

May 30, 1939.

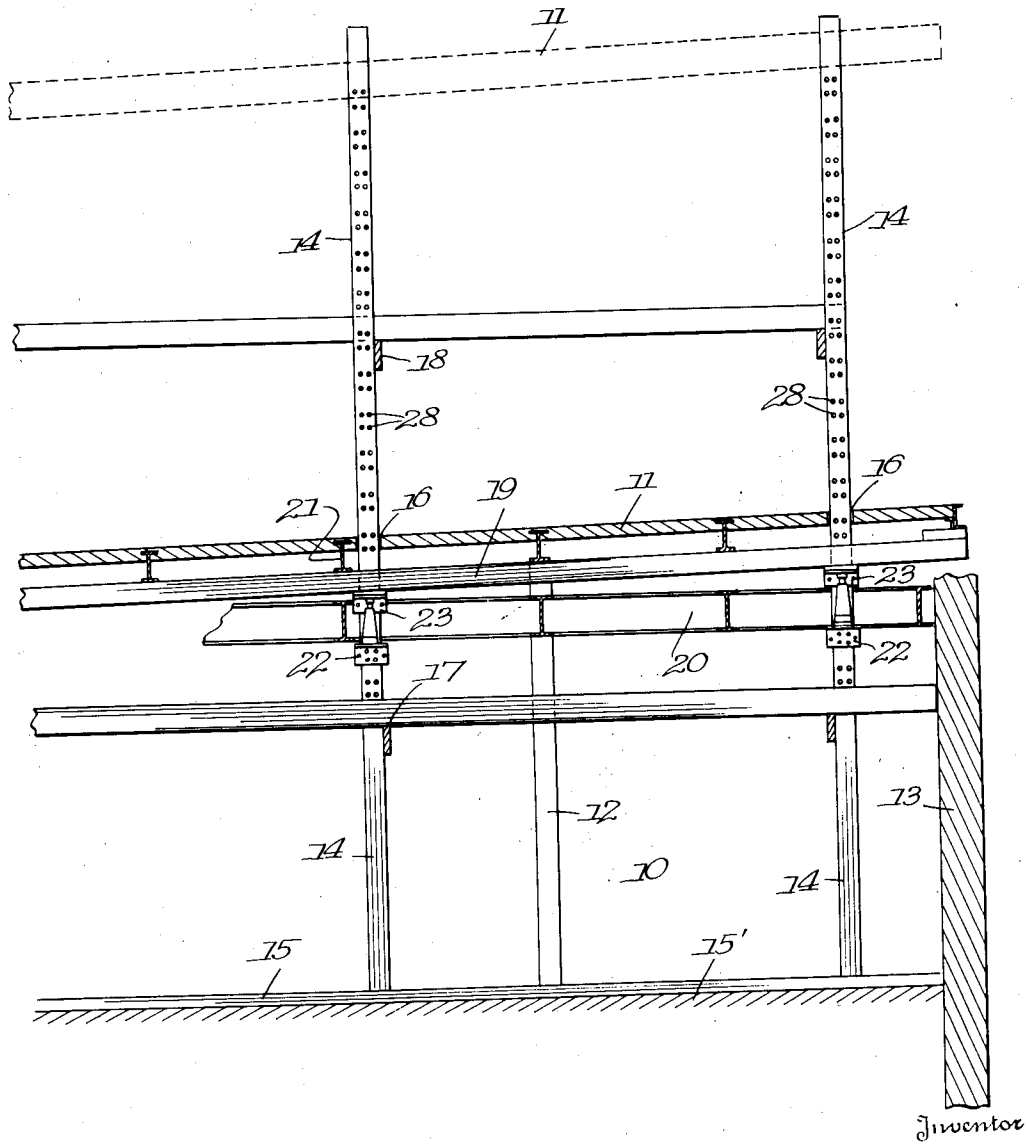
APPARATUS FOR RAISING ROOFS

Filed Oct. 6, 1938

2,160,446

2 Sheets-Sheet 1

Fig. 1.



John A. Stalfort.

By

Cushman, Dwyer & Sherman
Attorneys

Attorneys

May 30, 1939.

J. A. STALFORT

2,160,446

APPARATUS FOR RAISING ROOFS

Filed Oct. 6, 1938

2 Sheets-Sheet 2

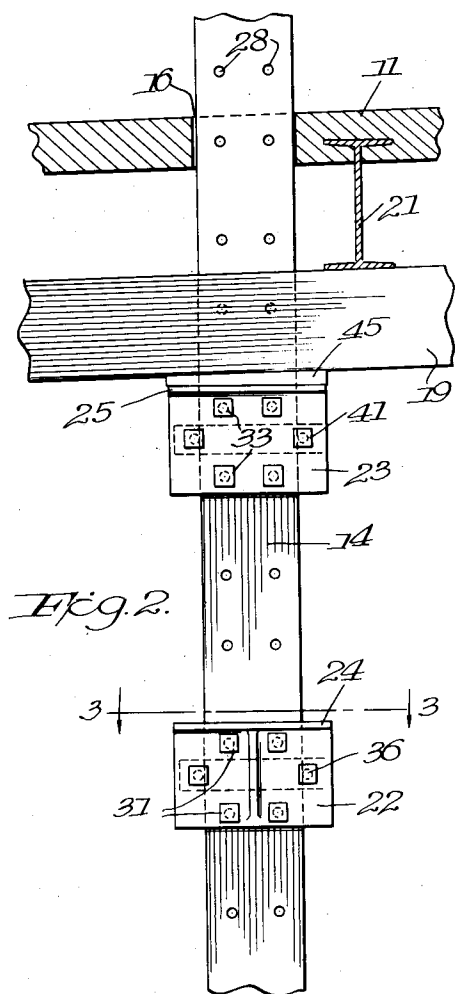


Fig. 2.

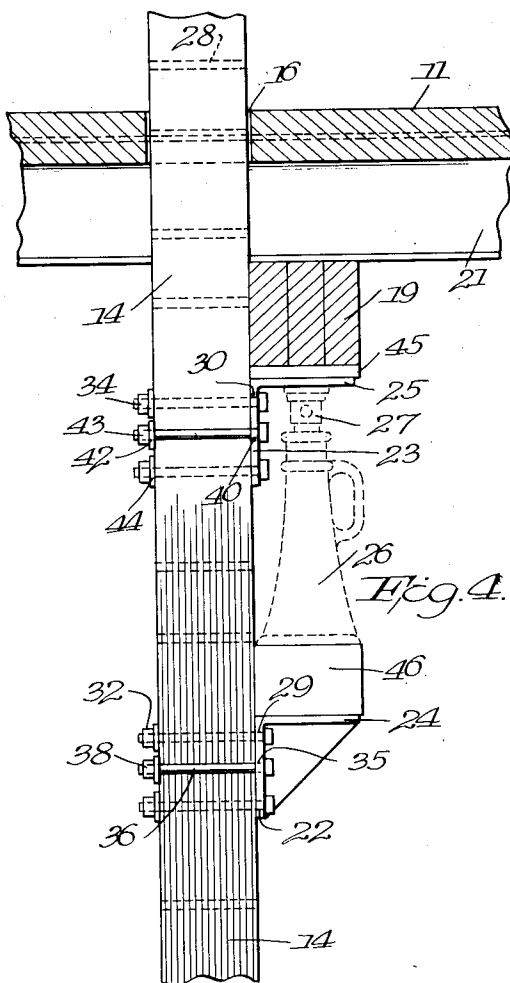


Fig. 4.

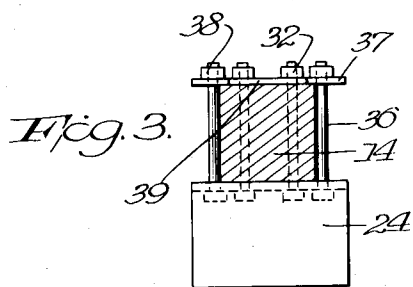


Fig. 3.

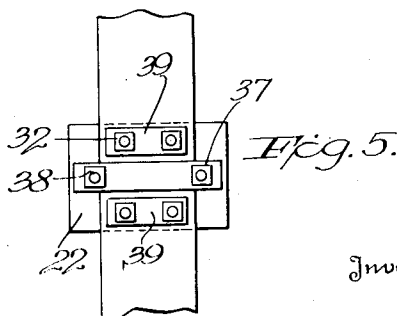


Fig. 5.

Inventor

John A. Stalfort

334

Lawman Dwyer & Lawman
Attorneys

UNITED STATES PATENT OFFICE

2,160,446

APPARATUS FOR RAISING ROOFS

John A. Stalfort, Baltimore, Md.

Application October 6, 1938, Serial No. 233,695

2 Claims. (Cl. 254—1)

The present invention relates to a method and apparatus for raising roofs. In the past, when it is desired or has become necessary to enlarge a building by adding one or more stories or floors, it has been the usual practice to entirely dismantle or destroy the roof, preparatory to building on the new floors. This procedure has been followed primarily because the cost of preserving the roof would have been excessive and entirely unwarranted by the results obtained.

The present invention is designed to eliminate these objectionable features and to provide a method and apparatus wherein the roof of a building may be profitably saved and raised to the necessary height at a minimum of expense.

This method and apparatus contemplates utilizing a plurality of temporary columns which are secured to the top story of the building with a considerable portion of each column projecting through an opening formed in the roof. To each column is secured a pair of superposed brackets, one of which is positioned in close proximity to and supports a portion of the roof. The other bracket of each pair is adapted to support a jack in position below the upper bracket whereby the jacks may be operated in unison to raise the upper brackets on the columns and thereby gradually raise the roof to the desired height.

An essential feature of the invention is the provision of bolts or other suitable fastening means by which the brackets may be secured either in stationary or slidable relation to the columns to permit each pair of brackets to be moved in step by step relation up its respective column as the jacks are operated to raise the roof.

The present method comprises initially securing each set of brackets in non-slidable relation on the temporary columns and then placing a telescoped jack on each lower bracket and moving its lifting head into contact with the upper bracket. The upper bracket of each set is then slidably mounted on its respective column so that it may be moved up the column when the jack is operated. Assuming, therefore, that an operator is placed at each jack, the latter may be operated simultaneously and progressively with the other jacks by the operators to gradually move the upper brackets on the columns and thus raise the roof to the required height. When the jacks have been operated to their fullest extent, the upper brackets are made fast to the columns. The jacks are then removed, telescoped, and the lower brackets released and raised on the columns the required distance to their new jack support-

ing positions, and again made fast to the columns. Thereafter, the jacks are again supported on the lower brackets with their operating heads in contact with the upper brackets. These brackets are again slidably mounted on the columns and the roof raising operation is repeated, the jacks being again raised simultaneously and progressively. This operation is repeated until the roof has been raised to the desired height.

Thereafter, the additional stories or floors are built upon the original top story and the temporary columns removed after the permanent steel framework has been erected.

With the foregoing and other objects in view, the invention will now be more fully described, reference being had to the accompanying drawings in which,

Figure 1 is a vertical section through the top story of a building with the roof raising apparatus in operative position.

Figure 2 is a front elevation of one of the columns with the upper and lower brackets in operative position.

Figure 3 is a section on line 3—3 of Figure 2.

Figure 4 is a side elevation similar to Figure 2 showing the upper and lower brackets in operative position, and

Figure 5 is a detail of the rear of one of the brackets showing its connection to the column.

Referring to Figure 1, there is disclosed the top floor 10 of a building having a roof 11 which is to be raised as a unit to permit one or more stories to be added onto the top floor 10. The roof may be raised any desired height, depending upon the number of stories to be added, and these new stories will be built up under the raised roof and the latter then permanently secured thereto.

Preparatory to raising the roof 11, the latter is severed from the framework 12, walls 13 and other roof supporting elements, and a plurality of column receiving openings are cut in the roof. The means for supporting and guiding the roof during the raising operation comprises a plurality of rows of temporary columns 14. Each set or row of columns is supported upon a horizontal beam 15 which, in turn, is supported upon the flooring 15' of the top story 10. As will be observed, the columns 14 project through the openings 16 in the roof and project upwardly the distance which the roof is to be raised. These columns are tied together below and above the roof by suitable temporary wooden framing or braces 17 and 18 respectively. The braces 18 are, of course, removed when the roof has been raised

up to a point adjacent said braces; thereafter they may be replaced at a still higher level. These braces may be of any desired dimensions, so long as they adequately maintain and tie the columns 14 together in their operative roof raising and guiding positions.

Before the roof raising operation is started, a plurality of spaced beams 19 are connected to the underside of the roof. Each beam 19 is positioned so that it will extend parallel to one row of temporary columns 14 and as shown in Figure 1, each beam is in close proximity or contacting relation with its row of columns.

Prior to the roof raising operation, the floor framing of the first new floor to be added, is erected and as shown in Figure 1, is designated by the numeral 20. The roof 11 is illustrated as extending at a certain pitch or inclination; therefore the framing 20 can be initially erected only to a certain point, since the height of the roof at its lower end would interfere with the erection of the entire floor framing. However, the framing 20 is erected and extended as far as possible, prior to the initial raising of the roof and the remainder of the new floor framing is completed as soon as the roof has been raised sufficiently to permit this to be erected.

Referring to Figures 1 and 2, it will be observed that the roof 11 is provided with supporting girders or framing 21 and these, in turn, are directly supported upon the beams 19. Before the roof is entirely detached or separated from its original supporting structure, but after the columns 14 have been erected to extend through the openings 15 in the roof, a plurality of sets of brackets are applied to each column to support and take up the weight of the roof. Each set comprises a lower bracket 22 and an upper bracket 23 which is substantially identical to the bracket 22. These brackets are provided with supporting shelves 24 and 25 respectively which are initially spaced from each other a distance sufficient to accommodate a lifting jack 26, shown in dotted lines in Figure 4. This jack may be of any well-known construction but is preferably of the telescoping screw type in which the lifting head 27 may be rotated and raised a predetermined distance.

As will be observed (see Figure 4) the shelf 25 of each upper bracket is adapted to engage the under surface of one of the beams 19, while the shelf 24 of each lower bracket is adapted to support one of the jacks 26 in operative position. It will be further observed that each temporary column 14 is provided with spaced rows of holes or openings 28 which extend transversely through the column from one side to the other. The distance between the sets of openings is uniform in order that two sets of openings or four holes will always register with like sets of holes 29 and 30 in the lower and upper brackets respectively. As shown in Figures 2, 3 and 4, the lower bracket 22 is positioned so that its set of holes 29 register with like holes 28 in its column 14. A set of four bolts 31 pass through the aligned holes 28 and 29 and securely maintain the bracket in non-slidable relation with respect to the column by means of suitable nuts 32. In like manner, the set of openings 30 in the upper bracket are positioned in alignment with another set of holes 28 in the column and a set of four bolts 33 pass through the aligned openings and are secured in place by nuts 34.

In addition to the sets of bolt holes 29, bolts 31 and nuts 32, the lower bracket is provided

with another set of bolt holes 35 which are located exteriorly of the column but adjacent to the sides of the column (see Figs. 3 and 4). A pair of bolts 36 pass through the holes 35 and extend from front to rear of the column on opposite sides thereof. Preferably, a strap 37 (see Fig. 5) is positioned on the opposite ends of the bolts 36 and is adapted to be clamped to the column when the nuts 38 are screwed on the bolts 36. In this connection, a set of smaller straps 39 may be placed on the ends of the bolts 31. However, if desired, these may be supplanted by suitable washers or any other means to prevent the nuts 32 from digging into the column when they are screwed up on the bolts 31.

The upper bracket 23, similar to bracket 22, is also provided with a second set of bolt holes 40, each of which is located outside of one longitudinal edge of the column and these are adapted to receive bolts 41 which extend on the outside of the column. A strap 42, similar to strap 37, is adapted to be placed over the ends of the bolts 41 before the nuts 43 are screwed onto the bolts. Furthermore, the bolts 33 may be provided with straps 44 corresponding to the straps 39 of the lower bracket. The purpose of employing these multiple sets of bolts, one of which extends through the column and the other of which is positioned exteriorly of the column, is to provide means for securing each bracket either in fixed, non-movable relation to the column or in slidable relation thereto whereby one bracket of each set may be moved on the column at certain predetermined times while the other bracket is fixed to the column, during the roof raising operation.

With the construction as thus far described and assuming that the roof 11 has been made free of its original supporting structure and in condition for the raising operation, the sets of brackets are mounted as shown in Figures 1 and 3 so that the sets of bolts 31 and 33 secure each set of brackets in non-slidable position on their respective column 14. The brackets of each set are spaced sufficiently to permit a telescoped jack 26 to be placed upon the shelf 24 of the lower bracket 22. Any clearance between the lifting head 27 and the under side of the shelf 25 of the upper bracket is taken up so that the head is screwed into tight engagement therewith. Thereafter, each set of bolts 33 are removed from the upper bracket 23 so that the whole weight of the roof is directly supported by the jacks 26. In this connection, it should be explained that the set of bolts 41 and nuts 42 clamp the upper bracket sufficiently to prevent lateral movement of the bracket on the column, but at the same time permit sliding movement up the column when the jack is operated.

Sufficient scaffolding (not shown) is adapted to be located about the columns 14 to support a number of workmen or operators, one for each jack 26, and when a signal is given, each operator is adapted to rotate his jack a predetermined amount, whereby all of the jacks are operated in unison and thus simultaneously raise all portions of the roof. This lifting operation is continued until the jacks have been expanded substantially to their fullest extent. In this connection, however, the final raising movement of the jacks should be such as to align the bolt holes 30 in the top brackets with certain of the openings 28 in the columns 14 to permit the bolts 33 to be replaced in the upper brackets and positively secure the brackets in non-slidable relation on the columns. The jacks may then be

telescoped and released from the upper brackets and these latter brackets together with the columns 14, will support the entire weight of the roof while the jacks and lower brackets are being

5 arranged for another roof raising operation.

After the jacks 26 have been telescoped, the bolts 31 in the lower brackets are removed and the lower brackets are moved up on their respective columns a distance corresponding to the distance to which the roof has been raised. In this connection, the outside pairs of bolts and nuts 36 and 38 are loosened sufficiently to permit the lower brackets to be readily slipped up the columns to their next jack supporting positions. Thereafter, the bolts 31 are replaced in the lower brackets to secure the same in non-slidable relation to the columns. The telescoped jacks are again positioned on the shelves 24 and the heads 27 are raised into contacting relation with the shelves 25 of the upper brackets. Then the intermediate sets of bolts 33 of the upper brackets are removed and the signal given for the operators to operate the jacks. The jacks, upper brackets and roof are thus given a progressive step-by-step upward movement until the jacks have again been expanded to their fullest extent. The upper brackets are again made fast while the jacks are telescoped. This operation is continued until the roof has been raised to the desired position. Thereafter, the upper brackets are made fast to the columns and maintained in this position until the permanent framework and roof supporting structure have been built in and secured in position to permanently support the roof. The brackets are finally removed from the columns and the columns and other temporary roof supporting structures are dismantled and removed from the building. The openings or holes 16 which have been cut into the roof are, of course, filled in and covered over and any other operations necessary to permanently secure the roof in place are performed.

With the present construction, it will be appreciated that a roof may be expeditiously and economically raised and utilized as a new roof when it is desired to build one or more floors or stories onto a building. The only mutilation to the roof is the formation of the column receiving openings 16 and these may be filled in and repaired at relatively small expense. Furthermore, the mechanism necessary to accomplish the roof raising operation is quite simple and easily applied to the building. It will be observed that it is not necessary to use any special type of jack or temporary column other than that the column be provided with sets of holes or openings which will align with the bolt holes in the brackets. It will be further observed that the upper bracket of each set is substantially identical to the construction of the lower bracket whereby the brackets may be made in quantity production at comparatively small cost.

In Figures 2 and 4, there is disclosed a plate

45 which is inserted between the shelf 25 of the upper bracket and the roof supporting beam 19. It will be apparent that this may be discarded, if desired, and that the shelf itself may have its upper face inclined sufficiently to take care of the pitch in the roof. Furthermore, it will be observed that a block 46 is placed on the shelf 24 of the lower bracket to support the jack 26. However, any other block or plate may be utilized or if desired, the jack may rest directly on the shelf. It is also to be understood that the invention is not limited to the details of construction shown in the drawings and that the samples of the use of the device which have been given do not include all of the uses of which it is capable, and that the phraseology employed in the specification is for the purposes of description and not of limitation.

I claim:

1. Roof raising apparatus comprising an upright column having vertically spaced bolt holes, a pair of substantially identical brackets supported in superposed relation on the same side of the column and movable step-by-step up the column during the roof raising operation, one of said brackets being adapted to support a lifting jack and the other bracket being adapted to support the roof and to be moved upwardly on the column by the jack with the roof, each bracket having a relatively flat column-engaging base and a supporting shelf projecting laterally from the base on the same side of the column as the shelf of the other bracket, the base of each bracket projecting beyond the sides of the column and having two sets of bolt holes, one set located within the confines of the column and registering with the bolt holes in the column, and the other set located exteriorly of the column, and sets of bolts associated with the bolt holes of said brackets and column whereby the brackets may be secured in either stationary or slidable engagement on the column.

2. Roof raising apparatus comprising an upright column, a pair of substantially identical brackets supported in superposed relation on the same side of said column and movable step-by-step up the column during the roof raising operation, one of said brackets being adapted to support a lifting jack and the other bracket being adapted to support the roof and to be moved upwardly on the column by the jack with the roof, each bracket having a relatively flat column-engaging base and a supporting shelf projecting laterally from the base on the same side of the column as the shelf of the other bracket, the base of each bracket projecting beyond the sides of the column, means located within the confines of the column and supporting each bracket on the column in fixed relation thereto, and means located exteriorly of the sides of the column for slidably supporting the brackets on the column.

JOHN A. STALFORTH.