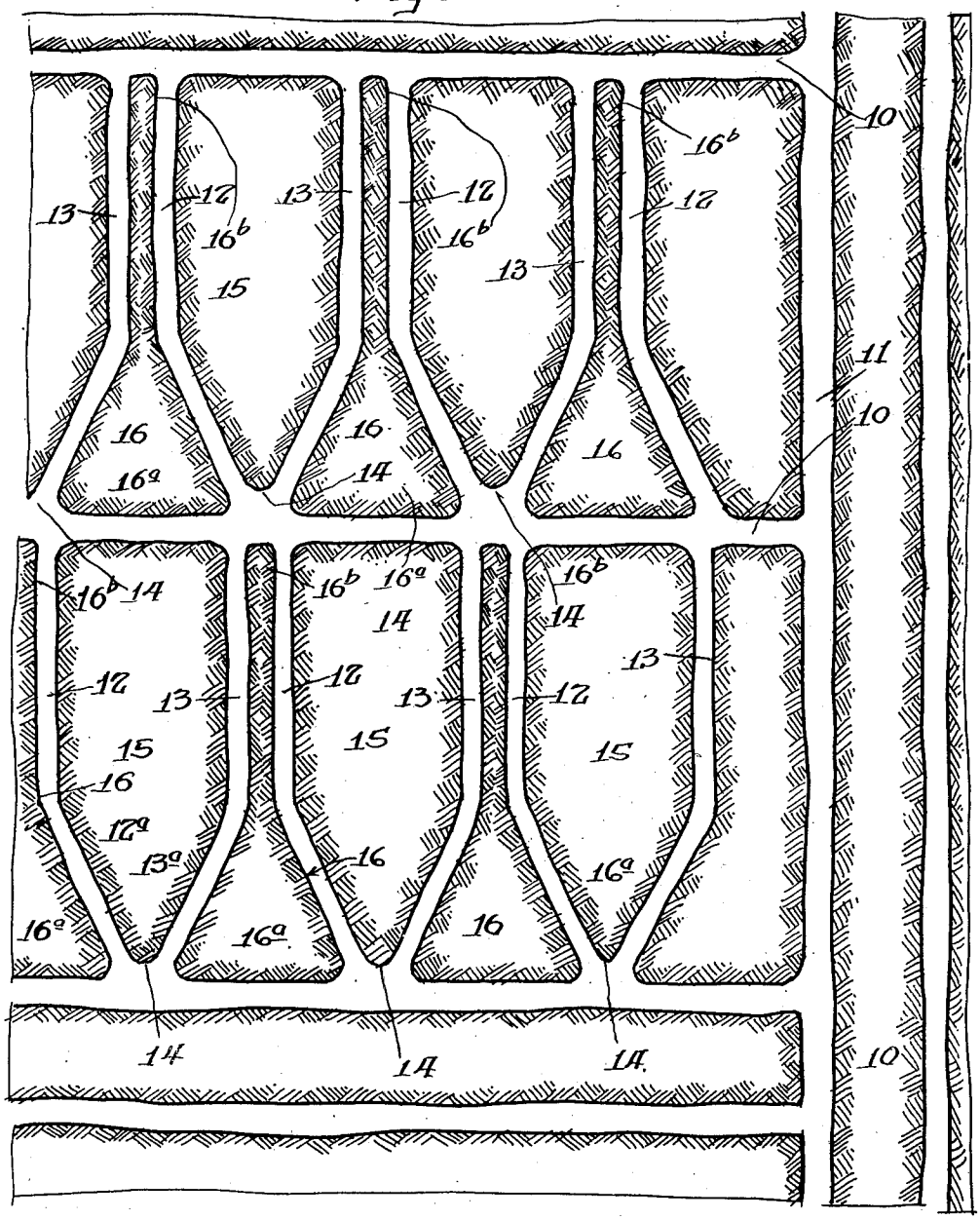
March 29, 1927. J. W. PEARCE 1,622,837

SYSTEM FOR MINING

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Fig. 1



Inventor
James W. Pearce
By Clarence F. Poole
Attorney

Witness
Herbert Buehler

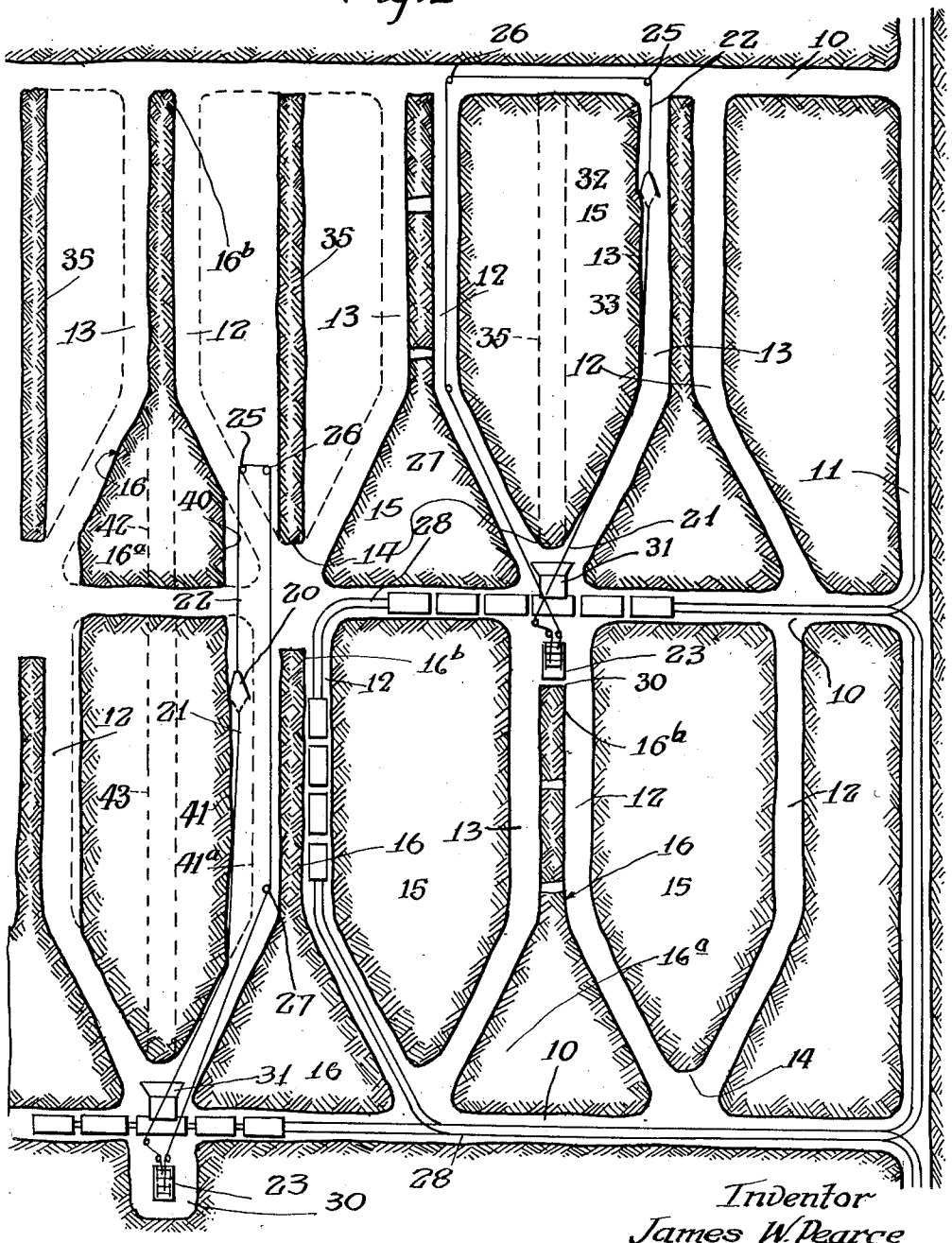
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J. W. PEARCE

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Fig. 2



Witness
Herbert Buehler

Inventor
James W. Pearce
By Clarence D. Poole
Attorney

Patented Mar. 29, 1927. 1,622,837

UNITED STATES PATENT OFFICE.

JAMES W. PEARCE, OF CHICAGO, ILLINOIS, ASSIGNOR TO GOODMAN MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SYSTEM FOR MINING.

Application filed December 6, 1924. Serial No. 754,262.

This invention relates to improvements in systems for mining, and more particularly to systems where draft operated scraper loaders are used to gather the material from predetermined areas in the mine but leaving certain portions of the material as supports for the mine roof.

My invention is particularly adapted for use in coal mines where it is desirous to leave pillars or supports at various intervals while the coal is being mined.

Among the objects of my invention is the provision of a system whereby scraper loaders are advantageously used in gathering loose material as it is dislodged along certain working faces, and transported for loading upon mine cars.

More specifically the object is to provide a working plan or system wherein the material is worked out along relatively long working faces so as to require a minimum number of changes in the position of the scraper loading apparatus including the draft rope anchors and power devices as well as the loading chutes or platforms adjacent the mine cars where final loading is accomplished.

Scraper loaders have heretofore been used more or less extensively as a means of gathering or transporting loose material from the working faces of the mine to be loaded on mine cars. One of the prerequisites of successful operation of the scraper loaders, especially where it is desired to leave pillars at certain intervals, is the provision of a system wherein a maximum area can be gathered and loaded with a single setting of the loading apparatus. In scraper loader systems of the class herein referred to, the scraper is of any desired form capable of gathering loose material and is operated by draft ropes trained over guides or sheaves anchored in proper positions, the draft ropes being operated by a winding engine or hoist in position to move the scraper reciprocably between the working face and the loading station at an entry where the mine cars are loaded. One of the most efficient and satisfactory methods heretofore employed in connection with scraper loaders is the so-called panel system of mining in which cross entries substantially at right angles to each other are driven in the material to be mined so as to form substantially rectangular blocks. Tracks are laid along certain of the entries and cross entries and the scraper loader apparatus is positioned at such loading track to load out material through an entry at right angles to said loading track, the working face extending along one or more blocks and being progressed laterally in a line substantially parallel with the loading entry. In systems of this kind, however, it is necessary to change the position of the loading chute and the hoist quite often as the loading operation proceeds in each entry. It is also more or less difficult to provide for pillars spaced the required distance apart, it being understood that the blocks are usually in elongated form, and the pillar which would be left along the center of such a block is unnecessarily long, thus resulting in a loss of material which might otherwise be obtained. As will be seen from the following description my improved system contemplates a modified form of the panel system of mining in which the cross entries running in one direction are substantially continuous and parallel with each other, while the entries running in the opposite direction are non-parallel, at least through a portion of their length and two adjacent entries converging at a substantially common point at a cross heading in which the loading is accomplished. In this manner blocks of irregular shape are formed but the arrangement is such that the material may be loaded out from either side of the blocks in the most economical manner, leaving pillars a predetermined distance apart.

The invention may be best understood by reference to the accompanying drawings, in which;

Figure 1 shows a plan view of a mine with the entries driven to form panels in accordance with my invention;

Figure 2 is a view similar to Figure 1 but drawn to a somewhat larger scale and showing the scraper loading apparatus in the process of loading out the panels.

Figure 1 shows the initial arrangement of the entries in carrying out my improved system. A series of panel entries 10, 10 are arranged at the right angles to a main entry 11. This latter entry may form a main haulage line of the system with branch haulage lines running into the entries 10, 10 wherever necessary. The entries 12, 12 and 13, 13, extending between and connecting

the cross entries 10, 10, are arranged in pairs and are non-parallel with each other throughout a portion of their length. For instance, in the form shown the lower portions 12^a and 13^a of each pair of entries 12 and 13 converge toward each other to meet at a common point of entry 14, so as to form an irregular block 15 between each pair of entries 12, and 13. Another irregular block 16 is left between each of the adjacent blocks 15, 15, said block 16 having an enlarged lower portion 16^a and a narrow extended upper portion 16^b. The arrangement is such that the blocks in succeeding tiers are in staggered form, the common entry 14 in the upper tier being in alignment with the narrowed portion 16^b of the adjacent lower block 16. The object of this staggered relationship will appear from a description of the loading operation which will now be described, having especial reference to Figure 2.

In this Figure 2, two sets of loading apparatus are shown in operation, each comprising a scraper 20 having a headrope 21, tailrope 22, operatively connected to a winding engine 23. The scraper and winding engine are of the usual form and need not be described in detail.

In this Figure 2, two sets of loading apparatus are shown in operation, each comprising a scraper 20 having a headrope 21, tailrope 22, operatively connected to a winding engine 23. The scraper and winding engine are of the usual form and need not be described in detail. The tailrope 22 is turned over sheaves 25, 26 and 27, so as to permit the scraper to be moved reciprocably through one of the side entries and along the side wall of one of the blocks 15 as shown in the upper tier in this figure. The tracks 28 serving this loading machine extend from one side entry 11 through the cross entry 10 and down one of the cross entries, as for instance a cross entry 12, as shown, and thence through the lower entry 10. The winding engine 23 is located opposite the common entry 14 in which the loading is to proceed. In the form shown the winding engine is preferably located on the opposite side of the track in the space 30 formed by cutting out a part of the extended block portion 16^a. A loading chute 31 of any approved form is located in the common entry 14 in position to permit the scraper to unload the material on the mine cars.

With the apparatus in the position just described it will be seen that the material may be dislodged from the side of the block 15 in the entry 13, thus forming a working face 32 which progresses laterally as the mining operations proceed. When the working face 32 has reached the position of the dotted line indicated by 33 the work is discontinued, inasmuch as it is usually desirable to leave a pillar of which this line 33 is the right hand margin. The opposite side of the block is then loaded out in a similar manner by reversing the head and tail ropes so as to operate in the entry 12 until a narrow strip of material is left along the centre of the block section 15 which strip forms also a pillar. Reference to the corresponding areas in the upper tier in Figure 2 shows two block sections 15 which have been already loaded out to leave similar elongated pillars 35, 35, along the centre of the blocks. When the upper tier of blocks 15, 15 have been completely worked out, leaving only the pillars 35, 35 in the center thereof, loading is then carried out in the next cross entry 10 below the first cross entry. Suitable loading tracks are shown in this second entry and a loading apparatus similar to that already described is shown in operation. It will be observed however, in the case of operations in the second or lower tier, that the guide devices or sheaves 25, 26 and 27 are all arranged in alignment with the same loading entries as shown herein, being on the right hand entry 13. Furthermore the uppermost guide sheaves are arranged at a point above the upper cross-entry 10 so as to extend the total working face to include a face 40 along the enlarged portion 16^a of the panel 16 and also the working face 41 along the side of the adjacent lower block 15. The working faces 40 and 41 are therefore progressed laterally until they reach a line indicated in dotted lines at 40^a and 41^a forming substantially a continuation of the side of the narrow portion 16^b of the upper block 16. Operations are then transferred to the other side of the block 15 and 16 until a similar point is reached at the working faces 42 and 43 in substantial alignment with the left hand side with the upper portion 16^b of the block 16. When the mining operation has reached this stage it will be observed that a pair of elongated pillars are left standing as a support for the roof, the upper pillar comprising the remaining portion of the block 16 and the lower pillar comprising the remaining portion of the lower block 15 corresponding with the pillar 35 which has already been described in connection with the operations on the upper tier of blocks 15.

With my improved system the line of movement of the scraper may be maintained in substantially straight lines between the moving chute and the movable guide 25, thus eliminating the necessity of changing the course of movement of the scraper to any great degree. This is a distinct advantage in the operation of scrapers of this character in view of the manifest difficulty of providing satisfactory means for turning or changing the forward course of movement of the scraper. My system furthermore affords considerable variation in the

manner in which it may be carried out either in the shape of the blocks, the number of blocks to be worked at one time, or the shape or/and size of the pillars which may manifestly be varied widely, depending upon the working conditions. The development of my improved system is such that it is unnecessary to clean out material from corners, as in room and pillar methods.

I claim as my invention:

1. The method of mining, which consists in initially forming a plurality of substantially parallel cross-entries, and a plurality of connecting entries between adjacent cross-entries, said connecting entries being non-parallel with each other through a portion of their length and arranged in pairs to meet at a common point at said cross-entries, the common meeting points of the connecting entries being in offset relation with the corresponding meeting points in the adjacent cross entries, and removing the material from the resulting blocks by scraper loading devices extending along working faces in said connecting entries and loading at predetermined common meeting points in the cross-entries.

2. The method of mining, which consists in initially forming a plurality of substantially parallel cross-entries, and a plurality of connecting entries between adjacent cross-entries, said connecting entries being non-parallel with each other through a portion of their length and arranged in pairs to meet at a common point at said cross entries, the common meeting points of the connecting entries being in offset relation with the corresponding meeting points in the adjacent cross entries, and removing the material from the resulting blocks by scraper loading devices extending along working faces formed continuously along a plurality of offset connecting entries in adjacent tiers of blocks, and loading at predetermined common meeting points in the cross entries.

Signed at Chicago, in the county of Cook and State of Illinois, this 28th day of November, A. D. 1924.

JAMES W. PEARCE.