

2nd. The adoption ~~and use of arch braces in~~ of cast iron steps to receive and counteract the thrust of the main braces

3d. A method of enlarging the abutment and pier posts, as also all the posts directly above the bolster frames, and all of the main braces connected therewith, for the purpose of giving more spacious and efficient bearings to receive the increased action to which these parts are liable in sustaining the weight of the bridge and its load.

4th. A more simple and economical manner of constructing bridges of short spans. And,

5th. A method of constructing draw bridges, applicable in connection with my plans of bridge building heretofore patented, or in connection with other plans of bridge building adopted by others; all of which improvements, especially in their application to bridges built under my former patents, are believed to be new and original; &c &c .

Col Long gives very careful and full directions in regard to the selection of the timber its proper dimensions for spans of various lengths ; its ~~direction~~ and manner of adjustment; he keyed up the truss so that the loading produced greater strains than when the bridge was unloaded; he also advocated making the spans , if there were more than one , continuous; claiming that this results in an increased efficiency of the structure amounting to double of what it would afford without ~~principle he added is operative~~ it is admitted that this

But he adds in a foot note " it is admitted that this principle is rendered operative in the lattice bridges invented by Mr. Town, but it should be borne in mind, that his bridge frames are not truss frames, in as much as they are completely destitute of keys, wedges or trussing of any kind, and are trenailed, rather than truss frames."

Long asked a royalty of one dollar per foot of bridge for his patents

Long's pamphlet was loaned me by Col. Julius W. Adams; vol. of miscel. reports no 12