Nov. 30, 1926. 1,608,561

G. H. LARSSON

INTERCHANGEABLE PLATE FOR CRUSHING MACHINES

Filed April 21, 1924

Fig. 1.

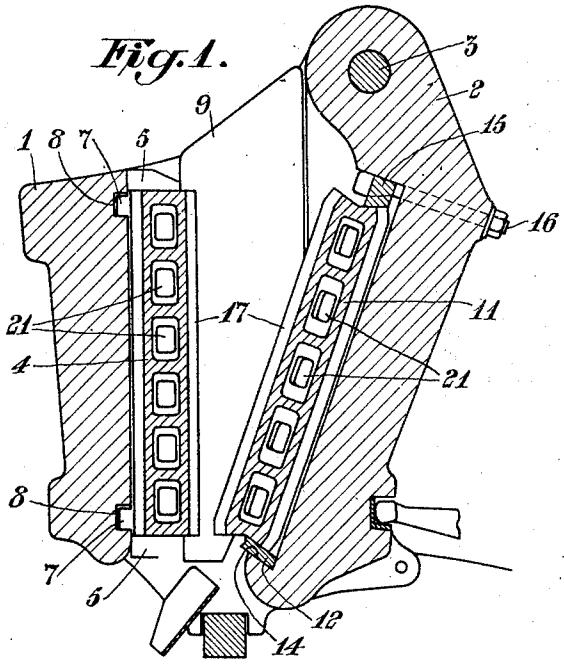


Fig. 3.

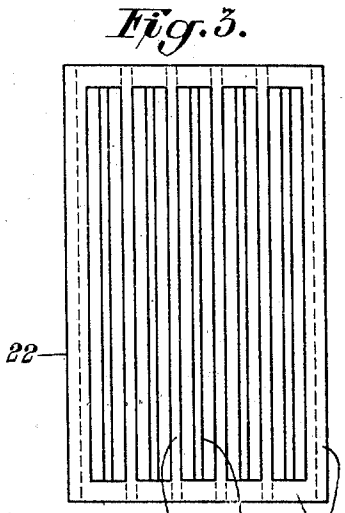


Fig. 4.

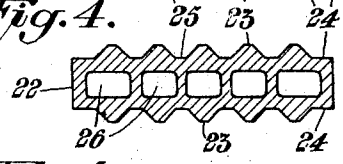


Fig. 2.

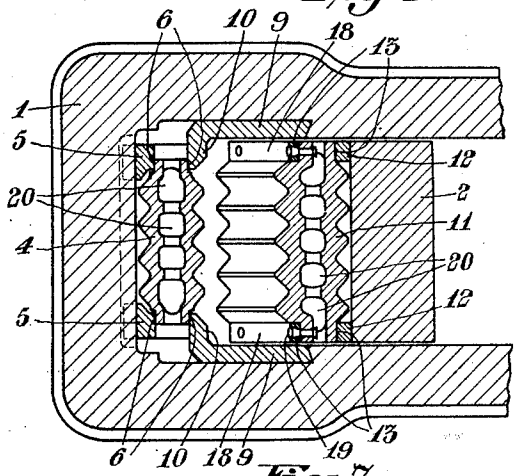


Fig. 5.

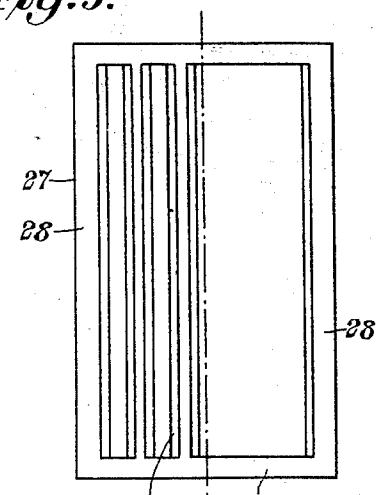


Fig. 7.

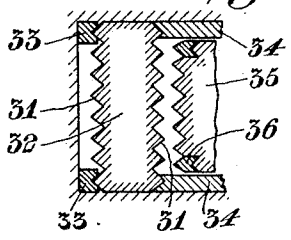
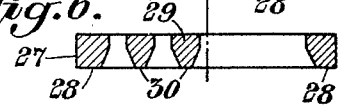


Fig. 6.



Inventor:
Gustaf Henning Larsson

By George Bagard Jones
Atty.

Patented Nov. 30, 1926. 1,608,561

UNITED STATES PATENT OFFICE.

GUSTAF HENNING LARSSON, OF SVEDALA, SWEDEN.

INTERCHANGEABLE PLATE FOR CRUSHING MACHINES.

Application filed April 21, 1924, Serial No. 707,891, and in Sweden December 31, 1921.

The present invention relates to an improvement in interchangeable crushing or wear plates in machines for crushing stone and the like, of the type which are provided on both sides with the usual teeth or ribs which effect the crushing, so that when the plates have become worn on one side they may be reversed and used again until they have become worn out also on the other side. In heretofore known machines of this type the crushing plates bear with their ribs against seatings provided in the machine frame, which seatings possess a bearing surface with slots or grooves of a shape corresponding to that of the ribs, or against an intermediate part of a comparatively soft material, for instance a zinc filling. The result of such arrangements is, however, that the crushing plates will not be firmly held in the machine when the same have been reversed and the worn side is turned towards the seating, because the ribs on said side are more or less deformed so that the precise bearing necessary for a good crushing work can not be attained.

The purpose of the improvement forming the subject of the present invention is to avoid the difficulty above referred to. For this purpose the invention consists principally in that the crushing plate is adapted to be supported at its edges only. The plate may be supported at two opposite edges only, or it may be supported at three edges, or all around its edges. In order to protect the edges of the plates on the front sides, which are first used for the crushing, from wear, said edges may be lined with wear plates adapted to be removed when the crushing plates are to be reversed. The said teeth or ribs may end at a distance from the edges of the crushing plate in such manner that at two opposing edges at least, preferably the two longitudinal edges, or if desired at all edges, the plate obtains bearing surfaces on both sides which surfaces are substantially straight in the direction of said edges, and which are adapted to bear against seating surfaces of corresponding shape on the machine frame, or on seatings provided in said frame, said surfaces having such width that the plate obtains through the same the necessary support without any intermediate parts of soft material, such as zinc or the like, having to be used. Owing to the bearing surfaces being in this manner located at the edges of the crushing plate where the wear is small or none at all, the plate, when worn on one side and therefore reversed, will still be firmly held in the machine so that it is able to produce an efficient crushing work. On the front sides of the plates said bearing surfaces may also be lined with wear plates. In order that the plates shall be capable of resisting the pressure when supported at their edges only, the plates must be comparatively thick, and in order to decrease their weight it is suitable to provide the plates with channels extending through the plates intermediate their ribbed sides.

The accompanying drawing illustrates the invention by way of example. Fig. 1 shows a vertical section through a stone crusher provided with crushing plates according to the invention, and Fig. 2 shows a horizontal section of the stone crusher. Fig. 3 shows a modified construction of a crushing plate in elevation, and Fig. 4 shows a cross section of the same. Fig. 5 shows an elevation and Fig. 6 a cross section of a seating frame for the crushing plate shown in Figs. 3 and 4, the left-hand halves of Figs. 5 and 6 showing the frame provided with interior longitudinal lists, and the right-hand halves showing the frame without such lists. Fig. 7 illustrates diagrammatically a further embodiment of the invention.

Referring to Figs. 1 and 2, 1 denotes the frame of the stone crusher in which the jaw 2 is movable on its shaft 3. A stationary crushing plate 4, which has rectangular shape, in the usual manner, is supported in the machine frame 1 by a seating 5. As illustrated in Figs. 1 and 2, said seating 5 has rectangular shape and supports with its longitudinal or vertical parts the plate 4 which for this purpose is provided with bearing surfaces 6 on both sides at its longitudinal or vertical edges. The seating frame 5 is held in position in the machine frame 1 by shoulders 7 projecting from its rear side into recesses 8 in the machine frame. The crushing plate 4 is held between the upper and lower sides or parts of the seating frame 5, as shown in Fig. 1, and is held bearing against the vertical sides of said seating frame by wedges 9 inserted in the machine frame 1 and the laterally projecting flanges 10 of which bear against the bearing surfaces 6 on the front side of the crushing plate 4.

A movable crushing plate 11 is supported in the movable jaw 2 on a seating frame 12 which has the shape of a rectangular frame with one short side, the upper one being omitted. The crushing plate 11 is provided with bearing surfaces 13 on both sides at its longitudinal or vertical edges and bears with said bearing surfaces on the longitudinal sides or parts of the seating frame 12. The lower side of the frame 12 rests against an oblique abutment 14 in the jaw 2 and supports the lower end of the plate 11. The plate 11 is retained in position bearing against the seating 12 by means of a wedge 15 inserted between the jaw 2 and an oblique surface on the upper end of the plate 11, and said wedge 15 is retained in position by means of bolts 16 traversing the jaw 2 and retained by means of nuts on the rear side of the jaw.

The stationary crushing plate 4 and the movable crushing plate 11 are provided on both sides with longitudinal teeth or ribs 17 which in the embodiment illustrated have substantially triangular cross section. Said ribs do not cover the entire surfaces of the plates, however, as both plates are provided with bearing surfaces 6 and 13 at their longitudinal edges, as above described. It is therefore possible, when the ribs on one side of a plate have become worn out, to reverse the plate so that the worn side is turned towards the machine frame 1, or towards the jaw 2, when the fresh ribs on the other side of the plate are presented towards the gap of the stone crusher. As it is essential that the plate shall always obtain a good bearing on its seating, it is suitable to protect the bearing surfaces on the side of the plate first used for the crushing, against wear, and such protection is afforded in respect of the bearing surfaces 6 on the stationary plate 4 by the lateral flanges 10 on the wedges 9, and in respect of the bearing surfaces 13 on the front side of the movable crushing plate 11 by said bearing surfaces being lined with wear plates 18 secured to the same in suitable manner, for instance by means of rivets 19. When the crushing plate 11 is to be reversed, said wear plates 18 are removed from the same by chiseling off the rivets 19. It will be understood that the movable plate 11 should not be reversed until the ribs 17 on its front side have become worn off so much that they will clear the adjoining surface of the jaw 2 when the plate 11 is reversed.

Owing to the crushing plates being supported at their edges only, as above described, the plates must of course have a considerable dimension in the direction perpendicular to their crushing sides, and in order to make the plates less heavy and yet sufficiently thick and strong to enable them to withstand the pressure to which they are subjected during the crushing, the plates are provided with channels 20 and 21 extending in the longitudinal and transverse directions, as shown in Figs. 1 and 2. It will be understood, however, that said channels may extend only in one of said directions, if desired.

Figs. 3 and 4 illustrate a crushing plate of a slightly modified construction. This plate is also provided on both sides with longitudinal teeth or ribs 23 of substantially triangular cross section. Said ribs do not extend quite out to the edges of the crushing plate, however, but end at a distance from the edges, so that at all four edges and on both sides of the plate there are formed comparatively wide plane bearing surfaces 24. These bearing surfaces 24 are approximately on a level with the bottoms of the grooves formed between the teeth or ribs 23, and said bottoms may be formed as plane surfaces 25 which may also act as bearing surfaces. The plate 22 is provided with a number of longitudinal channels 26 in order to decrease its weight. Figs. 5 and 6 illustrate a seating for the plate shown in Figs. 3 and 4. Said seating consists of a rectangular frame 27 which is provided with a plane bearing surface 28 along its edges against which the bearing surface 24 on the plate 22 may bear. As shown in the left-hand halves of Figs. 5 and 6, the frame 27 may be provided with parallel beams or lists 29 extending in its longitudinal direction and provided with bearing surfaces 30 adapted to cooperate with the bearing surfaces 25 on the plate 22, when it is desired to support said plate 22 also between its ribs 23.

In the construction illustrated diagrammatically in Fig. 7, the ribs 31 cover the entire surfaces of both sides of the stationary plate 32, and the seating frame 33 and the wedges 34 are formed in a corresponding manner to receive the outermost ribs on the plate. On the movable plate 35 the wear plates 36 have a similar cross section to that of the ribs, so that said wear plates may serve as ribs during the crushing operation.

The embodiments above described and illustrated in the drawing are of course only to be regarded as examples, as the invention is capable of modification in several respects without departing from the principle of the same. For instance, it will be readily understood by those skilled in the art that the seatings 5 and 12 in Figs. 1 and 2, instead of being made as separate pieces, may be made integral with the machine frame 1 and the jaw 2, respectively.

I claim:

1. The combination of a crushing plate for machines for crushing stone and the like provided on both sides with teeth, and a support adapted to carry said plate only at its edges,

said support being disposed to prevent distortional contact of the rear dress of said plate with a wall of said support.

2. The combination of a crushing plate for machines for crushing stone and the like provided on both sides with teeth, and a frame adapted to support said plate only at its edges, said frame being disposed to prevent distortional contact of the rear dress of said plate with a wall of said frame.

3. The combination of a crushing plate for machines for crushing stone and the like provided on both sides with teeth and with bearing surfaces at two opposite edges at least, and a support adapted to carry said plate through said bearing surfaces only, said support being disposed to prevent distortional contact of the rear dress of said plate with a wall of said support.

4. The combination of a crushing plate for machines for crushing stone and the like provided on both sides with teeth ending at a distance from at least two opposite edges of the plate and provided at such edges with bearing surfaces, and a frame adapted to support said plate through said bearing surfaces only, said frame being disposed to prevent distortional contact of the rear dress of said plate with a wall of said frame.

5. The combination of a crushing plate for machines for crushing stone and the like provided on both sides with teeth ending at a distance from at least two opposite edges of the plate and provided at such edges with bearing surfaces having a substantially straight extension in the direction of said edges, and a frame adapted to support said plate through said bearing surfaces only, said frame being disposed to prevent distortional contact of the rear dress of said plate with a wall of said frame.

6. The combination of a crushing plate for machines for crushing stone and the like provided on both sides with teeth and with bearing surfaces at two opposite edges at least, wear plates removably attached to said bearing surfaces on one side of the plate, and a support adapted to carry said plate through said bearing surfaces only, said support being disposed to prevent distortional contact of the rear dress of said plate with a wall of said support.

7. The combination of a crushing plate for machines for crushing stone and the like provided on both sides with teeth and with bearing surfaces at two opposite edges at least, and having channels extending through the plate intermediate said sides, wear plates removably attached to said bearing surfaces on one side of the plate, and a support adapted to carry said plate through said bearing surfaces only, said support being disposed to prevent distortional contact of the rear dress of said plate with a wall of said support.

GUSTAF HENNING LARSSON.

CERTIFICATE OF CORRECTION.

Patent No. 1,608,561. Granted November 30, 1926, to

GUSTAF HENNING LARSSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, in the heading to the printed specification, line 5, date of filing application in Sweden, for December 31, 1921, read December 13, 1921; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of March, A. D. 1927.

M. J. Moore,
Acting Commissioner of Patents.

Seal.