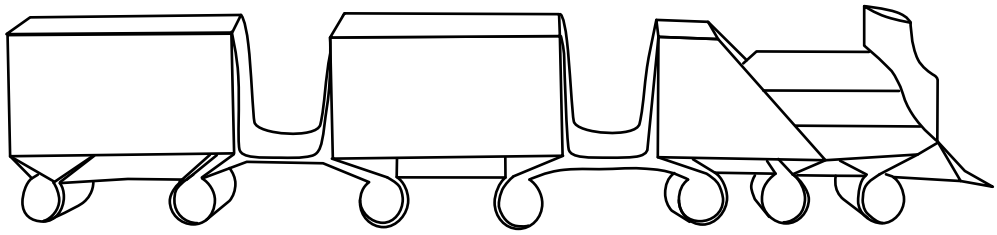
Mooser's Train

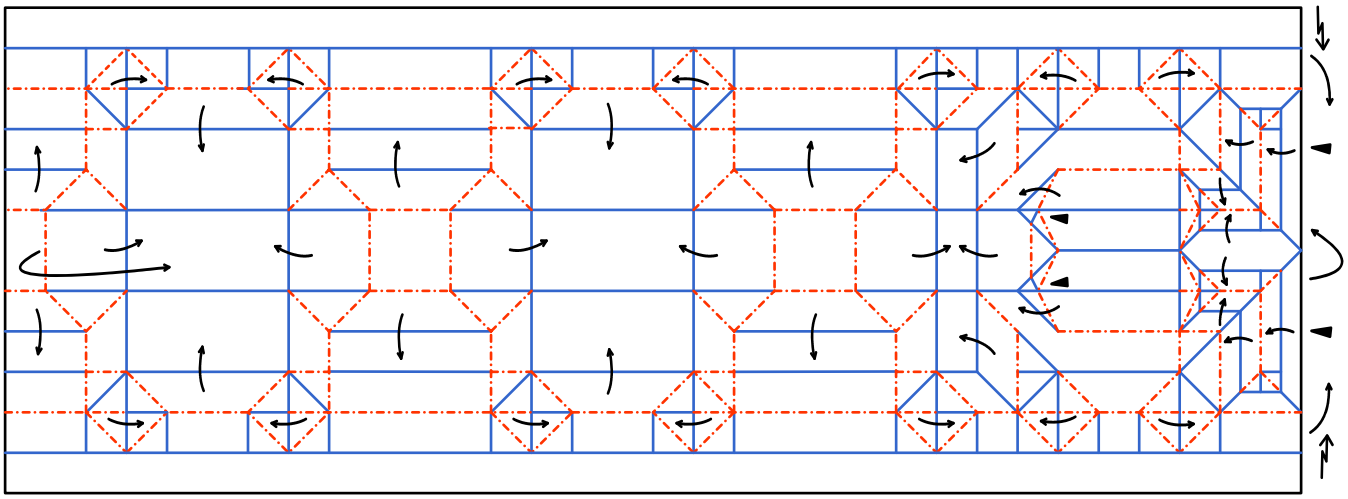
Complex

Diagrams V1.2 ©2013 - JC Nolan

Time to Fold: ~ 2 hours
Difficulty: Complex (low complex)
Reduction Ratio: .6
Paper: Trimmed 2x1 rectangle (varies)



Mooser's Train has inspired and challenged folders for nearly five decades. For the first five years after its creation the only existing documentation was a hand-written crease map with no instructions whatsoever. Later, in 1967, hand-written notes were added by Raymond McLain but it was still left up to the reader to decipher a folding sequence on their own. It was not until 25 years later that the notes became widely available and far more readable when Dr. Robert Lang reproduced clarified versions in his book "Origami Design Secrets" in its excellent chapter on box pleating. It was not until late 2012 when my friend Hank Simon generously arranged to have diagrams produced and made available for everyone. I hope these pages make the model fun and approachable for folders of all ages. - *JC Nolan,*



Abbreviated diagrams from "Mooser's Train: The Origami Train Set"
www.tinyurl.com/gamitrainbook. Full version includes variations, photo-step folds other extended techniques. Copies of these diagrams, crease maps and other resources at www.tinyurl.com/gamitrain

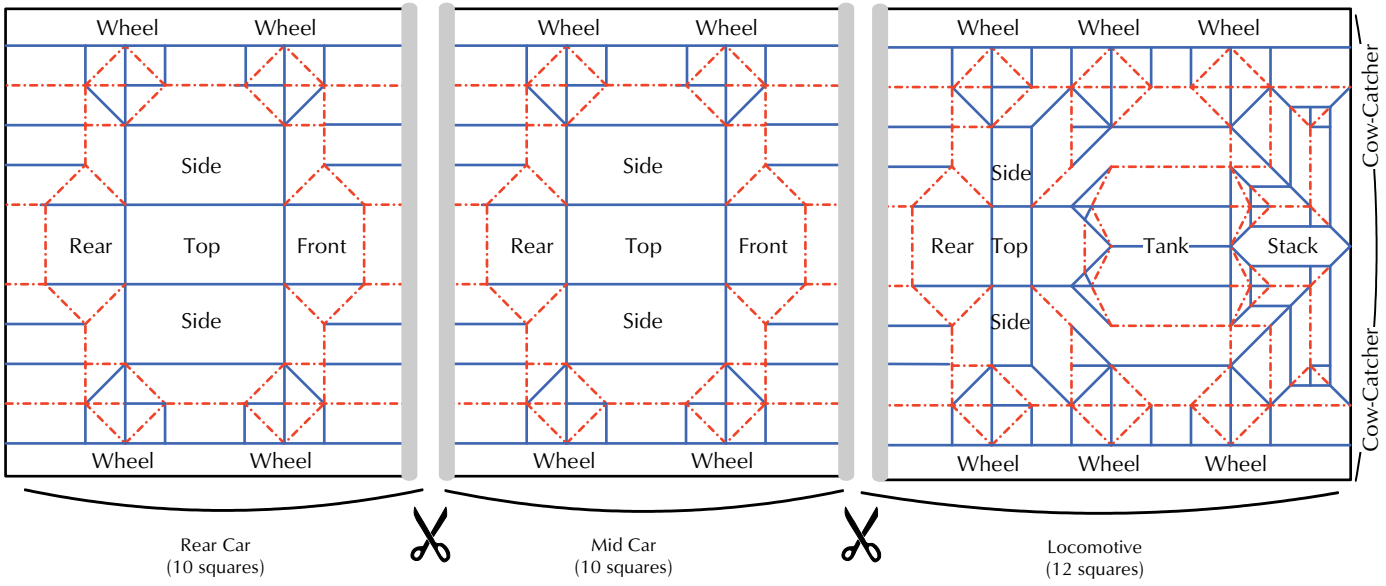
Credits

Original Design: Dr. Emmanuel Mooser (c. 1962)
Original Diagrams: Raymond K. McLain (1967)
Rear Locking Sequence: Andrew Hudson (c. 2006)
Coal Car Variation: Greg Bubniak (c. 2004)
Extended Cab Variation: Mike Jittlov (c. 2005)
Caboose / Fuel Car Variations: JC Nolan (2013)
Diagrams: JC Nolan (2012-2013)

Table of Contents

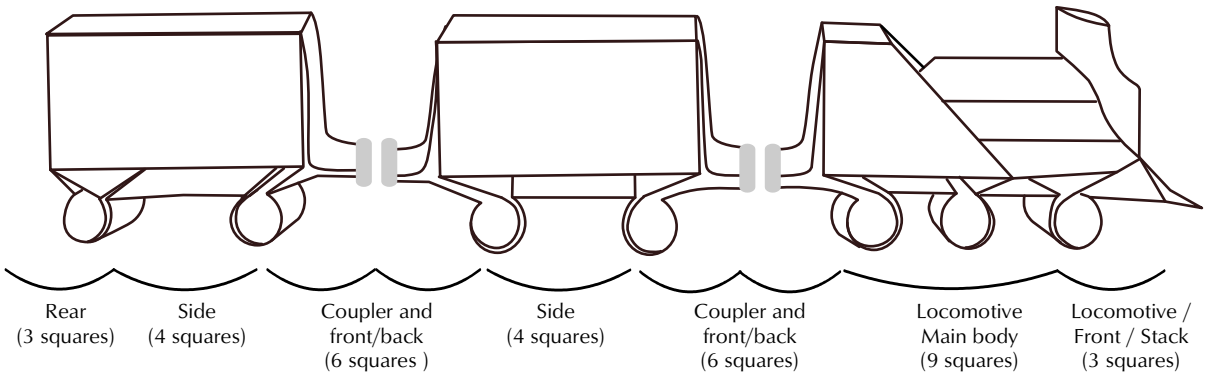
So how does one approach this model? McLain's instructions gave general clues on how to approach the work but for purposes of simplicity it is much easier to attack the work in separate portions. Rather than trying to execute the entire model all in one large collapse, it is much easier to break the work up into its separate components and become familiar with the individual folding sequences first - then the entire work can be attempted on a single sheet of paper. This is the approach that has traditionally been used by people sharing the work with each other and the one that we take here.

In the original 12x32 crease map each portion and the various parts of each care are easily identified: 10 squares for each of the boxcars and associated couplers and 12 for the locomotive. Note that this means that the locomotive is folded from a proper 12x12 square where the boxcars are folded from slightly smaller 10x12 rectangles. The map can be further broken down into the various portions which make up the cars: sides, couplers, front/rear, etc.

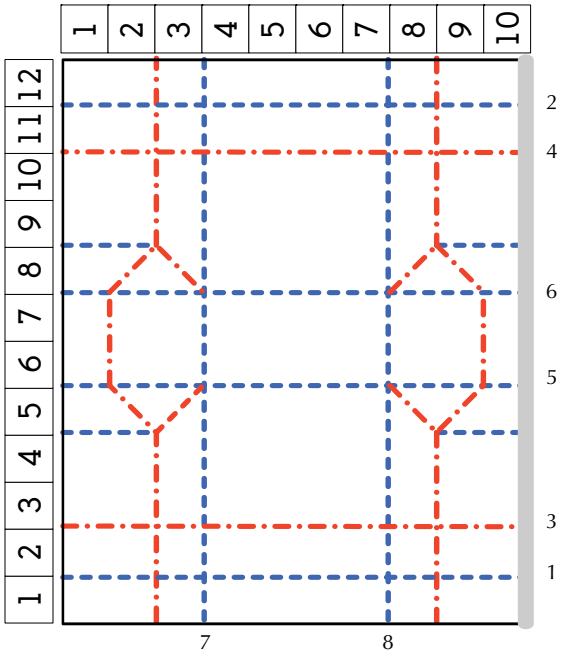


Rather than going through the process of creating a 32x12 pattern and lying in the associated crease patterns here we've provided colorized templates which the folder is encouraged to duplicate or download, cut out and then fold directly. Additionally, we break down each map into several independent sequences which can be folded separately and then added together. This allows the folder to get familiar with the sequences and get a better understanding of the overall sequence before attempting the work on a single sheet.

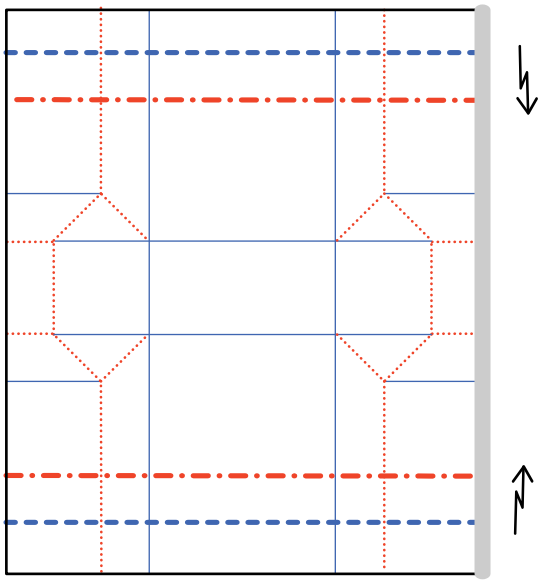
Later, when the folder works with "real" paper it is recommended that a crease map still be used but in this case transferred directly on back of the sheet using sewing paper and tracing tools which are designed to mark cloth which can be purchased inexpensively at any sewing store. It is important to note that the crease maps in these diagrams are all from the **bottom of the model** rather than the top. The diagrams and associated templates utilize color to indicate **valley (blue)** and **mountain folds (red)**. Depending on where we are in the sequence, for purposes of clarity the crease lines may or may not be shown as dashed to indicate only the most important folds in each step. This allows the folder to focus on the most important folds in each diagram for each step.



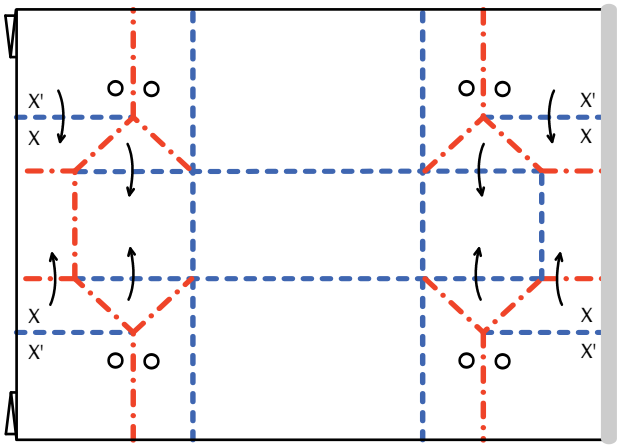
Boxcar / Caboose



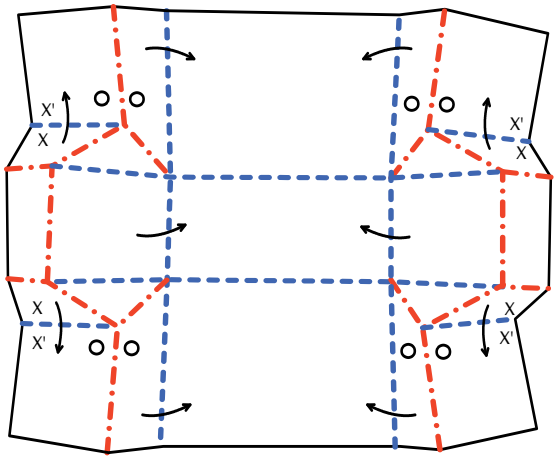
Add the creases, in the order shown: horizontals, then verticals and the diagonals last.



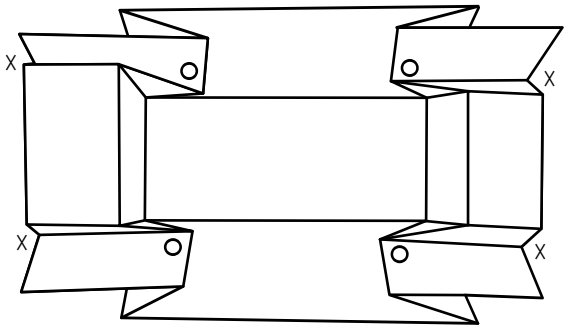
Crimp on the outer horizontal creases.



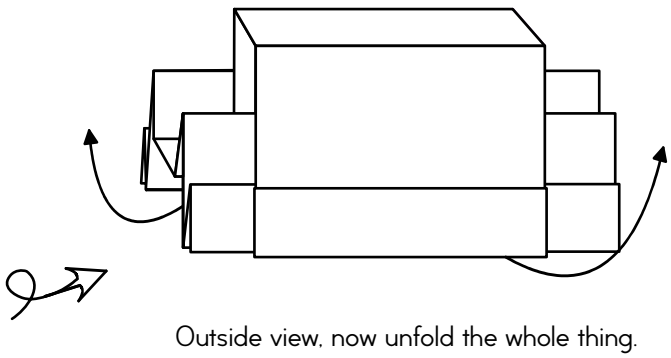
Start the collapse by pinching together at each pair of dots as each pair of Xs moves toward each other.



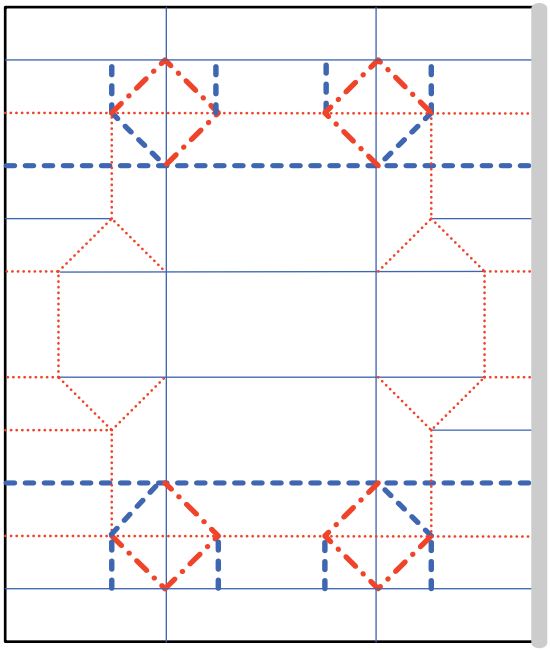
Mid-fold



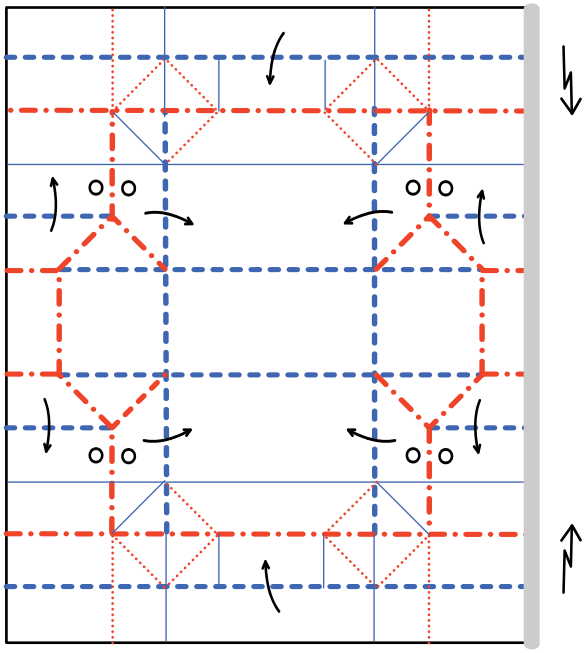
Like this, next view is from the outside.



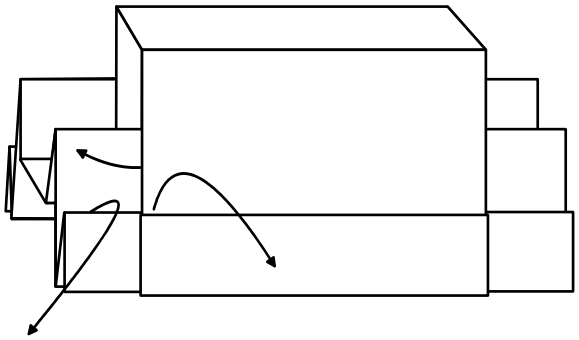
Outside view, now unfold the whole thing.



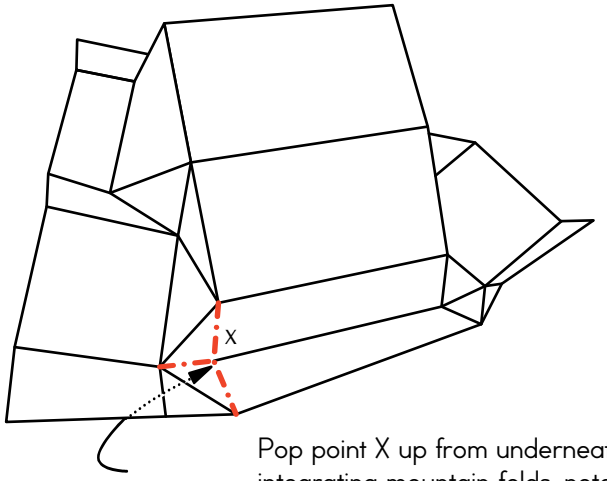
Add the remaining creases.



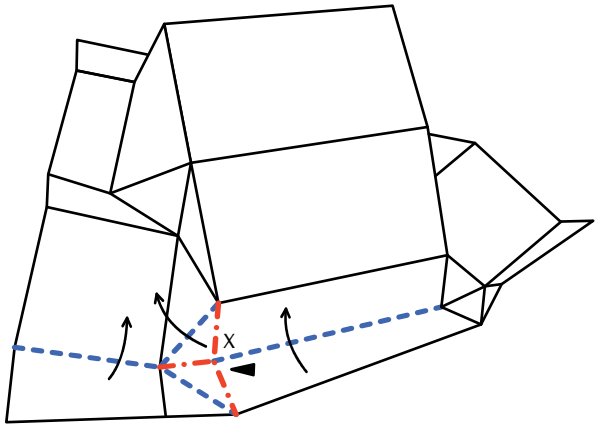
Collapse again on the same creases as before.
None of the new creases are added in yet.



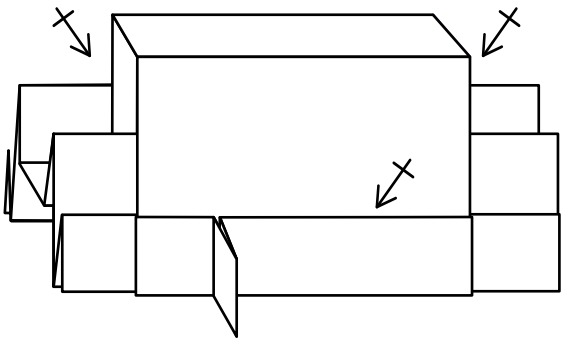
Partially unfold just one corner.



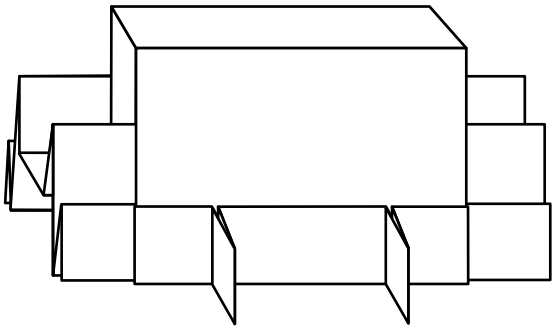
Pop point X up from underneath
integrating mountain folds, note
only critical creases are shown.



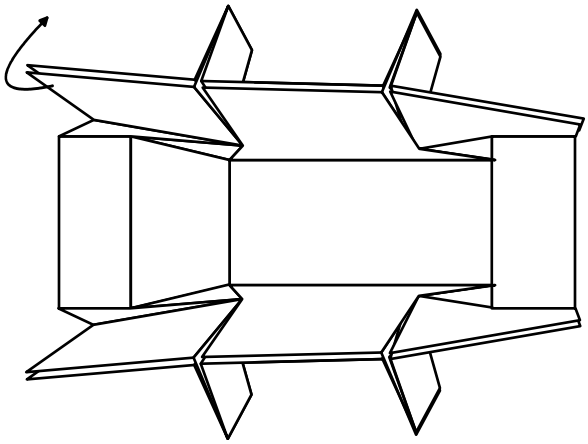
Fold back up on existing creases,
integrating the new ones.



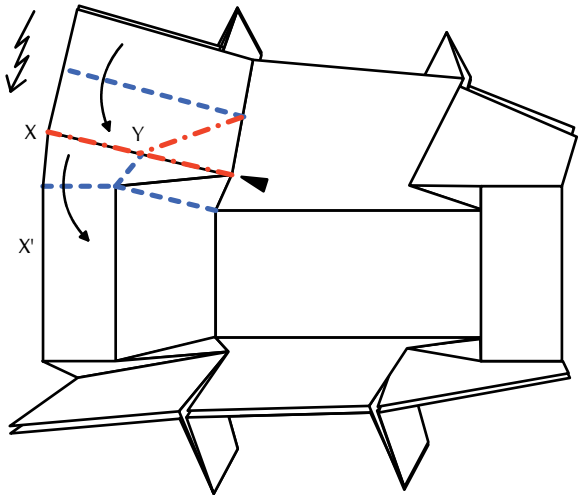
Repeat the sequence on
remaining three wheels.



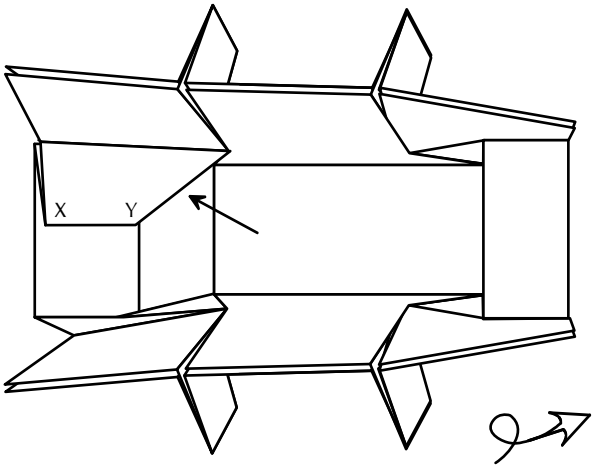
Like this, next view from the bottom.



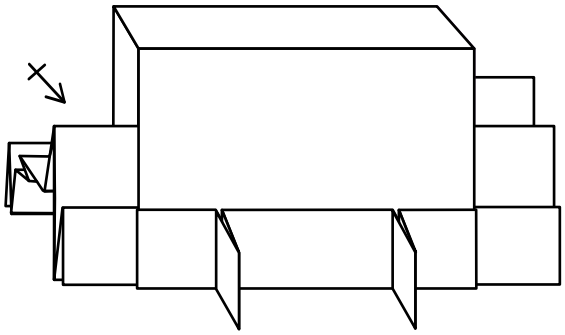
Open out, just a bit.



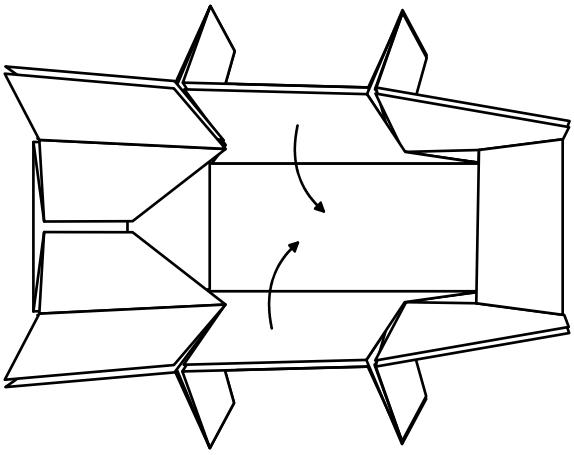
Turn the two points inside out and pleat back up on creases. This one will wrestle a bit but once achieved is pretty simple. Basically, we are just turning the line XY inside out to free up a trapped layer in the folds to allow them to be tucked inside in the following step.



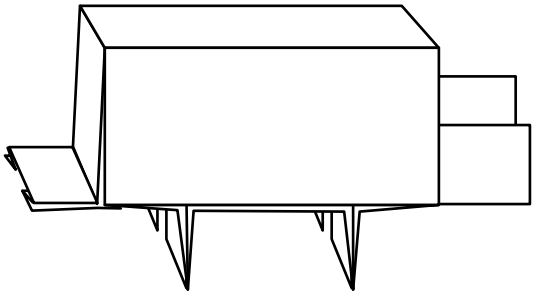
Repeat on other side. Note that triangular area indicated by arrow on the right may not lie totally flat, will likely be rounded. You may at your option lie in the triangular creases to flatten it out and tighten back of the caboose, but it will still not lie flat.



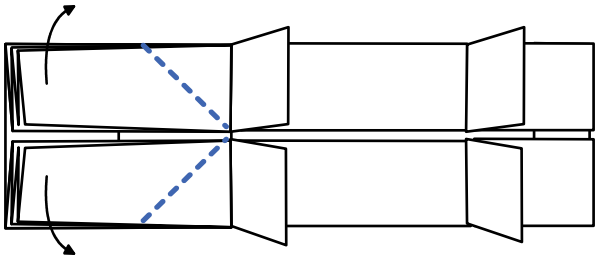
Repeat on other side



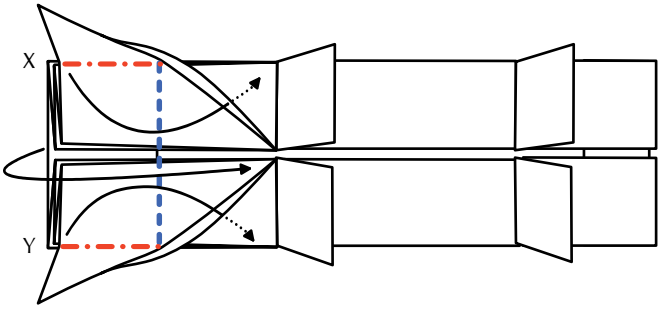
Close up the bottom.



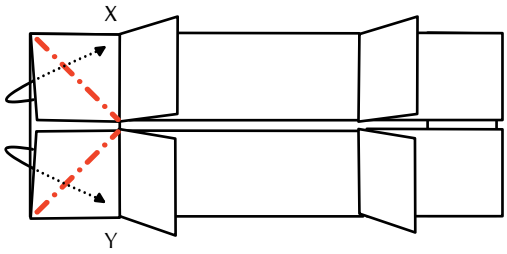
Like this, next view is from the bottom.



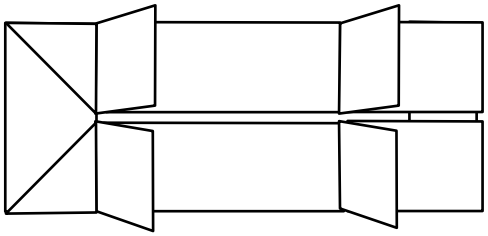
Gently open out the top layers only.



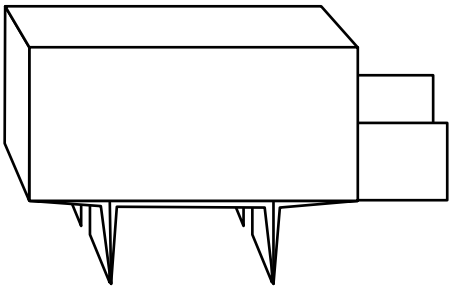
Tuck all layers at two points deep inside.



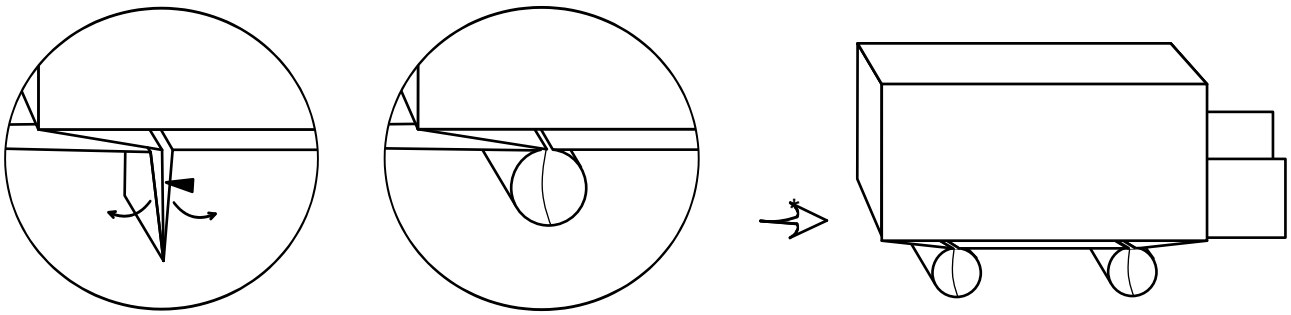
Complete the lock by tucking the two flaps under..



Like this, next view is from the side.

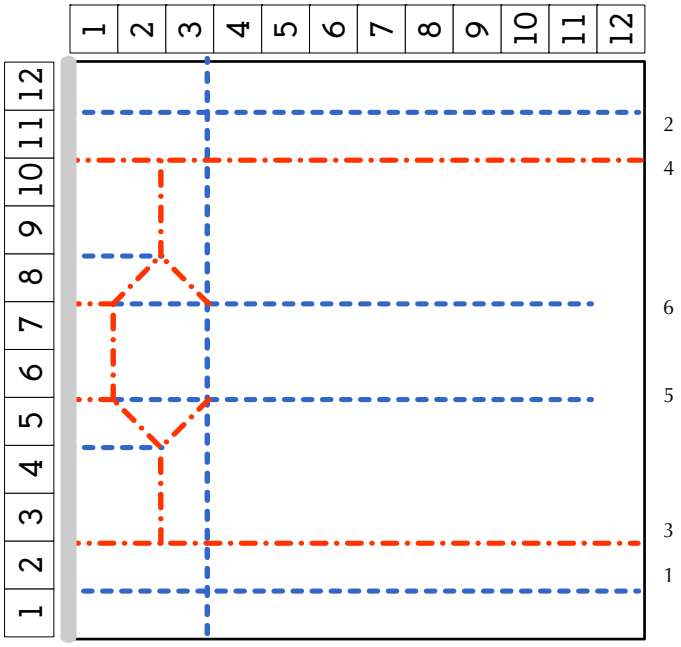


Like this, next we open out the wheels.

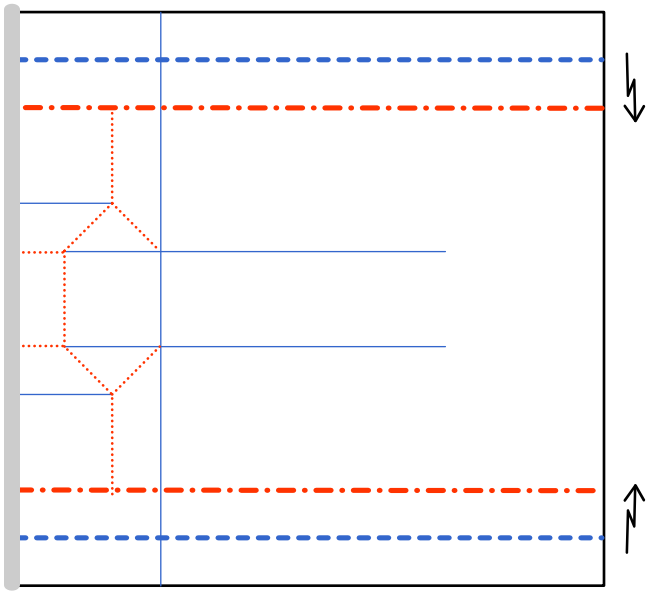


Close up of wheel stem as shown. Push the center layer inward as the outer edges spread to round out the shape of the wheel. Repeat on all four wheels.

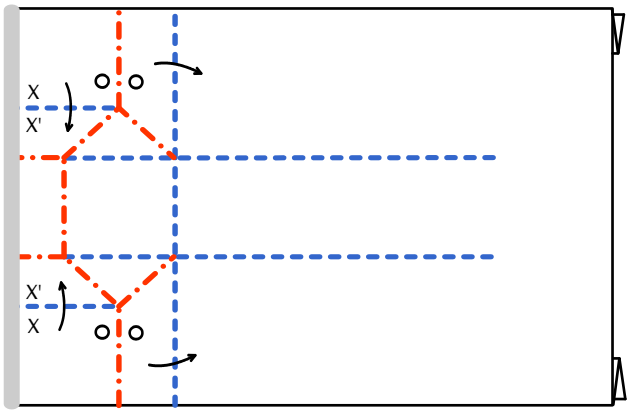
Locomotive



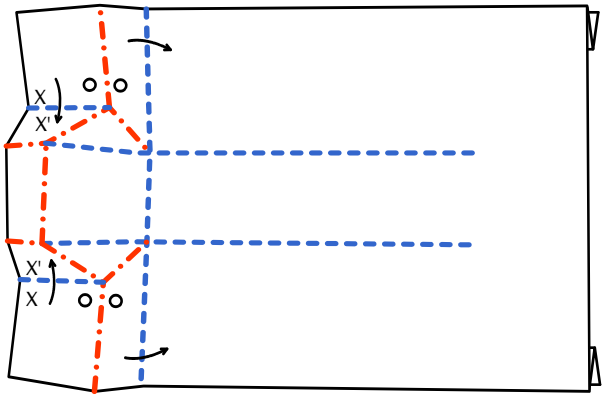
Add the creases, in the order shown. Note that the center two horizontals do not go all the way to the edge of the paper..



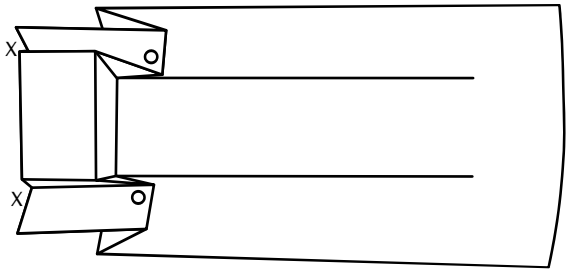
Crimp on the outer horizontal creases



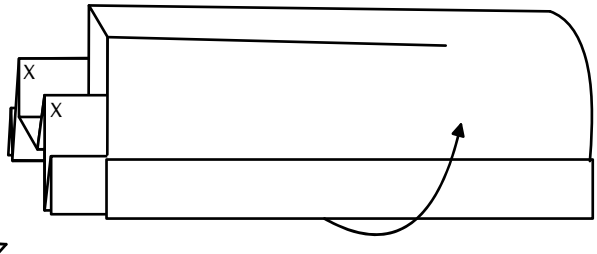
Same collapse as with the boxcar. Pinch together at each pair of dots as each pair of Xs moves toward each other.



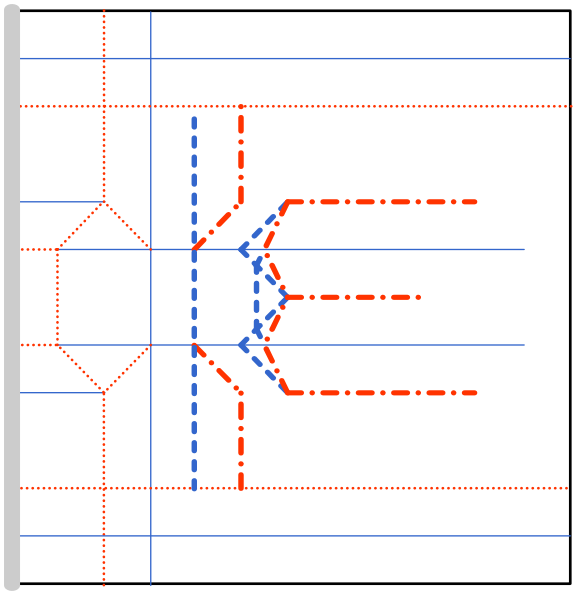
Mid-fold. Note that the horizontal creases only go part way to the right edge as that area will later be used for the cow catcher.



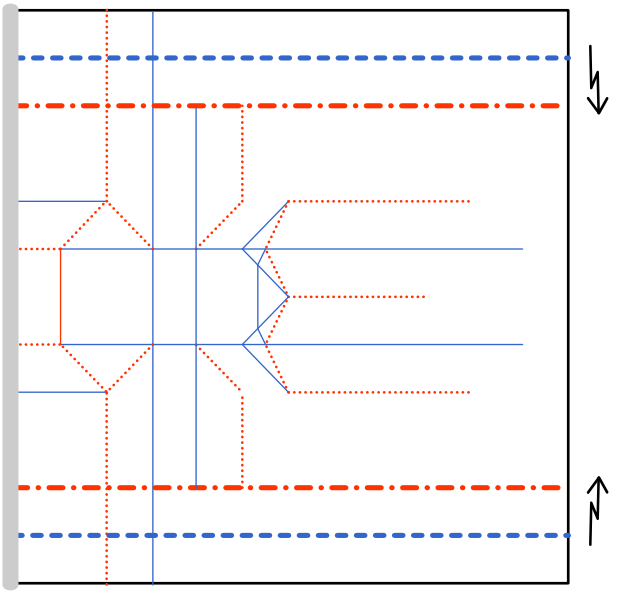
Like this, next view is from the outside.



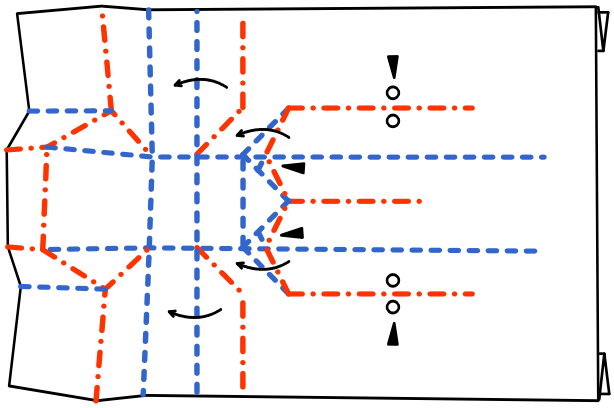
Outside view. Unfold entirely.



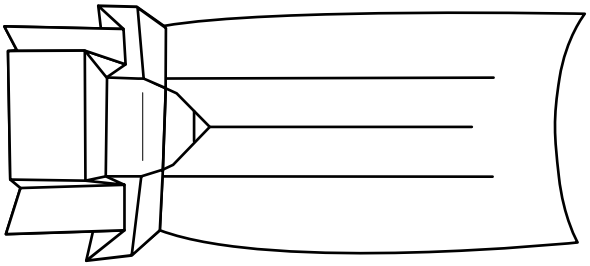
Add the next layer of creases.



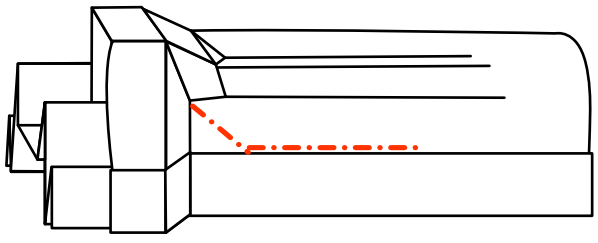
Fold the model back up on the existing creases starting with the outer pleats.



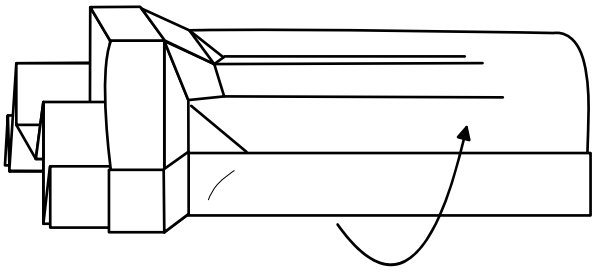
Keep going... integrating the new creases, pushing in at the arrows and pinching at the dots.



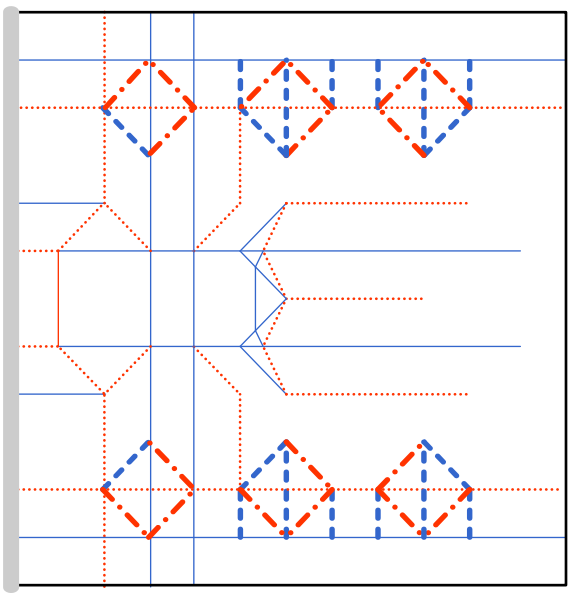
Mid-fold. Note again that the middle creases do not go all the way to the right edge. Next view from the outside.

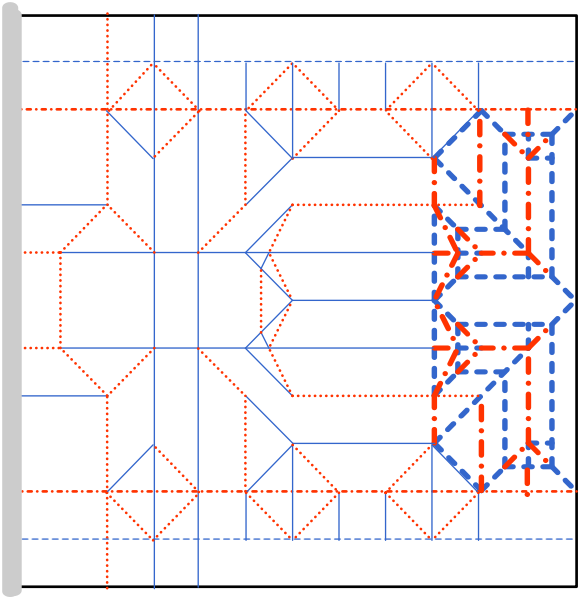


Outside view. Lie in the additional creases on each side of the model.

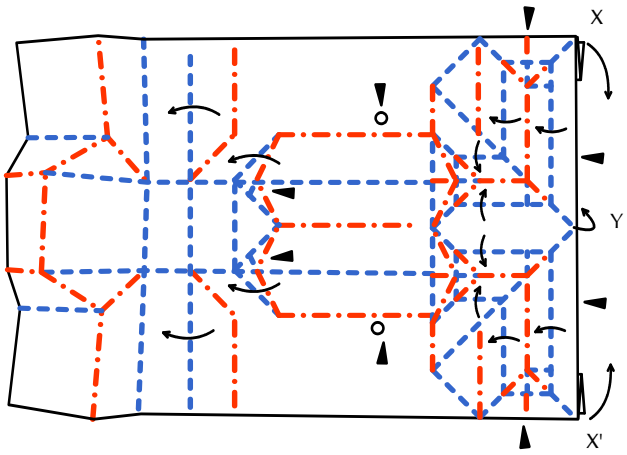


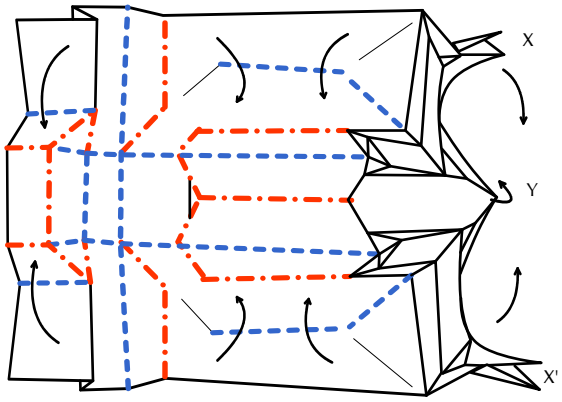
Like this, unfold completely one last time.



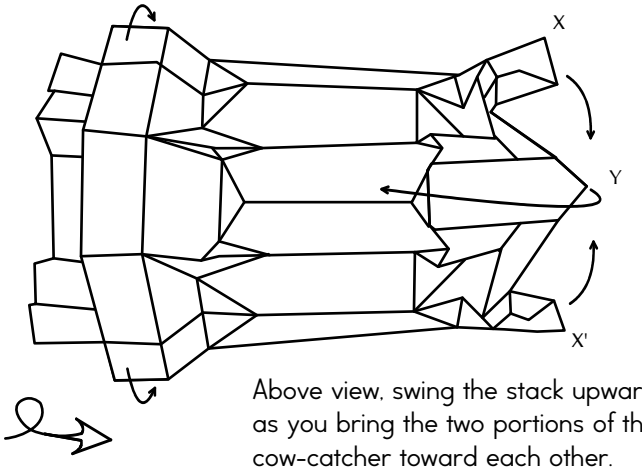


Next, lay in the creases for the wheels, then add in the last set for the cowcathcer and stack. Start the collapse by pleating up the sides starting to integrate the creases at the rear.

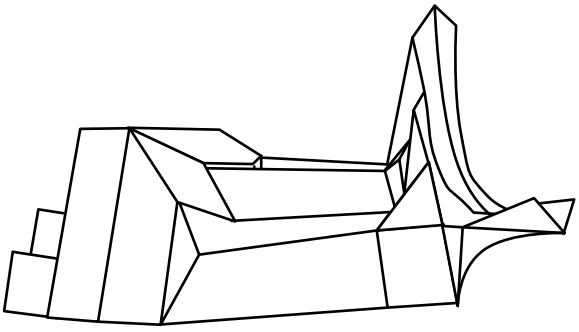




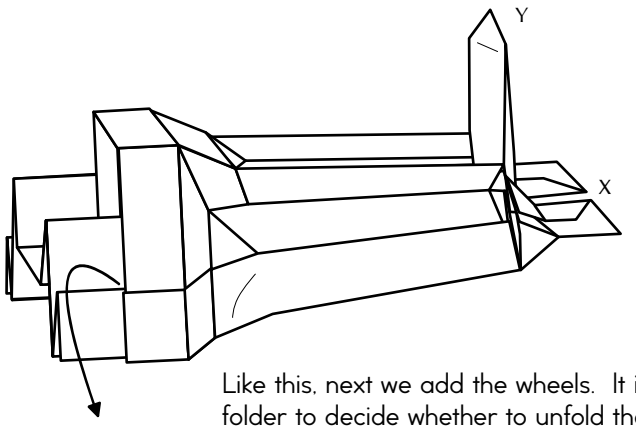
This is not nearly as hard as it looks. Start by pleating up the areas at the front which will become the cow-catcher. Then collapse by gently pushing inward where indicated, bringing points X toward toward each other while simultaneously integrating the folds from previous steps. Point Y is the smoke stack and it will naturally swing under as you go.



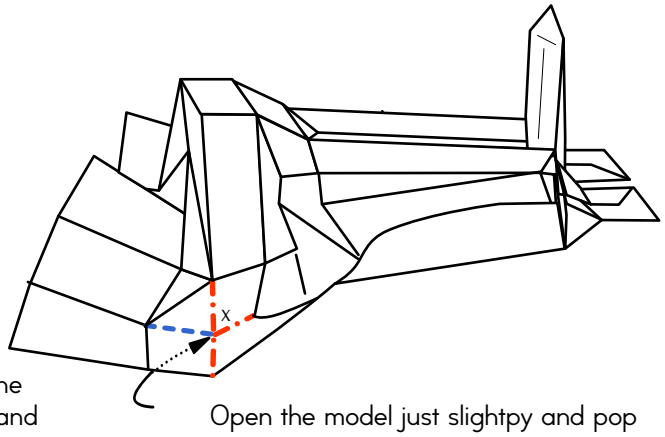
Above view, swing the stack upward as you bring the two portions of the cow-catcher toward each other.



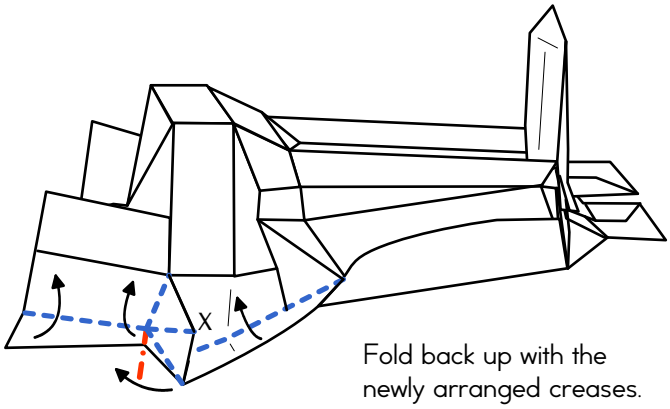
Mid-fold view from the side.



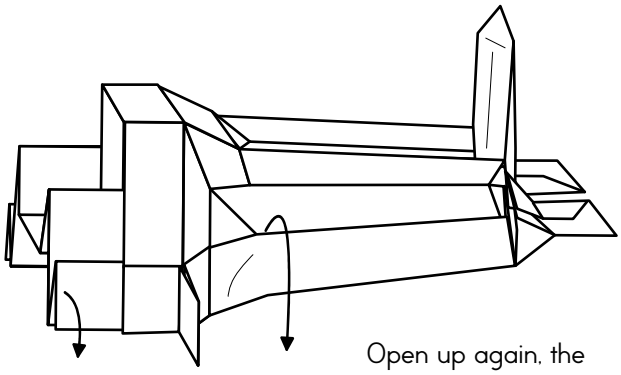
Like this, next we add the wheels. It is up to the folder to decide whether to unfold the model and integrate the wheel creases or add them inline.



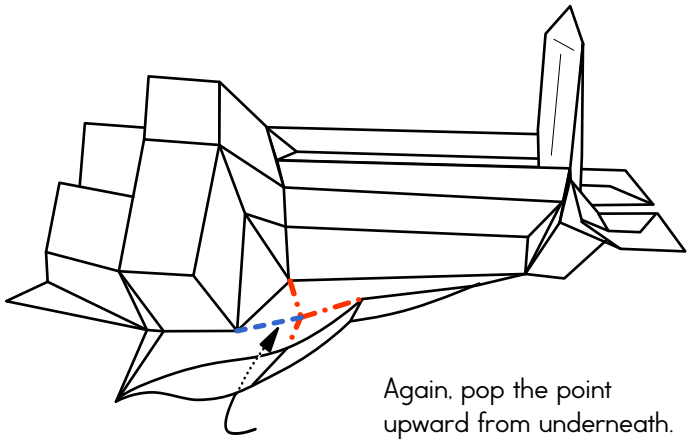
Open the model just slightpy and pop the point X upward from underneath.



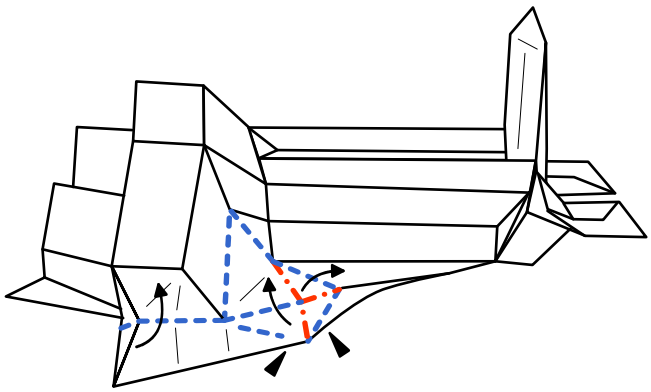
Fold back up with the newly arranged creases.



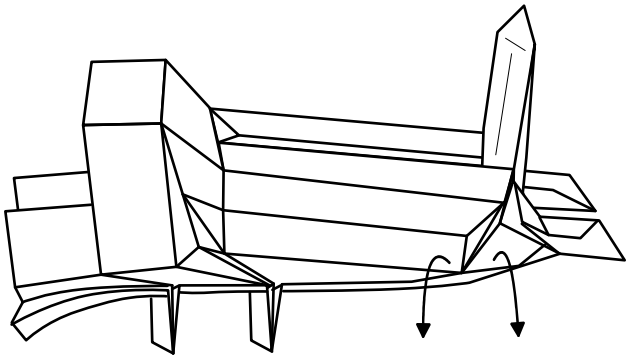
Open up again, the rear flap swings flat.



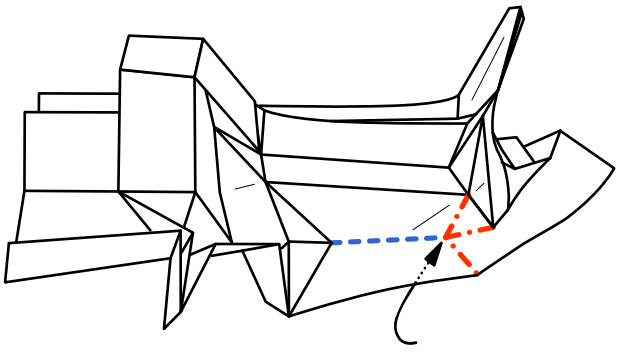
Again, pop the point upward from underneath.



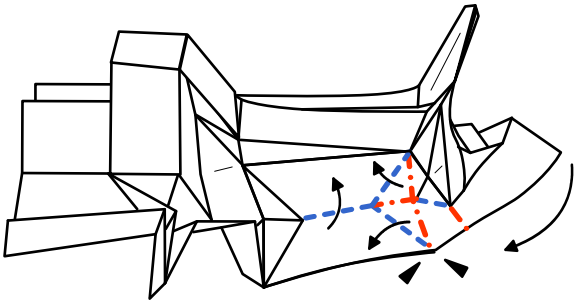
Fold back up on the creases pinching where indicated to create the wheel stem.



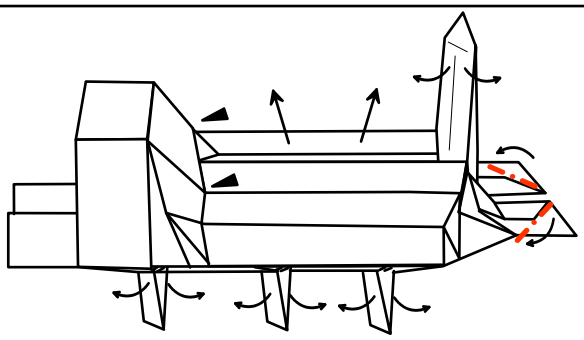
Open again, one last time.



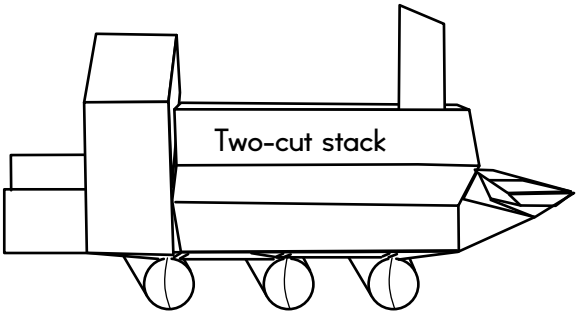
Pop the last point in to place...

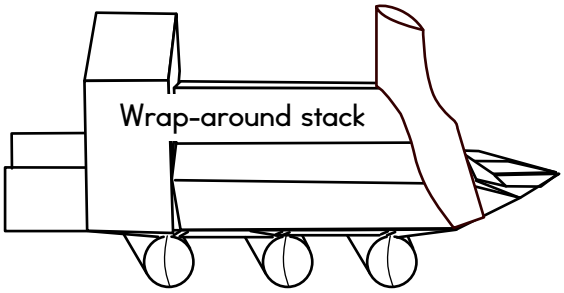


...and swing in to place, pinching where indicated.

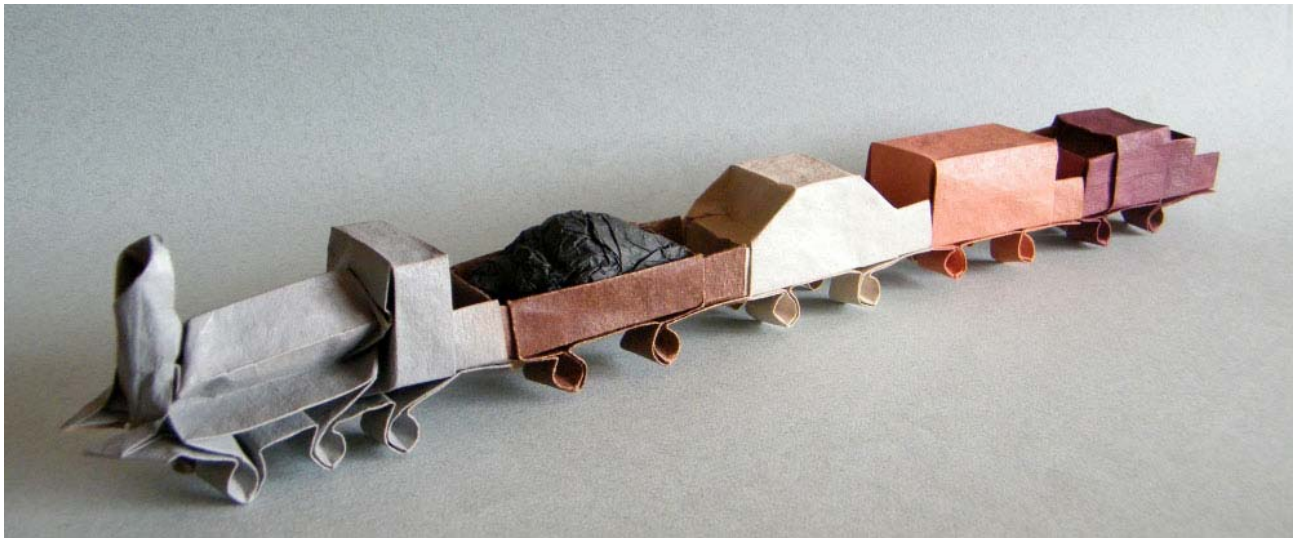


Finalize by popping up the center of the tank, flatting out the cab portion (on the left) and opening the wheels.





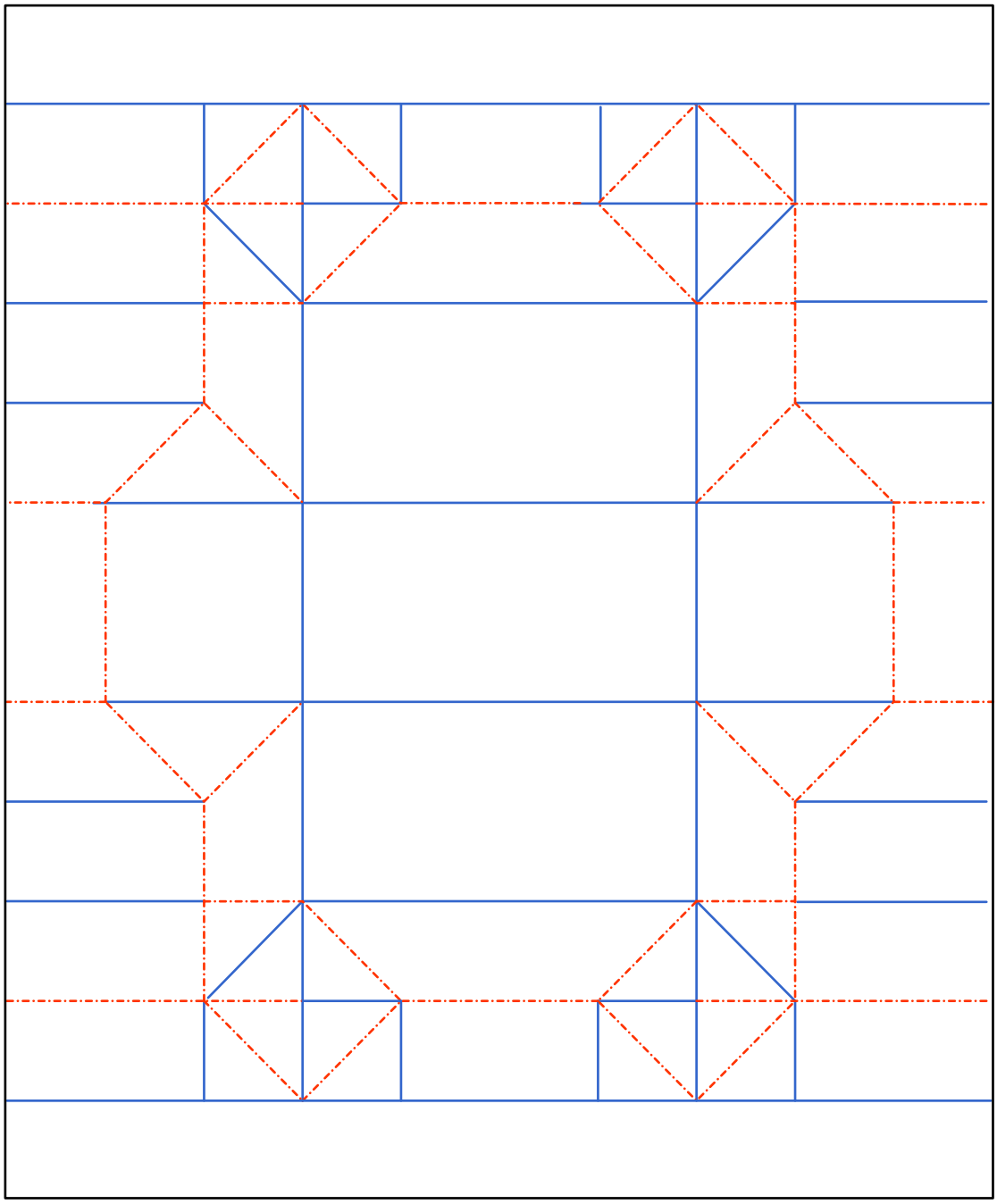
There are two ways to complete the stack. McLain's original instructions called for making a small cut in the front of the tank and another in the top and tucking the stack through while Jitlov's version used a wrap- around approach, both are illustrated in the final photos. As for final finishing and securing the stack/body, it is up to the folder whether tape, tissue foil, wet-folding or some other mechanism is used to retain the final shape.



Diagrams from "Mooser's Train: The Origami Train Set". Full paperback version including car variations, photo step-folds, bill-fold version and other advanced techniques available at www.tinyurl.com/gamitrainbook

Scalable templates, crease-maps and other resources at www.tinyurl.com/gamitrain

Mooser's Train - Boxcar / Caboose Map



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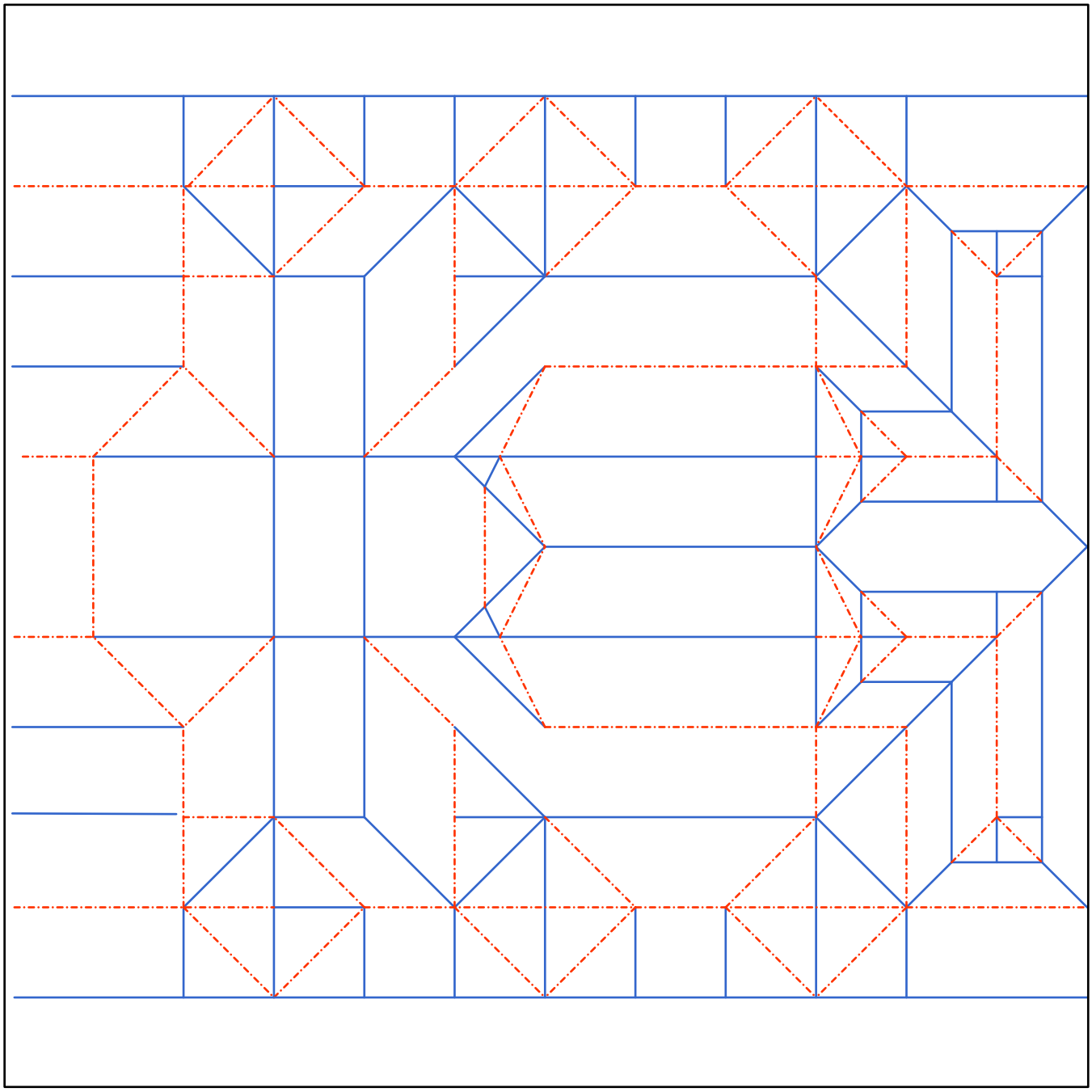
Mooser's Train - Locomotive Map



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