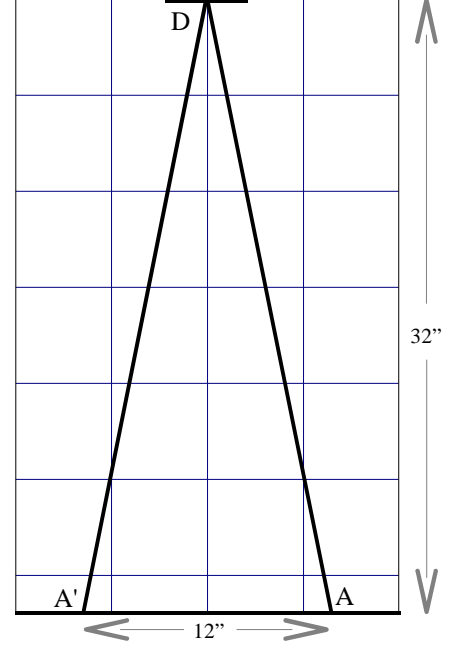
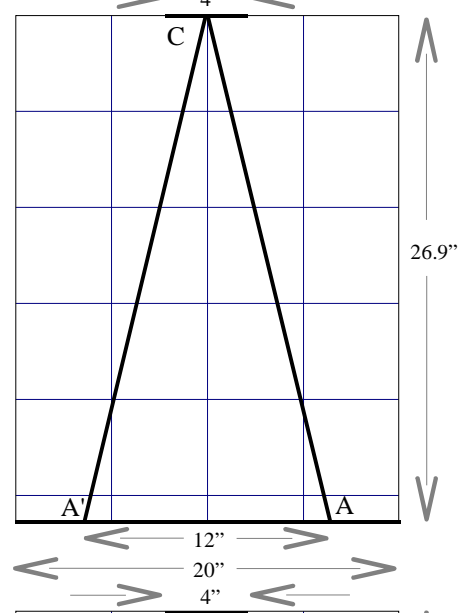
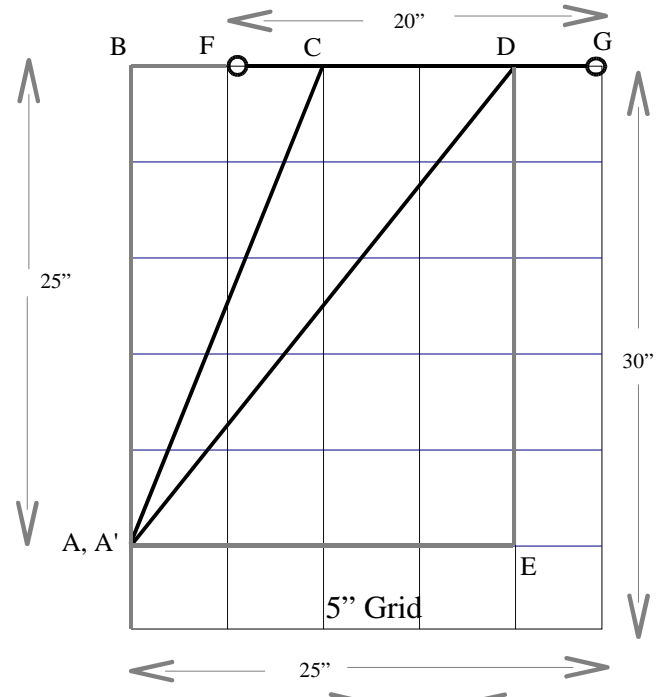
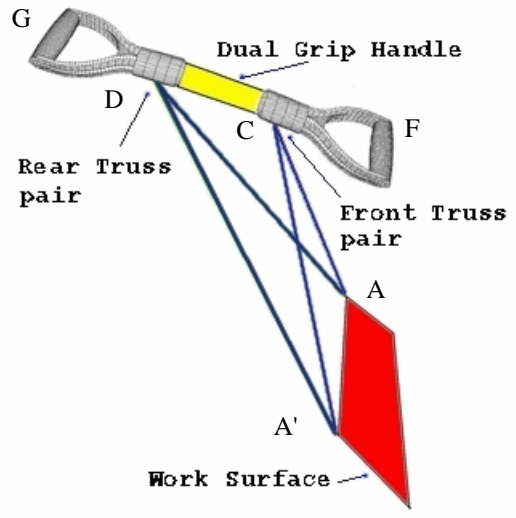


Dual-Grip Angled Handled Shovel
United States Patent 8,491,024

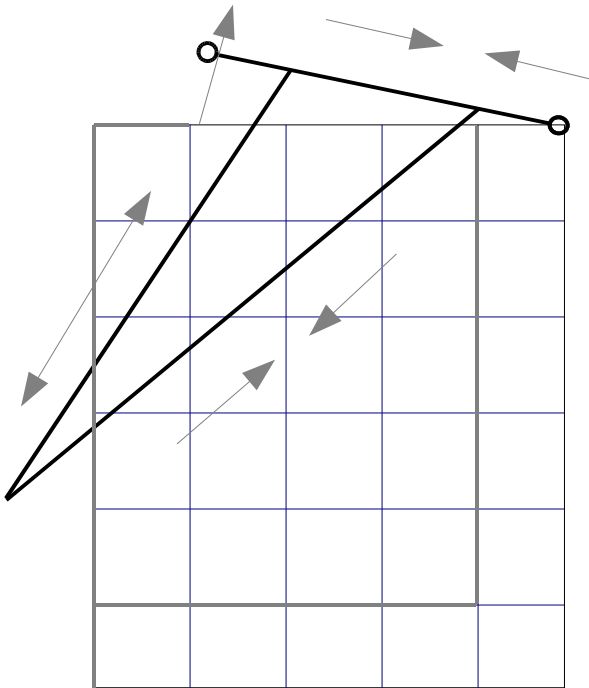


- $\triangle ABC :=$
 $AB=25''$, $BC=10''$, $CA=26.9''$, $BCA=68.2^\circ$, $BAC=21.8^\circ$
- $\triangle ADE :=$
 $AD=32''$, $DE=25''$, $EA=20''$, $ADE=38.6^\circ$, $DAE=51.4^\circ$
- $\triangle ACD :=$
 $AC=26.9''$, $CD=10''$, $DA=32''$,
 $ACD=111.8^\circ$, $CDA=51.4^\circ$, $DAC=16.8^\circ$
- $\triangle AA'C :=$
 $AA'=12''$, $AC=A'C=25.2''$,
 $A'AC=AA'C=77.4^\circ$, $ACA'=21.8^\circ$
- $\triangle AA'D :=$
 $AA'=12''$, $AD=A'D=32.6''$,
 $AA'D=A'AD=79.4^\circ$, $ADA'=21.2^\circ$

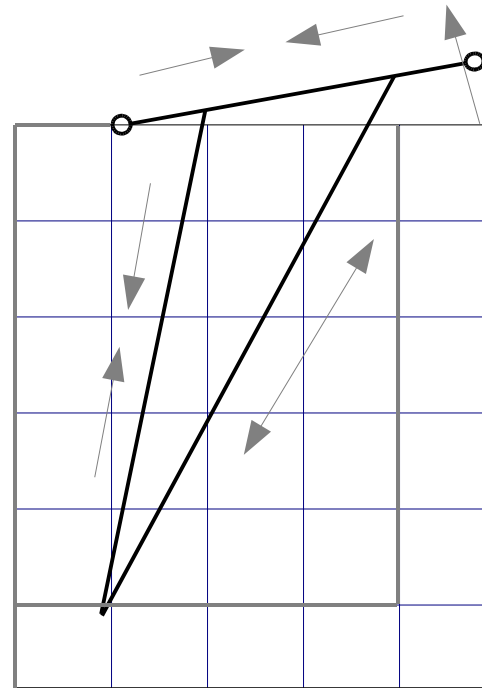
Dual-Grip Angled Handled Shovel
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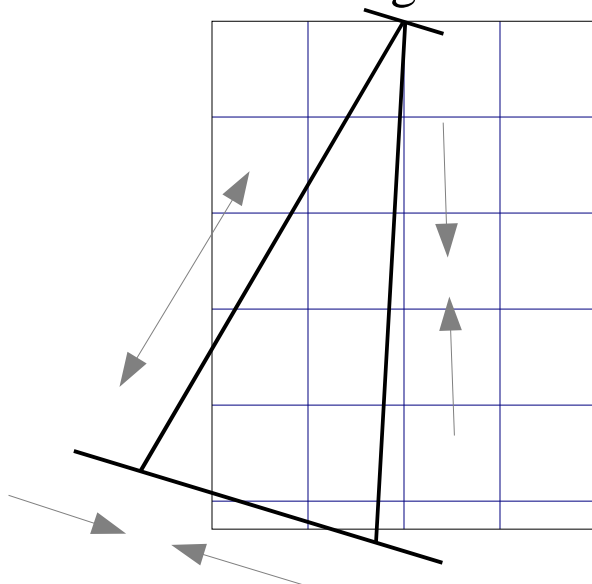
Alternating leverage between the dual grips leverages alternating compression and tensile forces through the trusses onto the work surfac. The alternating forces occur at such high frequency as to have the effect of distributing the work load evenly between both grips simultaneously



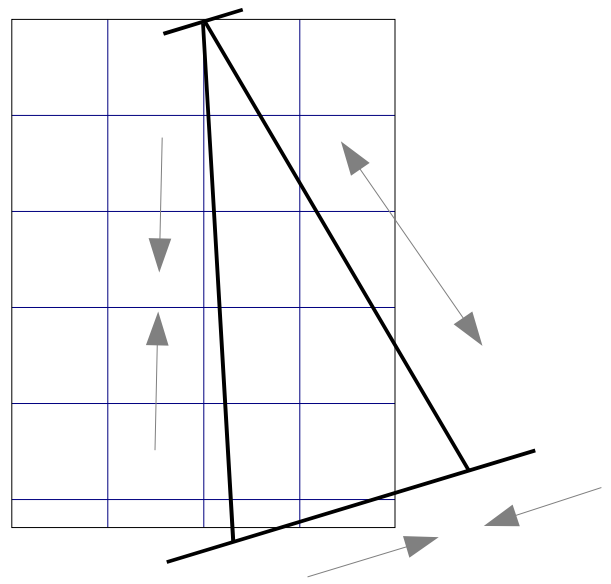
5" Grid



A martial Arts fist grip firmly controls the center of balance for lateral leverage of the alternating tensile and compression forces distributing the work load



5" Grid



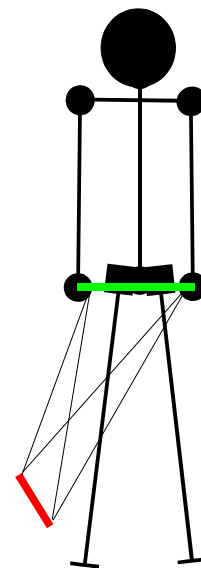
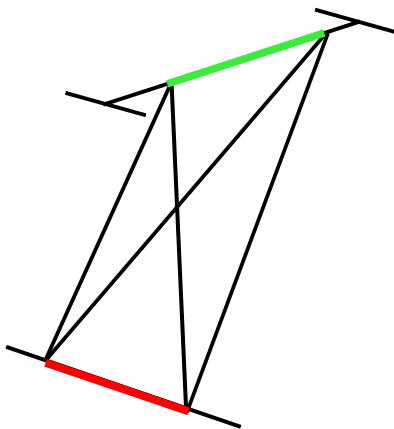


An application of tetrahedron geometry defining a pair of non-intersecting, orthogonal vectors, connected at the ends by four additional force distribution truss vectors. The four force distribution trusses may be actual trusses, or virtual within a solid molded form.

1:) The level applied work force line between the grips of the hands of an average person standing upright at rest (approximately 30" from ground).

2:) The corresponding level work load line, orthogonal to the first line and approximately 6" out from and above the outside of an average person's stable work stance.

3:) The four connecting trusses that distribute the work load up to the grips and the work force down to the work edge.

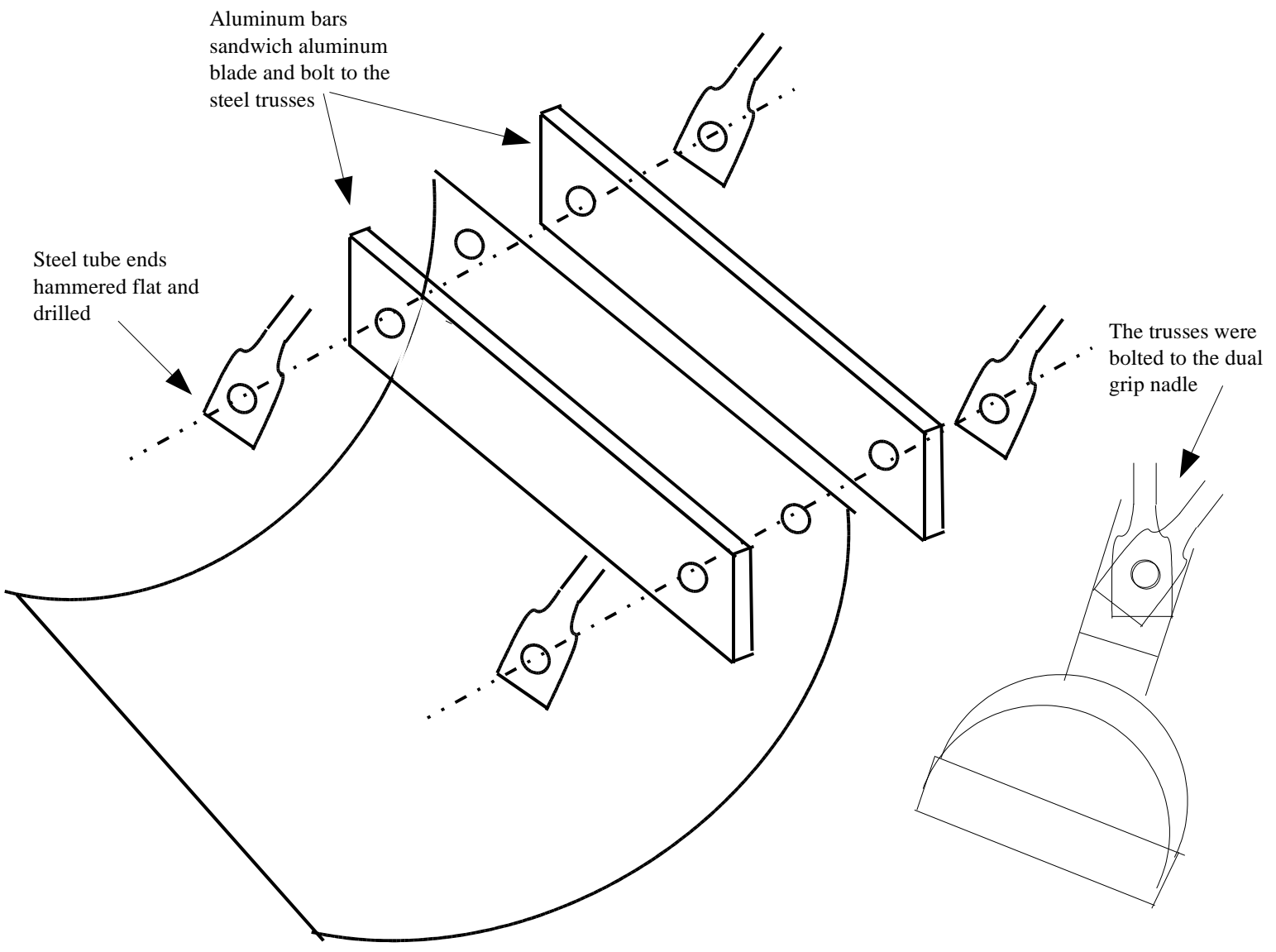
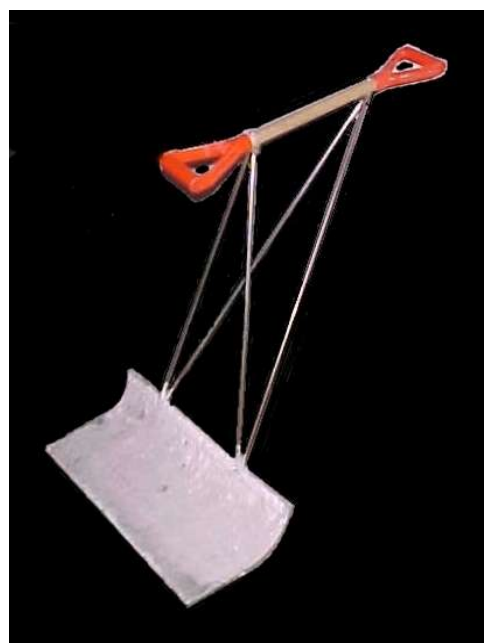


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The Prototype was constructed of common 'off the shelf' materials:

- common D plastic grips
- standard wooden 1 1/16" shaft handle
- steel tubing 3/8" for trusses
- aluminum bar 1/8" X 1"
- aluminum snow shovel blade
- nuts bolts and screws 3/8"



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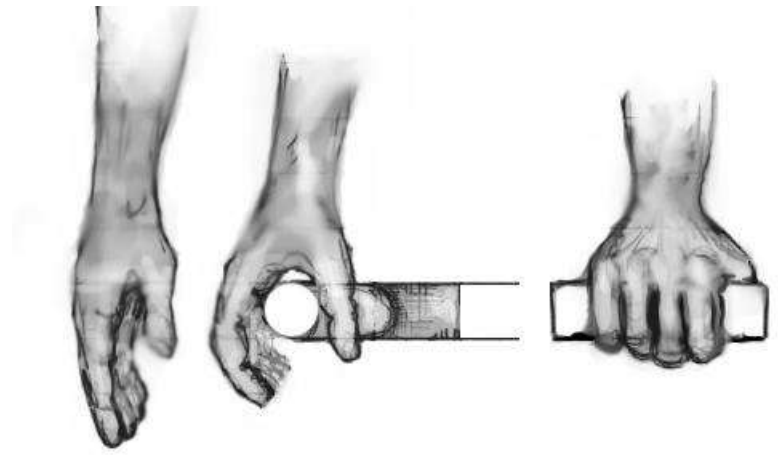


The prototype materials were chosen for their light weight, low work load/stress bearing properties to illustrate the effectiveness of the truss structure to divided and distribute heavy work loads throughout light load bearing components.

This initially underbuilt prototype lasted 3 seasons of rigorous use before the trusses broke, from metal fatigue, at the connecting points, indicating the location of concentrated work load forces needing enhanced structural support in an eventual product design.



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The design of the Dual Grips is derived from the natural placement of the hands of the average person standing at rest. From this position a person needs only flex their fists to be able to apply work force down to the work surface. The grip remains constant with no need to change for differing work tasks.

The upright stance and the natural martial arts straight fist provides the most stable strain free position from which to apply repetitive force (like shoveling now) without fatigue.