

A. PITTROFF.
FLEXIBLE METAL PROP.
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987,397.

Patented Mar. 21, 1911.

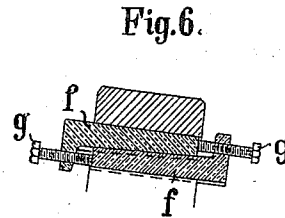
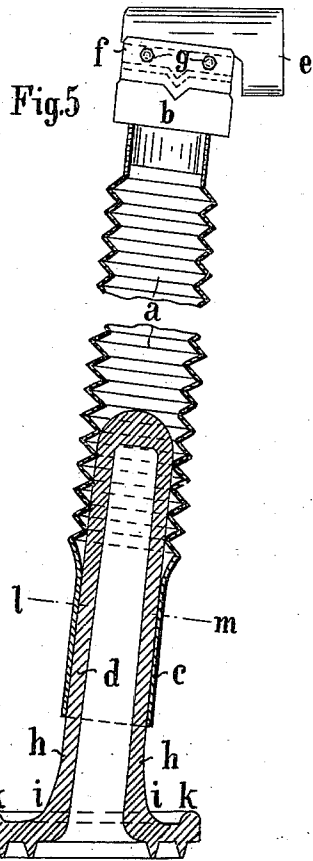
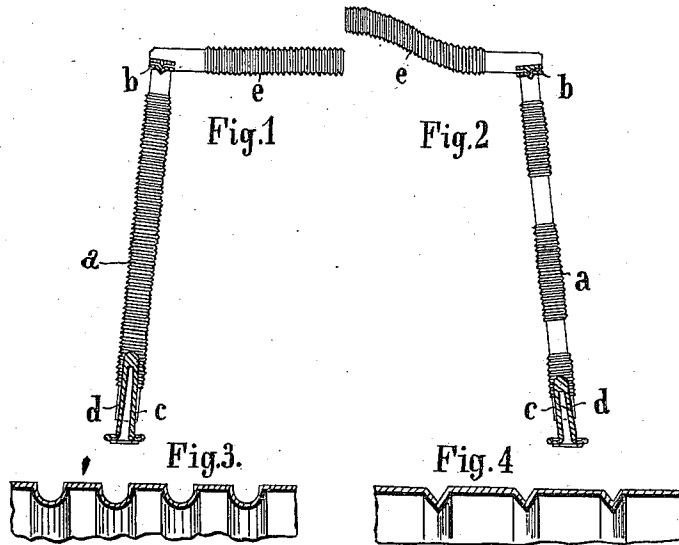


Fig. 7

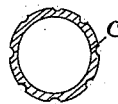
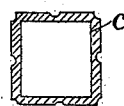


Fig. 8



Witnesses:
Hyman Schipper
Oscar Boep

Inventor:

A. A. Pittroff
by *B. Singer* Att'y.

UNITED STATES PATENT OFFICE.

ADAM PITTROFF, OF DUISBURG, GERMANY.

FLEXIBLE METAL PROP.

987,397.

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To all whom it may concern:

Be it known that I, ADAM PITTROFF, a subject of the Emperor of Germany, residing at Duisburg, Rhenish Prussia, German Empire, have invented certain new and useful Improvements in Flexible Metal Props, of which the following is a full, clear, and exact description.

The object of my invention is a hollow prop of suitable metal, preferably serving as prop or rafter where high pressures suddenly arising or constantly gradually increasing have to be absorbed by flexibility of the prop, as for example in mining, as prop and rafter for the mine. The hitherto known constructions for this purpose consist generally of too many separate co-acting parts which owing to the special conditions frequently give way, owing to chemical actions, rusting, rotting and mechanical injuries.

According to the invention the flexible props are made from a cross-plaited tube. The cross-plaitings yield elastically on the loading of the prop. In order, however, to avoid a breaking of the prop in the case of overloading, preferably the lower end of the prop is suitably formed. For this purpose the lower end of the prop can be provided with longitudinal grooves and is pushed on to a foot piece, so that in the case of overloading the lower end of the prop will split up along the grooves and will be pushed farther on to the foot piece, thereby shortening the whole prop. A hollow foot piece provided with outer longitudinal grooves and into which foot piece the lower end of the prop is pushed, may be used with equal advantage. The part not provided with grooves, that is to say consequently in the first case the foot piece and in the second case the lower end of the prop is suitably provided with sloping and curved surfaces so that after the splitting up of the part provided with longitudinal grooves, a rolling up of the resulting strips is occasioned.

I shall now describe my invention with reference to the accompanying drawing in which:

Figure 1 shows the prop and half a rafter made as a fully cross-plaited support. Fig. 2 shows a structure for attaining the same object in which the prop is partly plaited and partly plain, the rafter is wholly plaited and is curved somewhat upward so

as to be able to offer greater resistance. Figs. 3 and 4 show various methods of plaiting in longitudinal section. Fig. 5 shows the prop broken away in the middle with the head and foot portion drawn to a larger scale. Fig. 6 shows in side view as example a form of construction of the known wedging arrangements of the prop and rafter. Figs. 7 and 8 give as example two various cross-sections of the lower portion of the prop on the line *l-m* of Fig. 5.

The prop consists of the wholly or partly accordion plaited hollow support *a*, Figs. 1, 2 and 5, which is provided with the inserted head *b* and having a plain lower end which is pushed over a specially formed part *d*. The prop is held against the rafter *e* with two wedges *f*, *f'*—preferably of non-rusting metal—guided in grooves, which wedges can be pushed apart from each other by screws *g*, *g'*, Figs. 5 and 6, thereby releasing the prop.

The portion *h*, *i*, *k* of the part *d* is specially so formed that the part *c* of the prop (Figs. 7 and 8) provided with longitudinal grooves or slots, on increasing pressure will first split up and on further increases of pressure must roll up owing to the special shaping of the parts *i*, *k*. Owing to this special form of construction an easy flexibility of the prop is obtained without—and this is the essential feature of the inventive idea—its supporting power being decreased, but rather increased, in spite of the alteration in form.

On exceeding the normal pressure, which with the ordinary pine wood prop of about 200 millimeters may be taken as 50 tons, the prop will first elastically shorten by the elastic yielding of the cross-plaiting. On the further increase of pressure, the strain on the prop may without injury exceed the limits of elasticity. In this case the width of the plaits will decrease and the prop will be gradually pressed together, without there being any danger of the roof falling down in the part to be supported as may happen by any sudden breaking down of rigid iron or wooden props. Owing to the presence of the lower longitudinal grooves and correspondingly chosen depth of grooves, before surpassing the limits of elasticity in the cross-plaiting, the lower ends of the prop will split up.

The double flexibility of the prop is especially valuable inasmuch as by measure-

ments of the variations in the plaits the effects of the pressure can be followed and owing to the splitting up of the intentionally weakened part *c* greater pressure effects are absorbed and at the same time shown, an advantage not possessed by any hitherto known construction of flexible props. The prop may also be used without the special part *d* where the flexibility in the plaiting suffices, and only a wooden block is necessary as underlayer. Furthermore the partly pressed together prop may be again used at the same height by arranging wooden blocks underneath; the completely pressed together support can again obtain its original form and applicability by bringing to glow heat and stretching in the red-hot condition. This support may also be advantageously employed other than as a mine prop and the like also in buildings, if the latter are exposed to considerable vibrations and have to be protected from extensive destruction by elastic flexibility of the main supports.

25 I claim—

1. Flexible prop of iron or the like, consisting of a cross-plaited pipe with a suitable head and suitable foot part, substantially as herein described and set forth.
- 30 2. Flexible prop of iron or the like, con-

sisting of a cross-plaited pipe with a suitable head and a suitably shaped lower end, a foot part, the foot part and lower end of the prop being pushed into each other and one of the two being provided with weakenings in the material running in a longitudinal direction, substantially as herein described and set forth. 35

3. Flexible prop of iron or the like, consisting of a cross-plaited pipe with a suitable head and a suitably shaped lower end, a foot part, the foot part and lower end of the prop being pushed into each other and one of the two being provided with weakenings in the material running in a longitudinal direction, sloped and suitably curved surfaces on the part that is not weakened, so that on the splitting up of the part of the material which has been weakened, the strips of the latter will roll up sliding along the sloped and curved surface, substantially as herein described and set forth. 40 45 50

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

ADAM PITTROFF.

Witnesses:

RICHARD SCHÖPPER,
OSCAR BOCK.