



HO Scale Kit **OIL PUMP** 933-3170

Thanks for purchasing this Cornerstone Series® kit. All parts are styrene, so use compatible paint and glue. Please read the instructions and study the drawings before starting. Please Note: This kit can be converted to a working model with the optional Universal Gearbox and Motor Drive Kit #933-1050, sold separately.

For millions of years, crude oil has seeped through the earth's surface. In ancient times, it was used in building construction, as a water-proofing material and as an adhesive. By the 1800s, natural oil seeps were attracting the attention of settlers in America. Some tried crude oil to lubricate machinery, or burned it as a cheap alternative to candles or whale oil for lighting. A few enterprising folks even bottled seep oil and sold it as a cure-all medicine! In 1850 an English inventor patented a fractional distillation process, creating "refined" oil (kerosene) that burned very well in lamps. This set in motion the first large-scale demand for petroleum products.

There was money to be made - if oil could be forced to the surface in quantity. One of the most promising natural seeps was along Oil Creek near Titusville, Pennsylvania. There, Edwin Drake began drilling America's first successful oil well in 1859, and on August 27, hit oil at a depth of 69' 6". The next day, oil had risen in the drilling pipe, but was not flowing out. A kitchen pump, like those used for water, was attached to the pipe and worked by hand. Drake had not only started a brand-new industry, he had discovered one of the basic problems of oil production; getting to the oil was hard work, but getting oil out of a well was not easy either.

When a new oil field begins operation, if the oil is thin enough and there is enough natural pressure, it may flow through rock fractures and into the well. This natural flow, known as "primary production" may continue for a matter of hours or many years. But as more oil is removed over time or additional wells begin production nearby, this pressure drops. And simply relying on natural pressure alone leaves a lot of oil in each well - if production ends when the pressure drops, as many as three barrels of oil may be left behind for every barrel produced. Because of these factors, oil companies install large pumps to get more oil and up to 95% of all US wells are so equipped.

Today's oil pumps are a far cry from the early methods. Hand and animal power gave way to portable steam engines and elaborate rod and cable systems by the 1880s. One engine could run several pumps, each feeding its oil into a pipeline that ran to a storage tank.

The next improvement combined steam power with a "walking beam" lever. This machinery was built around a large support called a "samson" or "sampson" pole. At its top, a pivot point called a "saddle" allowed the beam to move freely up and down. In operation, one end of the beam was connected to a pitman arm powered by a steam-driven wheel, the other to a pump jack.

Stationary gasoline powered engines appeared early in the 20th century and were soon working in the oil fields. They were especially welcome where coal had to be purchased and hauled in, or where clean water for boilers was scarce. By the mid 1920s, these

engines were combined with walking beams to create a more efficient and economical oil field pump. While the design has been improved over the years, the operation of today's walking beam or "horse head" pumps is much the same.

Although most of the machinery is above ground, the pump itself is attached to a long string of small diameter pipe and lowered to the bottom of the well, sometimes as much as 10,000 feet down! Power is supplied through a pump jack on the surface. This is run by an electric motor or diesel engine (natural gas powered engines are also used) which may be fitted with a timer to reduce operating costs and keep the unit from running when little or no oil is in the well. The motor/engine drives a reduction gear to lower the speed of rotating cranks on both sides. The cranks are connected to pitman arms attached to one end of the walking beam and this creates the steady up and down motion. Both ends of the walking beam are fitted with counterweights to maintain balance and overcome inertia. The larger of these, mounted opposite the crank arm, is shaped like the head of a horse and is called a "horse head." At the low end of the horse head, a small connector called a "bridle" holds a rod clamp attached to a string of solid pipe called a "sucker rod". This goes down to the pump through small diameter casing pipe. On the downstroke, the sucker rod forces a valve open, allowing oil to flow in above the pump. On the upstroke, the valve closes and oil in the pipe is lifted to the surface. Each well routes its oil into a gathering system of small diameter pipelines that feed into larger trunk lines. These move the oil directly to a refinery or to a reload center, such as a shipping port or rail yard. Pumping stations along the trunk line maintain pressure to keep the oil moving.

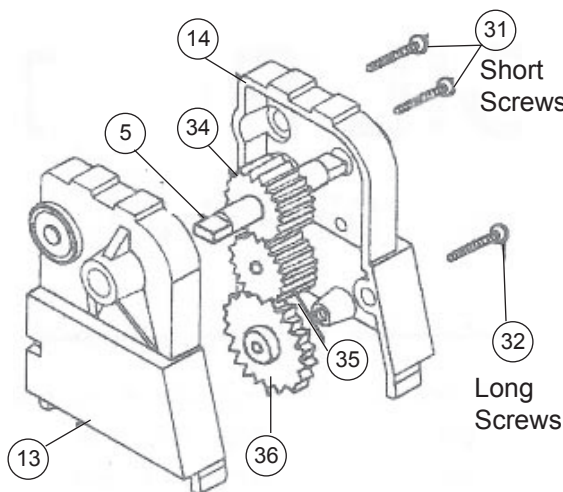
ON YOUR LAYOUT

Wherever oil is being produced or piped to a refinery, you'll find pumps like this on the job. They can be found in groups at producing oil fields, or by themselves serving trunk pipelines in rural and urban areas. Modern units are fenced-in for safety and usually painted dark colors.

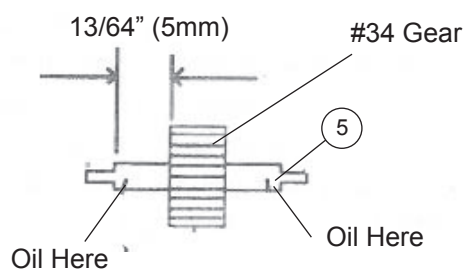
Your finished model can be converted to a working model at any time with the Universal Gearbox and Motor Drive Kit #933-1050, sold separately. This unit comes fully assembled, ready for drop-in mounting. It features a low-speed electric motor and a 320:1 gear box that simulates the steady up and down motion of the prototypes.

Its small size (and visible motion when built as a working model) make this a great stand-alone kit almost anywhere on your layout. It's a natural with the Wide (933-3167) or Tall Oil Storage Tank (933-3168). These easy-to-build models are complete with one-piece plastic tanks, spill containment berms, add-on vents, curved stairway and decals. Connecting pipes can be modeled with the Piping Kit #933-3105.

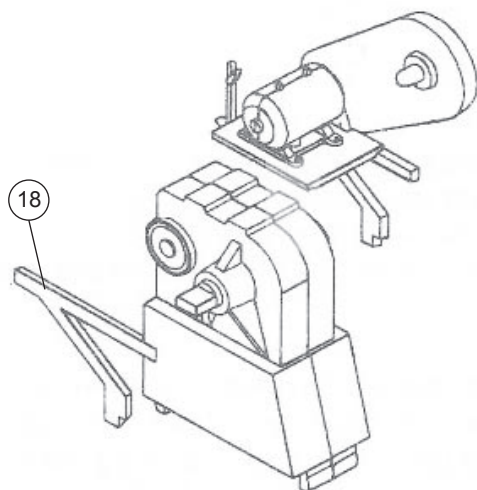
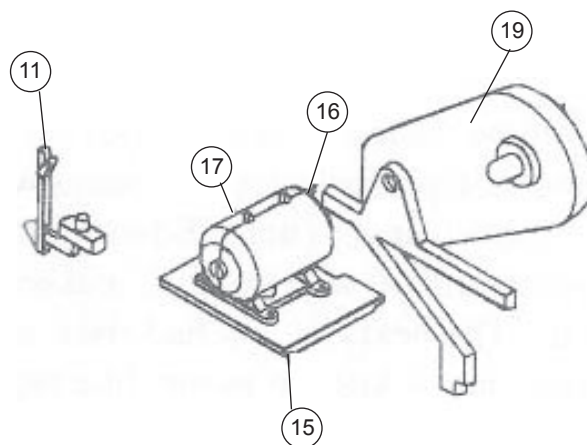
For more ideas to detail your layout and scene, ask your dealer, visit our Web-site at walterscornerstone.com or see the latest Walthers HO Model Railroad Reference Book.



1. Press the gear (34) - the one that has the largest center hole - onto and in the middle of the shaft (5) as shown in the diagram. Make sure that the ends of the shaft have any parting lines/ridges sanded smooth. NOTE: If you plan to motorize the pump, put a drop of plastic compatible oil on the ends of the shaft and on the other gear pegs located on part #13. Next, place main shaft with gear through the hole of gearbox half (13). Then put gear #35 onto the top peg in gearbox half (13). Put gear #36 (the bigger, thinner gear) onto the bottom peg of part #13, below gear #35. NOTE: It doesn't matter on which side the boss of the gear is on. Now press the other gearbox half (14) onto part #13, with the shaft going through. Secure the two halves together by using the short screws (31) in the upper two holes and one longer screw (32) in the bottom hole.

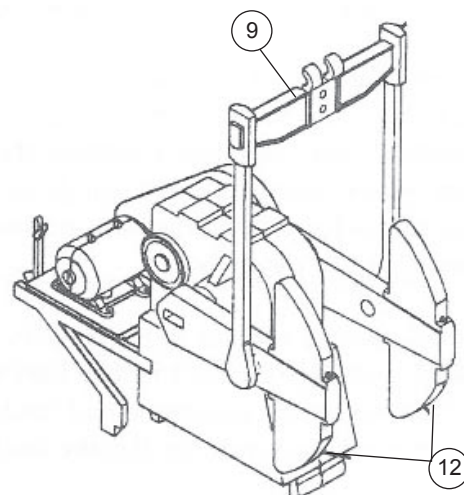


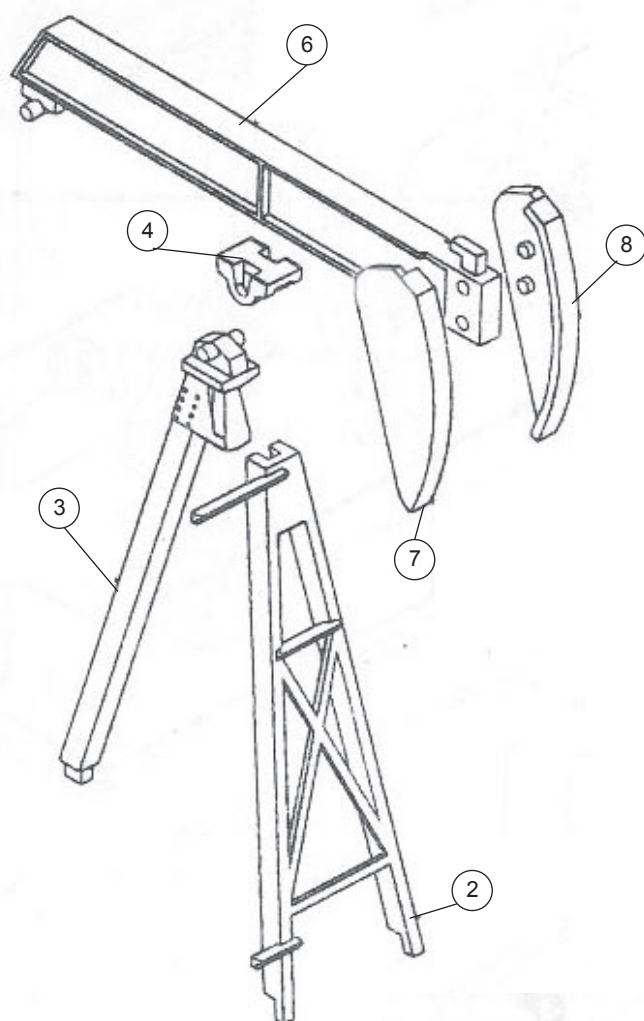
2. Glue the two motor halves (16,17) together and then onto the motor platform (15). Glue the brake (11) into the hole underneath the platform. Glue the platform and motor to bracket #19.



3. Glue the other bracket (18) into the notch in gearbox half #13. Then press fit the peg on bracket #19 into the hole in gearbox half #14 along with the horizontal brace into the notch in #14. NOTE: If you plan to motorize this kit do not glue this assembly in place. You will not be able to get at the screws to disassemble the gearbox if you do. Otherwise, for a static model you can glue the parts in place.

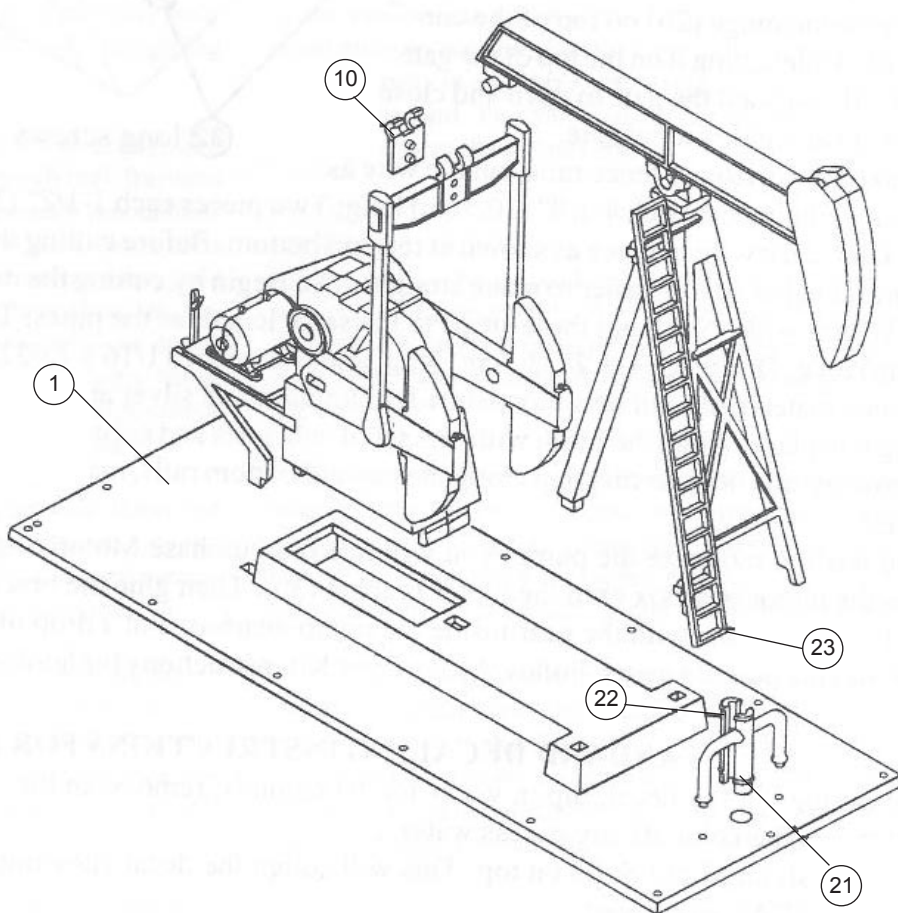
4. Glue the counterweights (12) to both ends of the gear shaft. Snap the pegs of the equalizer (9) into the holes in the sides of the counterweights. NOTE: Make sure the pegs move freely in the holes.



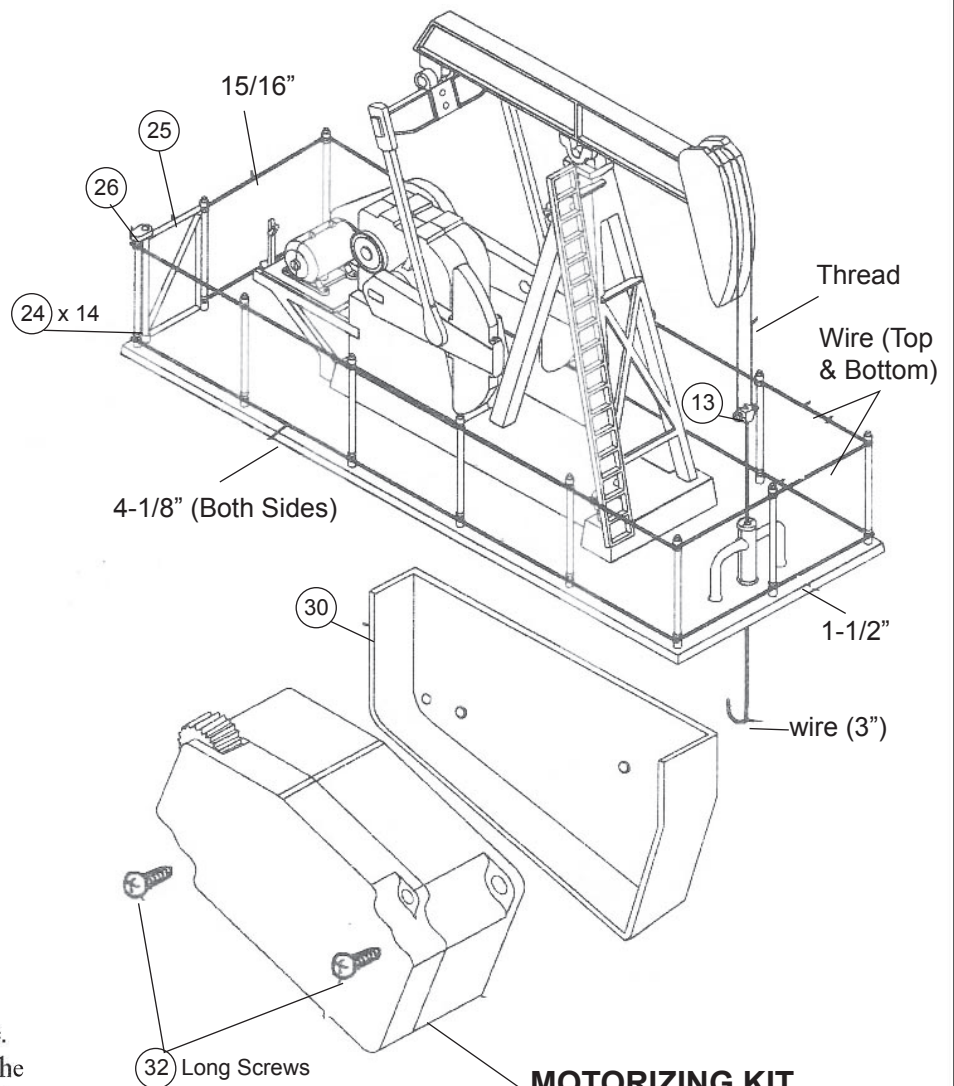


5. Glue the horse head sides (7,8) to the walking beam (6). Glue the bearing (4), underneath the beam, in the middle. After that has dried completely, snap the top of the support brace (3) into the bearing. Then glue the support (2) to the brace.

6. Snap, do not glue, the gearbox assembly in place on the base (1). Glue the walking beam assembly to the base. Next, glue the keeper (10) to the equalizer, sandwiching in between the pivot on the walking beam. NOTE: Make sure no glue comes in contact with the pivot. Glue the wellhead halves (21,22) together and to the base. Glue the ladder (23) in place.



7. Cut a piece of wire 3" long (7.5cm). On one end of the wire glue on the carrier bar (20) using CA type cement. Place the other end of the wire through the hole in the wellhead. NOTE: If you are motorizing this kit, bend the bottom of the wire into a small hook and add a small washer (not included) for weight. Now tie a knot in one end of the thread, leaving a little extra at the end, loop it over and attach to one side of the carrier bar. Tie a knot on the other end of the string, also leaving extra, and attach it to the other side of the bar. Next loop the middle of the string over the hook on the walking beam and once the string is equalized put a drop of CA glue on the string where it touches the horse head and on the ends of the carrier bar. Then trim off the excess thread.
8. Glue the fence posts (24) into the holes in the base (1). Place the gate (25) next to the corner post at the end of the base. Then glue the hinge (26) on top of the corner post, while setting it on the top of gate. NOTE: If you want the gate to open close, do not get any glue on the gate.



MOTORIZING KIT
(933-1050)
AVAILABLE SEPARATELY

9. To make the horizontal fence rails, cut the wire as follows - Four pieces each 4-1/8" (10.3cm) long; Two pieces each 1-1/2" (3.7cm) long; Two pieces each 15/16" (2.3cm) long. Glue each wire in place as shown at top and bottom. Before cutting the fencing material, you may wish to mount it on contact paper so it is easier to make straight cuts. Begin by cutting the mesh material into several long strips, each 11/16" (1.7cm) wide. Next, cut these strips to the same length as the pipes; Two pieces 4-1/8", 10.3cm; One piece 15/16" (2.3cm) long; One piece 1-1/2" (3.7cm) long; and One piece 11/16 x 13/32" (1.7 x 1.0cm) long for the gate. If you wish, the fence material should be spray painted (aluminum and silver are commonly used on prototype installations) before gluing it in place. Align the mesh with one set of end posts and secure in place with a small drop of CA cement on the top and bottom rails. Repeat this step along the top and bottom rails, making sure the mesh is straight and tight before gluing in place.
10. If you wish to motorize the pump, you will need to purchase Motorizing Kit 933-1050 separately. To install, simply screw the motor/gearbox onto the motor bracket (30). Then glue the bracket to the bottom of the base (1), aligning the gear from the motor with the gear inside the pump gearbox. Put a drop of plastic compatible grease on the gear. It will work into the pump's gears. Follow Motorizing Kit instructions for hook-up and maintenance.

STANDARD DECALING INSTRUCTIONS FOR APPLYING TO PLASTIC

1. After cutting out the decal, dip in water for 10 seconds, remove and let stand for 1 minute. Slide decal onto surface, position and then blot off any excess water.
2. Lightly brush on Micro Sol® on top. This will soften the decal allowing it to conform to irregular surfaces. DO NOT TOUCH DECAL while wet!
3. When the decal is thoroughly dry, check for any trapped air bubbles. Prick them with the point of a small pin or hobby knife blade and apply more Micro Sol®.

ALTERNATE WAY OF ATTACHING SIGNS

Following the outlines of the signs, cut them out from sheet. Put a little white glue on the back of the sign and glue in place on the mesh.