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(54) Mineral breaker.

(57) A mineral breaker including a pair of rotatable drums each having radially projecting breaker teeth, the teeth on both drums being arranged in axially spaced groups of circumferentially spaced teeth, the groups of teeth on one drum being axially offset from the groups of teeth on the other drum so that teeth in one group on one drum pass between neighbouring groups of teeth on the other drum, and a breaker bar assembly located beneath the pair of drums and arranged to co-operate with the teeth on the drums so as to break oversized lumps of mineral passing between the drums, the breaker bar assembly including an elongate support member which extends longitudinally of the drums and on which a first and second series of laterally projecting breaker teeth are supported, the breaker teeth in each of said series of teeth being spaced from one another longitudinally of the support member to enable the groups of breaker teeth on a respective one of the drums to sweep therebetween.

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A MINERAL BREAKER

The present invention relates to a mineral breaker.

In particular, the present invention relates to a mineral breaker including a pair of rotatable drums each of which are provided with opposed breaker teeth. The teeth on each drum are arranged in circumferentially extending groups and the groups on the drums are staggered so that teeth in one group on one drum pass between neighbouring groups of teeth on the other drum.

In a general aspect, the present invention provides such a mineral breaker which further includes a breaker bar assembly having a plurality of breaker teeth extending longitudinally of the drums and located between and beneath the axes of rotation of the drums so as to co-operate with the breaker teeth on the opposed drums for breaking oversized lumps of mineral.

Preferably the plurality of breaker teeth are arranged on an elongate support member which is mounted at opposite ends to opposed end walls of the breaker housing.

Preferably the elongate support member is cast from a suitable ductile steel.

The teeth are preferably each in the form of a base formed integrally with the support member and to which a removal tooth cap is attached. Each tooth cap is preferably formed of a hard wearing steel such as a high manganese steel.

Various aspects of the present invention are hereinafter described with reference to the accompanying drawings, in which:-

Figure 1 is a side view, partly in section, of a mineral breaker according to the present invention;

Figure 2 is a plan view, partly in section, of the mineral breaker shown in Figure 1;

Figure 3 is an end view, partly in section, of the mineral breaker shown in Figure 1;

Figure 4 is a plan view of a central breaker bar assembly incorporated in the mineral breaker shown in Figure 1;

Figure 5 is a side view of the breaker bar assembly shown in Figure 4; and

Figure 6 is an underneath plan view of a breaker tooth cap which forms part of the breaker bar assembly.

The mineral breaker 10 shown in Figures 1 to 3 includes a housing 12 in which is rotatably housed a pair of breaker drums 14. Each drum includes breaker teeth 16 which are arranged in circumferentially extending groups 18. The groups 18 on one drum are staggered in relation to the groups 18 on the other drum such that the teeth on one drum sweep in between teeth of adjacent groups on the other drum. Each drum 14 and teeth 16 may be of any desired construction; preferably the teeth 16 are constructed in accordance with the construction disclosed in our United Kingdom Patent Application No. 8519516.

Each end wall 20 of the housing is preferably constructed from three side wall end portions 20a, 20b and 20c which are bolted together. Each portion 20a, 20b and 20c are preferably a steel casting. Portions 20a and 20b are provided with recesses so as to define therebetween bearing housings 24 (only two of which is visible) in which bearings 26 are located. The bearings 26 rotatably support the drum shafts 27 (only one of which is visible).

A breaker bar assembly 30 extends between and is supported by opposed end portions 20c. The assembly 30 includes a main elongate support body 31 having support flanges 32 integrally formed at each end. The support flanges 32 overlap a flange 20d formed on portion 20 c and are thus supported thereby. Shims 38 are located between support flanges 32 and flanges 20d in order to provide height adjustment of the breaker bar assembly 30 relative to the breaker drums 14. The support flanges 32 are held in position by bolts 34.

A series of tooth bases 40 project from each longitudinal side of the main support body 31. The tooth bases 40 of each series are spaced from one another to define gaps 41 through which breaker teeth 16 on a facing breaker drum may sweep through on rotation of the drum.

Removably fixed to the upper surface of the main support body 31 and tooth bases 40 are tooth caps 50. As seen in Figures 3 and 5 each tooth cap 50 has a recess or pocket 51 which seats upon an elongate projection 53. Preferably the dimensions of the pocket 51 and corresponding projection 53 are such as to provide a tight fit to effectively key the tooth cap in position so as to accommodate working loadings.

Each tooth cap 50 is held in place on a projection 53 by means of bolts 55.

The external profile of the tooth caps 50 is chosen to cater for the type of mineral to be broken and so the shape may vary accordingly. However it is preferred to provide a raised central portion 56 which as seen in Figure 3 is located centrally between the drums 14. The central portions 56 of all the tooth caps are aligned longitudinally of the support 31 preferably contiguous to collectively form a ridge or shed.

Consequently it is not possible for elongate pieces of material to lodge or reside at this position.

The provision of the breaker bar assembly 30 enables the mineral breaker to size mineral from a relatively large size to a relatively small size in one pass. Thus it is possible to feed mineral lumps of say up to one metre cube size into the machine and obtain mineral lumps not exceeding say 200 mm cube size. This is very advantageous as it means that one machine can be used at a mineral winning location to break down won mineral to a size suitable for conveying the mineral away.

Size variation of the obtained product may be achieved by adjusting the height of the breaker bar assembly relative to the breaker drums.

In addition the provision of a breaker bar enables the breaker drums 14 to be independently driven which is advantageous as it enables optimum grip to be obtained on large lumps of mineral being gripped between the opposed leading faces of breaker teeth on opposite drums. It is however possible if desired, to drivingly connect both breaker drums and drive them with a single power source.

In addition positive sizing is achieved since it is not possible for mineral lumps of a greater than predetermined size to pass through the machine.

Claims

1. A mineral breaker including a pair of rotatable drums each having radially projecting breaker teeth, the teeth on both drums being arranged in axially spaced groups of circumferentially spaced teeth, the groups of teeth on one drum being axially offset from the groups of teeth on the other drum so that teeth in one group on one drum pass between neighbouring groups of teeth on the other drum, and a breaker bar assembly located beneath the pair of drums and arranged to co-operate with the teeth on the drums so as to break oversized lumps of mineral passing between the drums, the breaker bar assembly including an elongate support member which extends longitudinally of the drums and on which a first and second series of laterally projecting breaker teeth are supported, the breaker teeth in each of said series of teeth being spaced from one another longitudinally of the support member to enable the groups of breaker teeth on a respective one of the drums to sweep therebetween.

2. A mineral breaker according to Claim 1 wherein both drums and the elongate support member are mounted at opposite ends to opposed end walls of the breaker housing.

3. A mineral breaker according to Claim 1 or 2 wherein the height of the support member relative to the drums is adjustable.

4. A mineral breaker according to Claim 1, 2 or 3 wherein each breaker tooth of each series includes a detachable tooth cap supported by the elongate support member.

5. A mineral breaker according to Claim 4 wherein the elongate member is integrally formed with laterally extending projections which define a base portion for supporting a tooth cap.

6. A mineral breaker according to Claim 4 or 5 wherein each tooth cap is provided with a raised portion which is arranged to be located centrally of the support member when the cap is secured thereto, the raised portions of the tooth caps being arranged so that collectively they define a ridge extending longitudinally along the support member.

7. A mineral breaker according to Claim 4, 5 or 6 wherein the elongate support member is cast from a suitable ductile steel.

8. A mineral breaker according to Claim 7 wherein the tooth caps are cast from a suitable abrasive wear resistant steel such as a high manganese steel.

9. A mineral breaker according to any preceding claim wherein each drum is independently driven.

10. A mineral breaker substantially as described with reference to and as illustrated in the accompanying drawings.

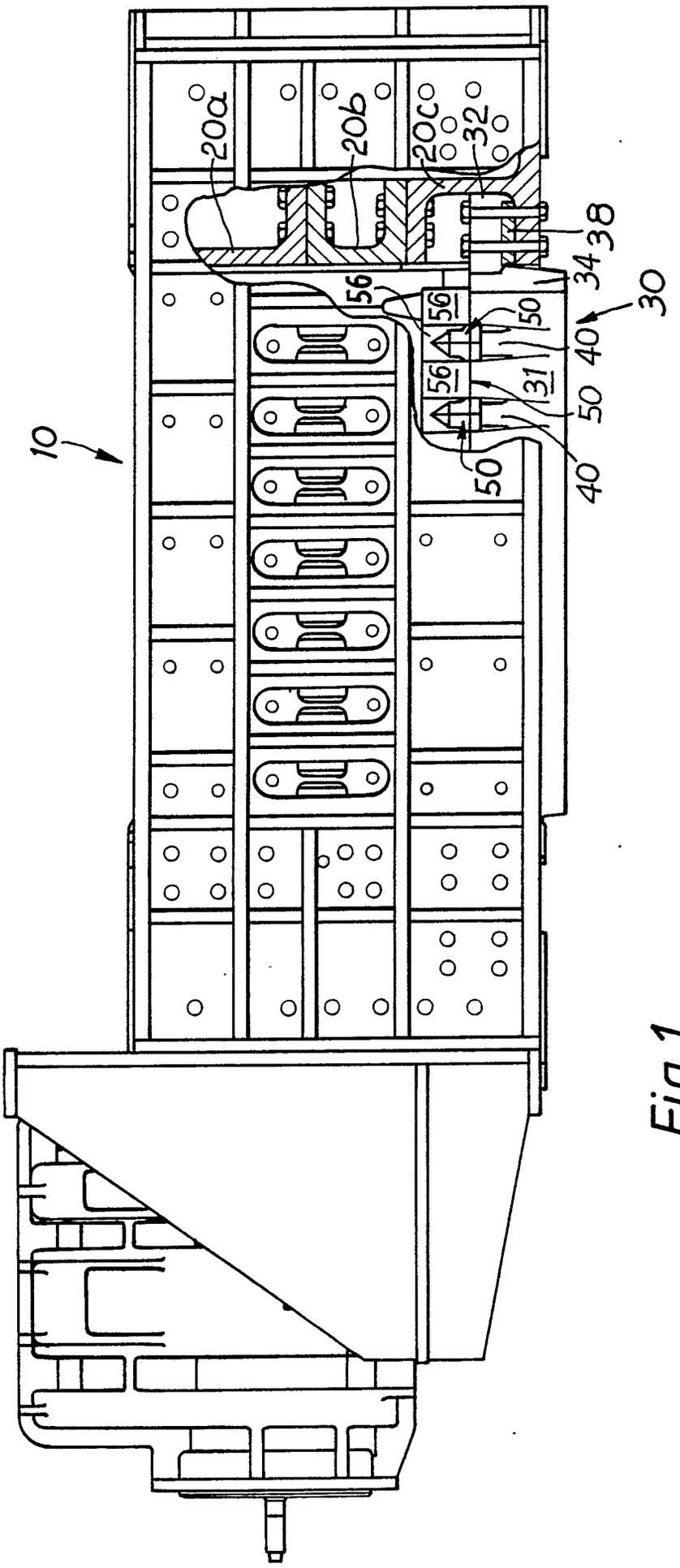

Fig.1

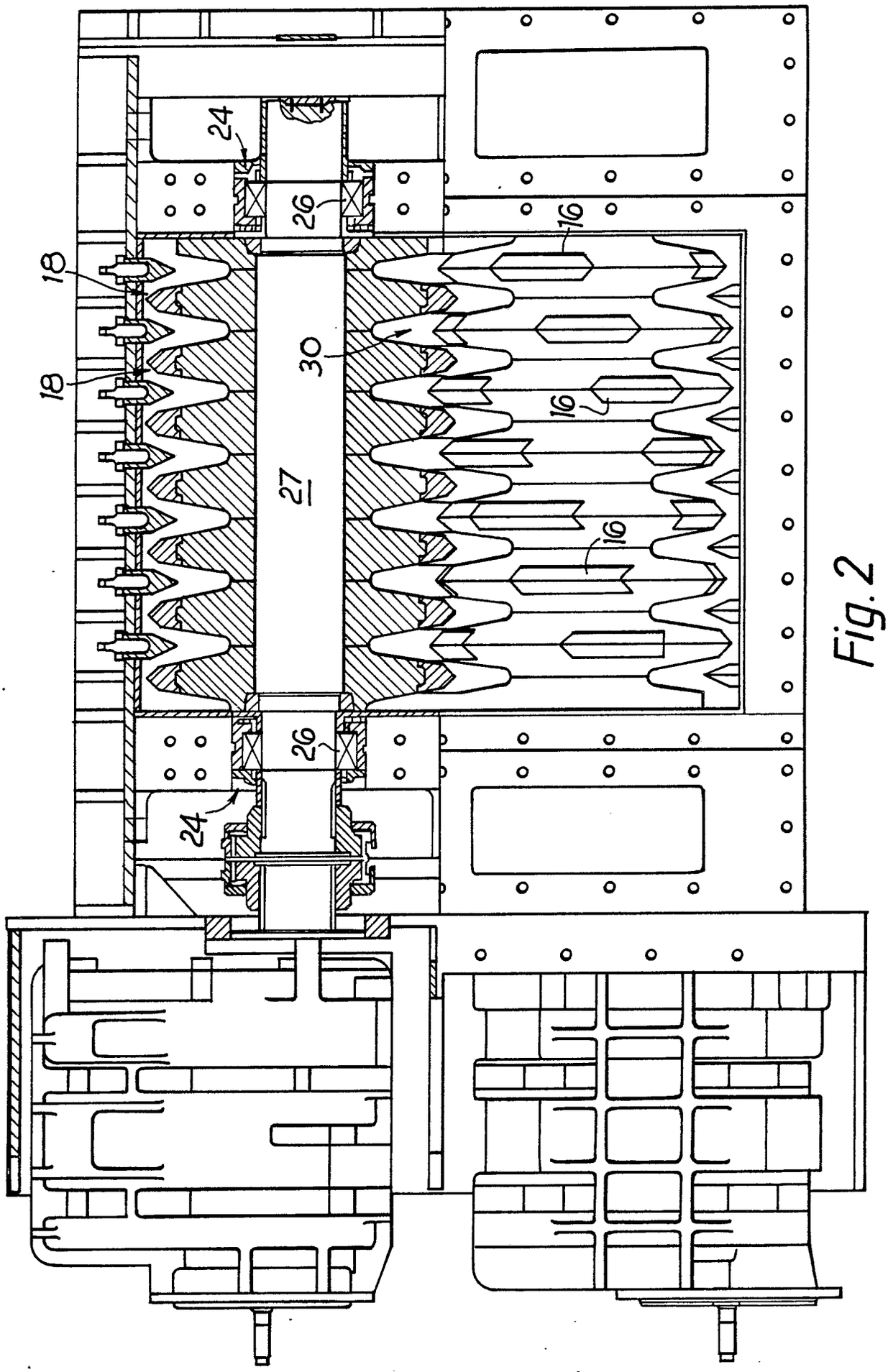

Fig. 2

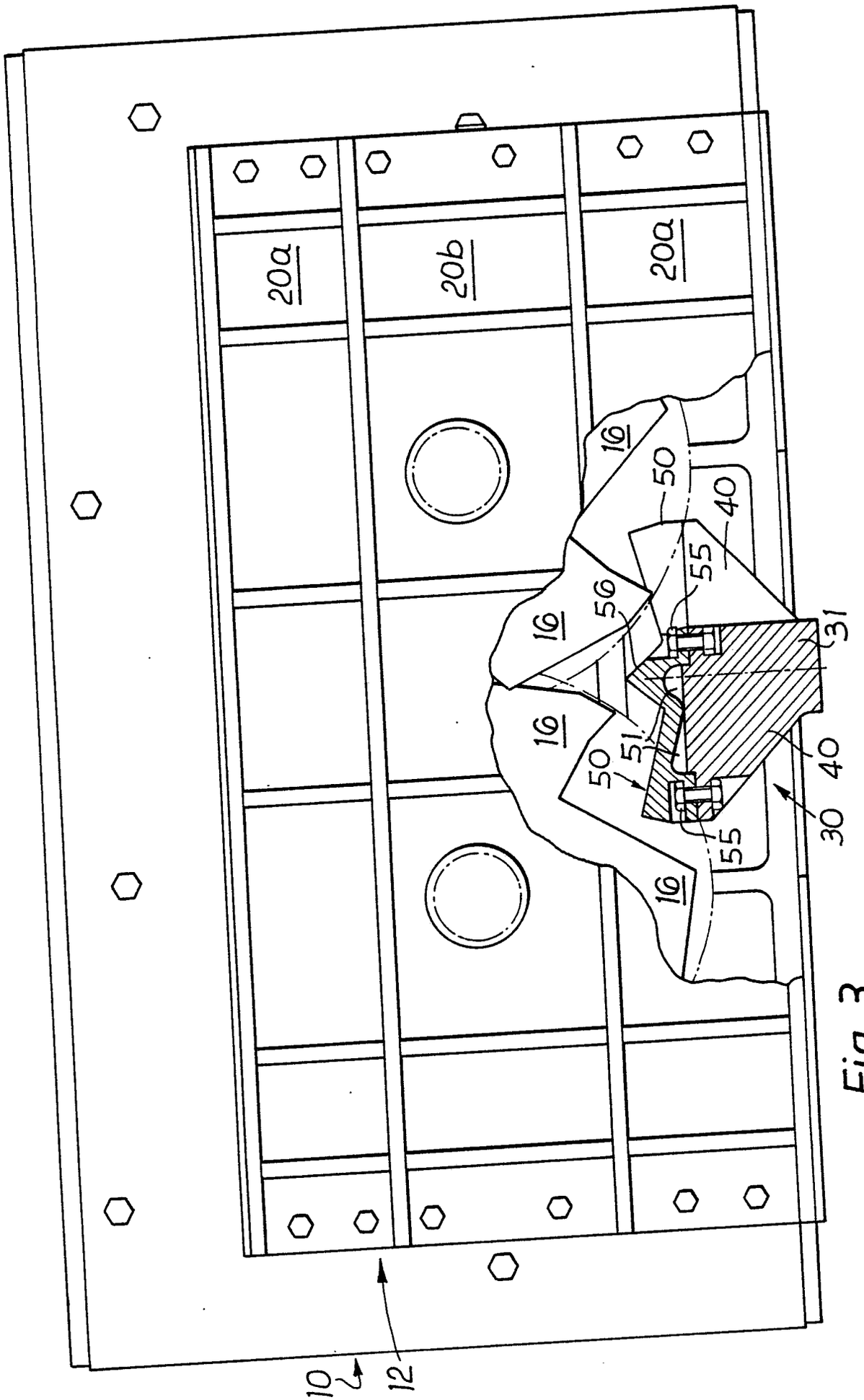

Fig. 3

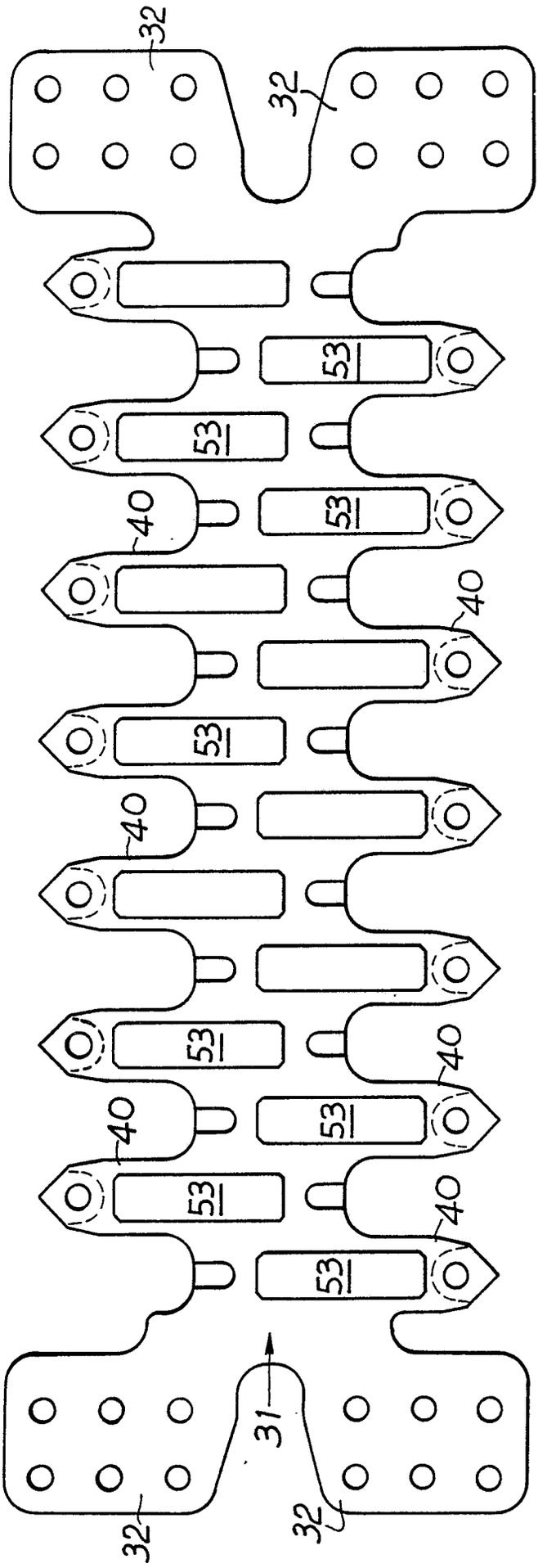

Fig. 4

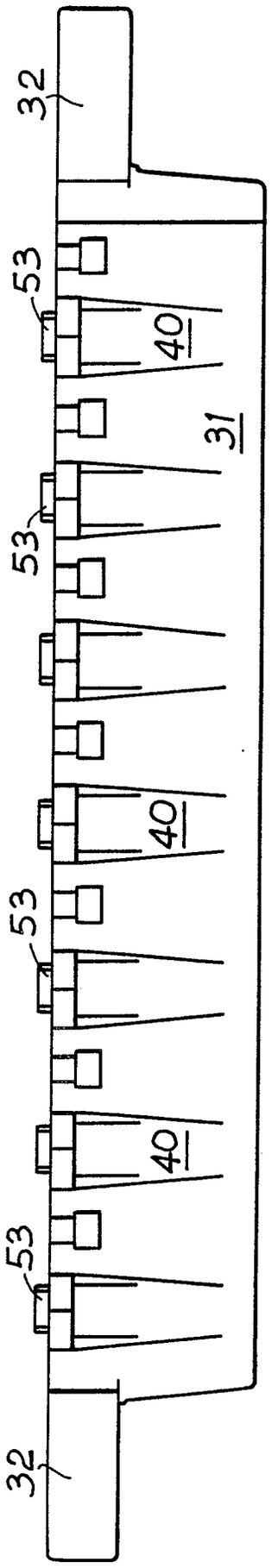

Fig. 5

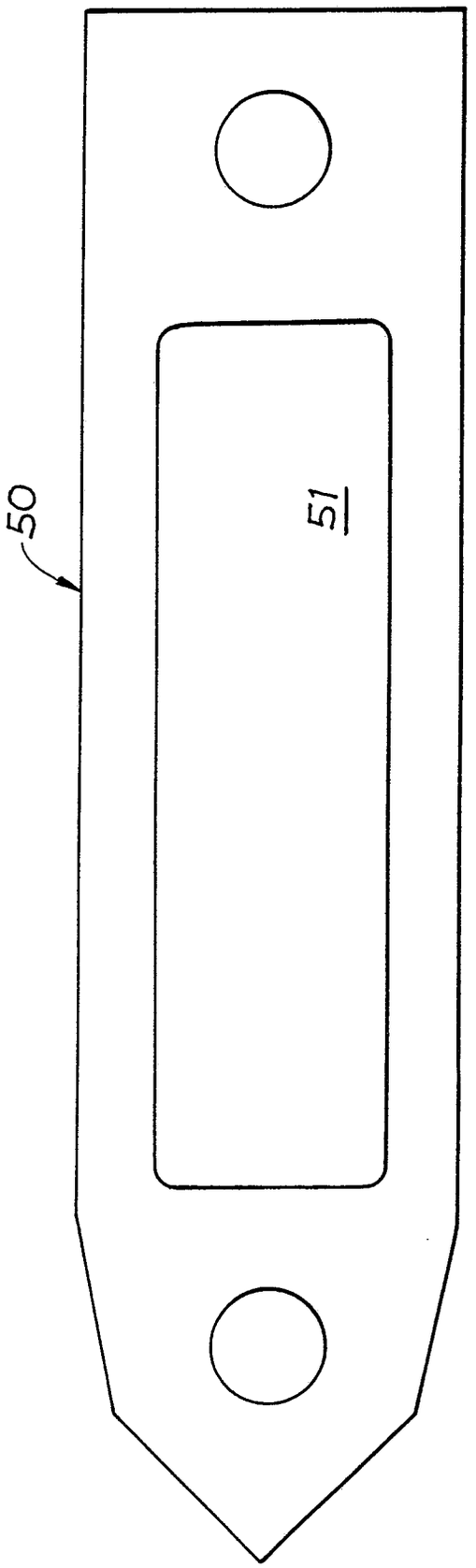

Fig. 6