members, said plates abutting against the ends of said keys whereby the roll structure is held against longitudinal movement on said
25 shaft.

6. A roll structure for rock crushing machines comprising a shaft, a row of core members surrounding said shaft, a row of crusher members surrounding said shaft
30 and alternating with said core members, means for connecting said core members in driving connection with said shaft, and means connecting said crusher members in driving connection with said core members.
35 7. A roll structure for rock crushing machines, comprising a shaft, a row of core members having driving connection with

said shaft, crusher members surrounding said core members, each core member being surrounded by two of said crusher mem- 40
bers, and driving connection between said core members and crusher members.

8. A roll structure for rock crushing machines, comprising a shaft, a row of core members on said shaft, driving connection 45
between said shaft and core members, a row of crusher members surrounding said core members and alternating therewith, and detachable driving connection between said core members and crusher members. 50

9. A roll structure for rock crushing machines comprising a shaft, cylindrical core members receiving said shaft and arranged in a row but spaced apart, annular crusher members surrounding said core members, 55
each crusher member spanning one of the spaces between said core members, and driving connection between said shaft and said crusher members.

10. In a roll structure for rock crushing 60
machines, the combination of a shaft, cylindrical core members arranged on said shaft in a row but spaced apart, annular crusher members surrounding said core members, said crusher members being arranged side 65
by side and each spanning one of the spaces between said core members, driving connection between said shaft and core members, and detachable driving connection between said core members and crusher members. 70

In witness whereof I hereunto subscribe my name this 8th day of January, A. D. 1920.

WILLIAM G. STEVENSON.