

# Construction Manual

## Forest Train

# Lumber Jack\*

[\*Lamber Tschaek]



Light and towing rod are not included in the scope of supply, please order these items extra.

# 30, 32, 45 mm

## Construction Manual

### Wir machen Dampf!

## Easy Line

# REGNER

## Dampf- & Eisenbahntechnik

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# Construction Manual

Congratulations!

The locomotive in the kit in front of you is a beautiful, as well as rustic, forest railway machine such as you might find in America, Canada etc. You have purchased a kit that we have designed with care for trouble-free assembly. We have already assembled and tested the elementary parts for you, such as machine and boiler system. Thus we think that you as customer, if this is your first project of this type, will have a lot of fun with this kit, and that it will certainly lead to success.

Congratulations! If you have read this far you are certainly on the right track. Keep going. Carefully read through the entire construction manual before starting assembly. Pick up the individual parts and familiarize yourself with where and how everything is designed to fit together. You will certainly be required to use your modeling skills and common sense at points of the construction process that perhaps these instructions are not completely clear to you. The author, (who also happens to be the technical designer), may not have perceived some things that might represent a challenge to you. Don't hold it against him, there will be an opportunity to discuss these things. We are always open to your comments.

## Packing list: "Included"

### Tools

Template for adjusting the gauge

Steam oil

Gas adapter

Water feed bottle

## What to look for when operating this locomotive

*This locomotive is designed so that it can be operated without hazard under normal operating conditions. Common sense however is the prerequisite. You should not do anything abnormal that could harm the model or its operator.*

*Use a cloth with some soapy water for cleaning, rather than a high pressure spray cleaner. Let the machine air dry; do not place the locomotive in the microwave to dry it off. (Yes we really have had it happen)*

*Do not smoke when filling the locomotive with gas, fill the gas tank only in well ventilated locations. Be sure other locomotives with flames are not close by. Make sure the children are safe; their safety should be the primary concern.*

*Only let children run this locomotive under your supervision.*

Please read this construction manual carefully through before assembling. It is a good idea to pick up the parts while reading the instructions and get a good feel for them. If something is not in order, or if it breaks during the assembly process, send the part back to us and we will get things in order quickly. Often there is information on the last pages that should have been noted earlier.

## Legend



M 2x7= thread diameter 2mm x7mm length

WS= wrench span of the screw head

St.= abbreviation for steel

SS= stainless steel

Abil= gasket material from the automotive industry from which we stamp the gaskets.

Stuffing box= the stuffing box is used to seal a rod or glass tube passage, e.g. with Teflon tape

M6x0.75= metric fine-pitch thread Ø 6 mm, pitch 0.75 mm

M6x0.5= metric fine-pitch thread Ø 5 mm, pitch 0.5 mm

## What we provide:

A brass socket wrench for 3 mm and 4 mm hexagon heads. A fork (open end or spanner) wrench, also for 3+4mm, and a 1.5mm Allen wrench. The fork wrenches will be working in very tight places. You may find it necessary to grind or file the outside of the wrench jaws to make them narrow enough to fit and work where needed.

## Other things you will need:

Prior to starting work, you should lay out an old cloth (a white shirt, or an old undershirt is even better, so that you can see the screws better). For the small parts and screws, get out some empty yogurt containers, they are ideal. You will also need a piece of wood, a small hammer, matchstick or watchmaker's screwdriver, some acid-free oil, such as sewing machine oil, some Vaseline or soap, a 6mm and 8mm fork wrench, some thread lock or super glue gel. It would also be advantageous to have a round needle-point file, scissors, and small pair of pliers on hand.

*Plan adequate time for the assembly. Work carefully and only move on to the next work step after checking to be sure all work up to that point has been executed properly. Thus you will always know that an error or difficulty is in the current work section. And keep in mind that errors quickly accumulate. At the beginning there may be a few points that are stiff, later it may be well be the case that nothing moves at all.*

## Other items you can order:

Radio remote control, see catalog,

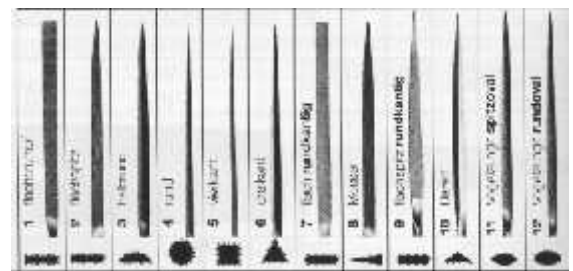
Steam oil, order no. 51302 (100ml) 51301 (250ml)

Filling adapter for camping gas, order no. 50834

Filling adapter for Rothenberger, CFH etc. order no. 50 837

Needle point files in the catalog

Acid-free oil, order no. 51304



# Chassis

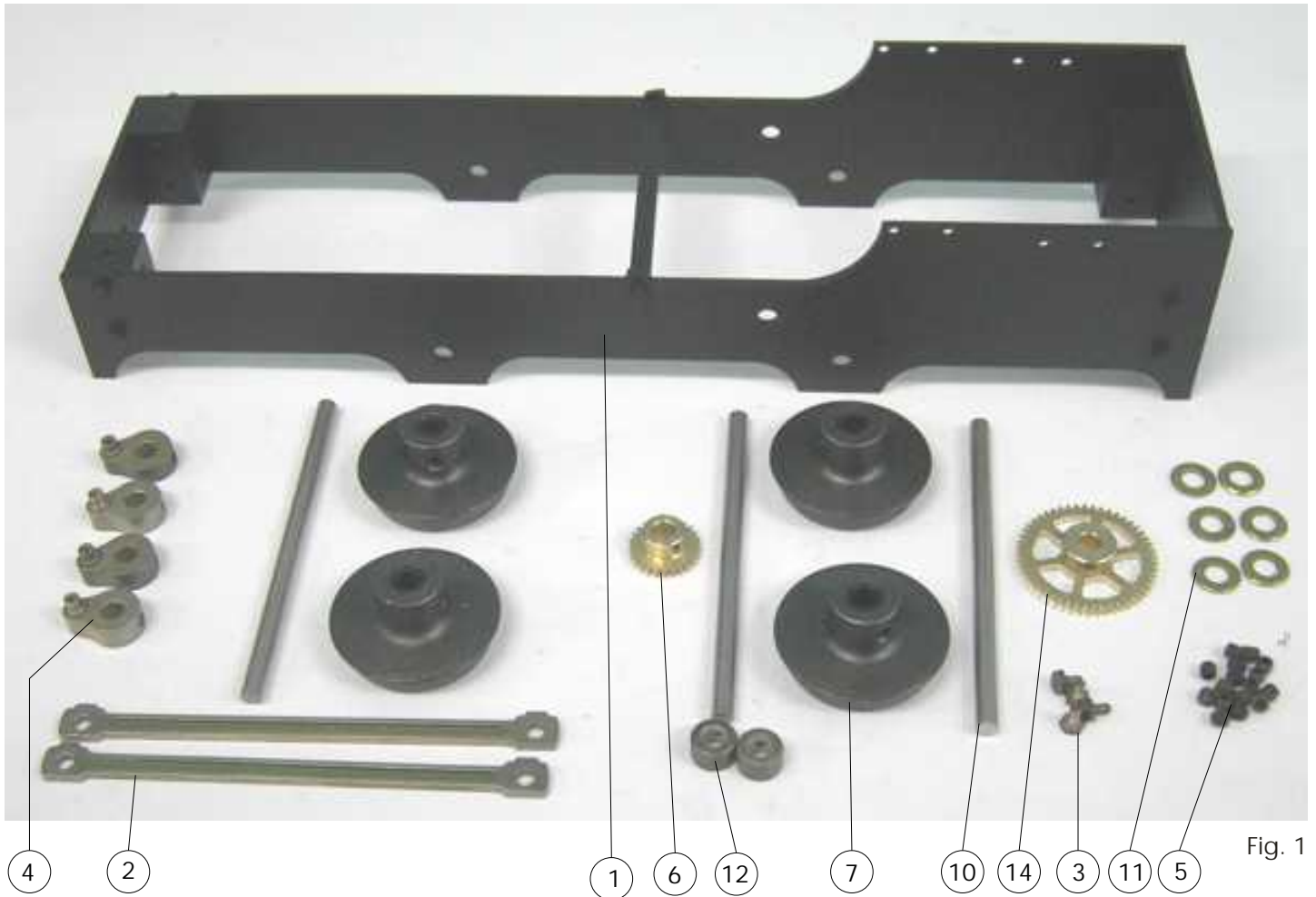


Fig. 1

## Part list for Fig. 1

No.	Designation	Units
1	Frame	1
2	Coupling rods	2
3	Hexagon head screw M2x4 SW 4 flat	4
4	Crank	4
5	Allen screw M3x3	16
6	Intermediate gear 25 teeth	1
7	Wheel	4
10	Axle	3
11	Spacing washer Ø4 mm	6
12	Set collar Ø4 mm	2
14	Drive gear 50 teeth	1

Start by inserting the axles and wheels. Front axle: Insert axle 10 into the axle bore and place the first wheel on the axle, then put on the drive gear 14 with the collar facing left in the direction of travel, then put the next wheel on. Push the axle through the other longitudinal girder, a spacing washer 11 and a crank 4.

Insert a washer 11 and crank 4 on the opposite side as well, and fix them in place by turning 90° with the stud screw. Leave approximately a tenth of a millimeter play between crank and frame so that you can turn everything with ease. Always apply a little oil to the bearings.

Rear axle: Insert axle 10 through the bore of the bearing, push another wheel, a second wheel and axle through the second longitudinal girder. On the outside there is another spacing washer 11 and crank 4. Fix this crank in place as before with a stud screw 5. Now place coupling rod 2 over the two coupling bolts of the cranks, and secure each with a screw 3. On the opposite side there is also a washer 11, a crank 4 that you should only tighten lightly enough with the stud screw that it can still be turned. Place the second coupling rod 2 over the coupling bolts of the front crank, and turn the crank that you just tightened slightly until the rod falls over the boss of the rear crank. If both axles can now be turned easily, then you can also firmly tighten the stud screws of the last crank.

However if this is not the case, then correct the crank until it is in order. Place the chassis onto the track and push slightly; if it runs a few meters perfect! Go on with the assembly.

Now insert the primary transmission shaft through the remaining bore, in this process also place the small gear with 25 teeth on. Ensure that the collar points in the same direction as the collar of the large gear.

Fix the primary transmission shaft in place with a spacing washer, the set collar, and the stud screw on each side as shown in Plate 1. Ensure that there is some play so that it can turn easily.

Use the setting caliper to adjust the desired gauge and clamp the wheels in place with the Allen screws 5.

Adjust the gears later when inserting the machine.

The buffer beam is screwed together as shown in Plate 1, and the hexagon head screws 19 cut their own threads when they are screwed in.

The couplings are screwed on with the hexagonal screws 8 and 15 Fig 4.



Fig. 2

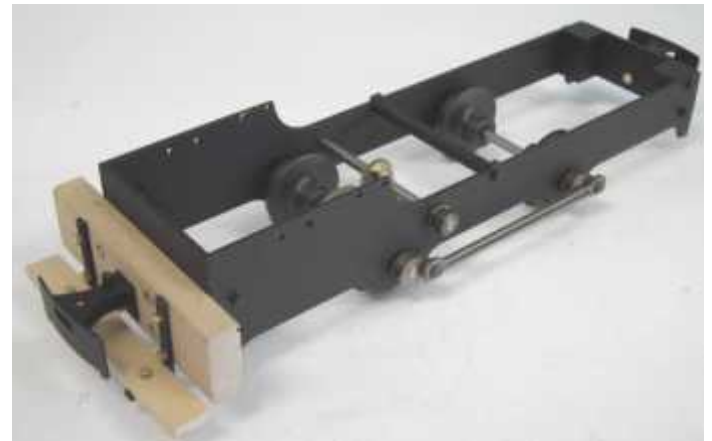


Fig. 4

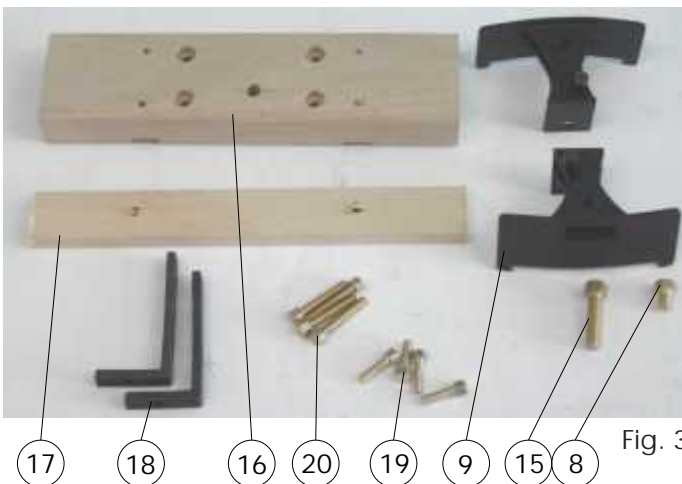


Fig. 3

Part list for Fig. 3

No.	Designation	Units
8	Hexagon head screw M3x4	1
9	Buffer coupling	2
15	Hexagon head screw M3x16	1
16	Buffer beam wood	1
17	Step	1
18	Angle	2
19	Hexagon head screw M2x7 SW 3	6
20	Hexagon head screw M2x12 SW 3	4

The wood of the buffer beam and the step are finished as you please. Either wash it or treat it with oils like linseed oil, olive oil, etc. You can also leave it as is, subject to the effects of weather, like on the original. It's up to you.

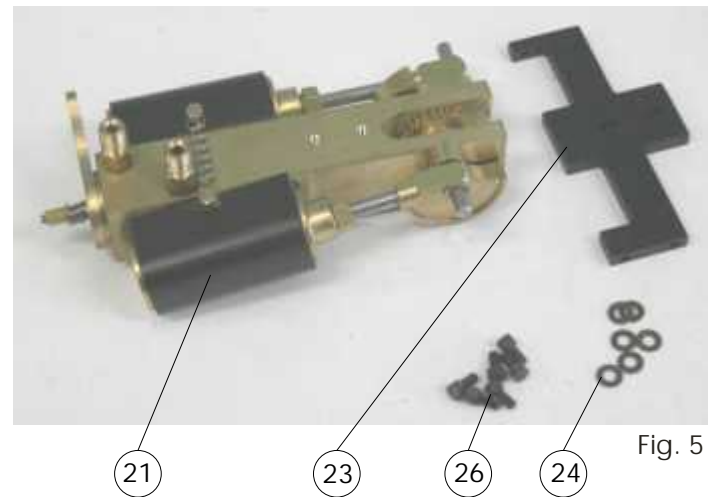


Fig. 5

Part list for Fig. 5

No.	Designation	Units
19	Hexagon head screw M2x7 SW3 black	2
21	Two-cylinder oscillating machine	1
23	Cylinder holder	1
24	Washer Ø 2 black	6
26	Hexagon head screw M2x4 SW 3 black	4

Now screw the cylinder holder 23 onto the machine with hexagon head screws and washers, however do not tighten it yet. Place the holder with machine between the longitudinal girders, bring into alignment with the intermediate gear, and attach the screws and washers from the outside. Align the holder horizontally and tighten the screws. Adjust the gear clearance by sliding the machine back and forth on the holder, then tighten the screws. See Plate 2 in this regard.

Now align the gear on the drive axle in the same way and tighten all Allen screws. If compressed air is available then you can attempt a trial run.

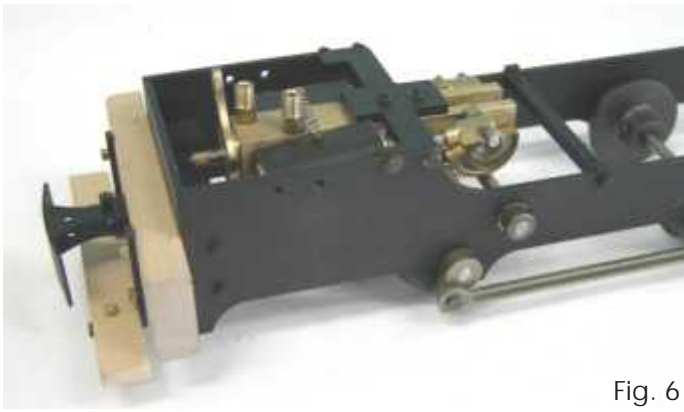


Fig. 6

Insert the boiler support 22 in the frame and screw it on tight on both sides with hexagon head screws 26 black, and washers 24 black. Screw the floor plate 27 onto the frame with four screws and washers.

Connect the front part of the housing 25 with the circular sheet metal from the bottom. For this use the brass screws.

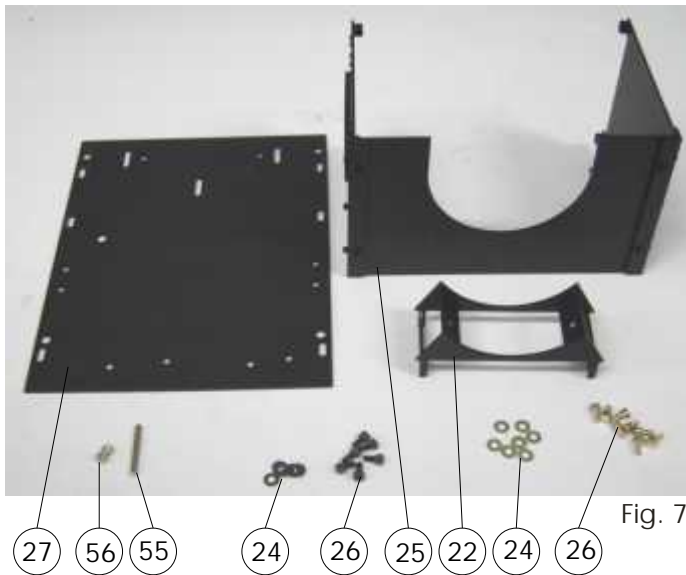


Fig. 7

Part list for Fig. 7

No.	Designation	Units
22	Boiler support	1
24	Washers Ø 2 brass	10
24	Washers Ø 2 black	6
25	Front housing part	1
26	Hexagon socket screw M2x4 SW 3 brass	8
26	Hexagon head screw M2x4 SW 3 black	6
27	Floor plate	1
55	Threaded rod M2x 20	1
56	Nut M2 SW 3	2

If the boiler support is screwed on, do not tighten the screws with force until everything bends, rather tighten it firmly by hand.

If bores or the cutout for the boiler become somewhat narrow, then please use a small sharp knife, a file, or a three-square scraper to remove the paint.



Fig. 8

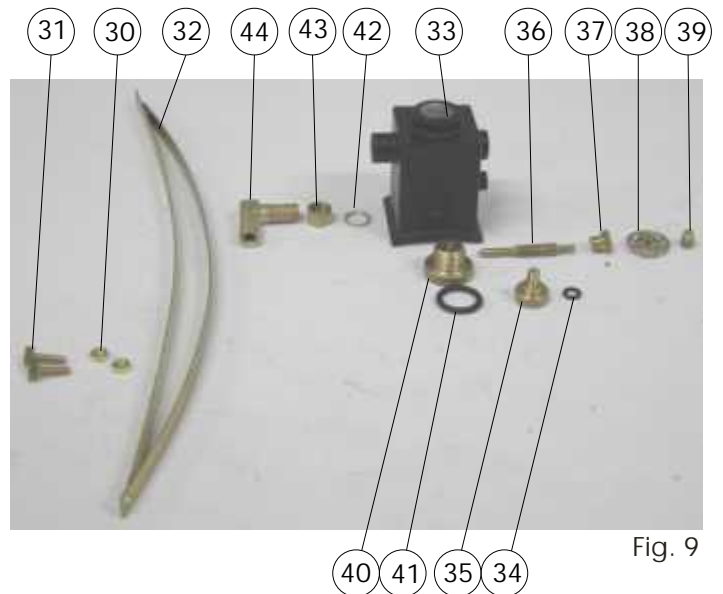


Fig. 9

Part list for Fig. 9

No.	Designation	Units
29	Boiler	1
30	Nut M2 SW 4	2
31	Hexagon head screws M2x8 SW 4	2
32	Boiler band	2
33	Oiler housing	1
34	O-ring Ø 2.5x1	1
35	Discharge screw for condensation	1
36	Regulating spindle long	1
37	Plug nut	1
38	Handwheel	1
39	Cap nut M2	1
40	Stopper screw	1
41	O-ring Ø8x1	1
42	Copper gasket Ø 5 mm	1
43	Lock nut M5x0.5	1
44	Angle connector M5x0.5	1



Fig. 10

Screw the handwheel firmly screwed onto the short thread of spindle 36, and counter it with the cap nut. Then put on the stuffing box and push it back to the hand wheel. Wrap 20mm Teflon tape "folded twice lengthwise" around the remaining thread. Fig. 11



Fig. 11

Screw the spindle into the threaded bore, retighten the stuffing box in alternation. This will compress the stuffing packing between both threads, and seal the oiler.

Push the O-ring onto the discharge screw and screw it into underlying bore, in this process only press the O-ring on hand tight, do not crush it.

Use the screw plug and O-ring 41 to close the oiler. Attach the angle connector on the opposite side of the adjustment spindle. Screw a lock nut 43 onto a threaded side of the angle connector, add the copper seal, and as for the adjusting spindle, wrap with 20 mm folded Teflon tape. Screw in the angle, align the angle, and tighten the lock nut. Fig. 12

Work the boiler band into a ring shape with your fingers. Use a small pair of pliers to bend the ends up approximately 5 mm. The boiler band that is used to anchor the oiler must have been previously routed through the oiler. Fig. 13



Fig. 12



Height adjustment Fig. 13

Screw the threaded rod 55 into the thread bushing from below, and screw a nut on. Later you can use this nut to adjust the height or the horizontal position of the boiler. At the front on the right and left push a screw with washer come through the bore of the boiler support and into the boiler. After adjusting the height fix the boiler in place with a nut from below.



Fig. 14

Part list for Fig. 1

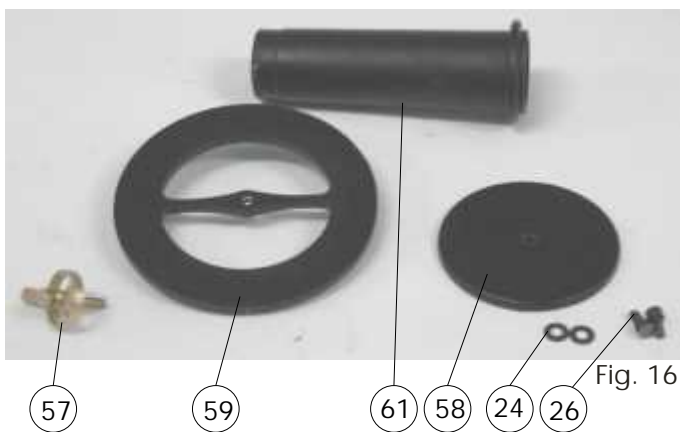
No.	Designation	Units
28	Steam line	1
45	Oiler line	1
46	Cutting ring Ø 3 mm	2
47	Union nut M5x 0,5	2
48	Exhaust steam line	1
49	Exhaust steam whistle	1

Insert steam line 28 through the boiler from the outer firebox side, and connect it with the steam cock. Bend the steam line is bent downward at the front in the smoke box, place a union nut and a cutting ring on the pipe, apply a little oil to the cutting ring, then screw everything onto the nipple of the machine with the nut. You must press the copper tube onto the steam nipple while screwing tight. Now the oiler can be connected to the steam line with the oiler line 45. The exhaust steam tube with the exhaust steam whistle can be screwed in, which is difficult at this stage. It is better to screw it on before the boiler is placed on.

The exhaust steam whistle is not called a steam whistle because it is supposed to whistle but because it looks like one. Its job is not to throw the condensation over the boiler and to reinforce the exhaust.



Fig. 15



Part list for Fig. 16

No.	Designation	Units
24	Washers Ø 2 mm black	2
26	Screws M2x4 SW 3 black	2
57	smoke box seal	1
58	smoke box door	1
59	smoke box ring	1
61	Smokestack	1

Press the smoke box ring into the boiler and screw it in firmly with screws 26 and the washers. Screw the door with the central shutter into the center in the ring. Insert the smoke stack, using light taps of the rubber mallet, or place a block of wood on the smokestack and use a normal hammer. Screw on the lower part of the rear housing tightly from below as well.

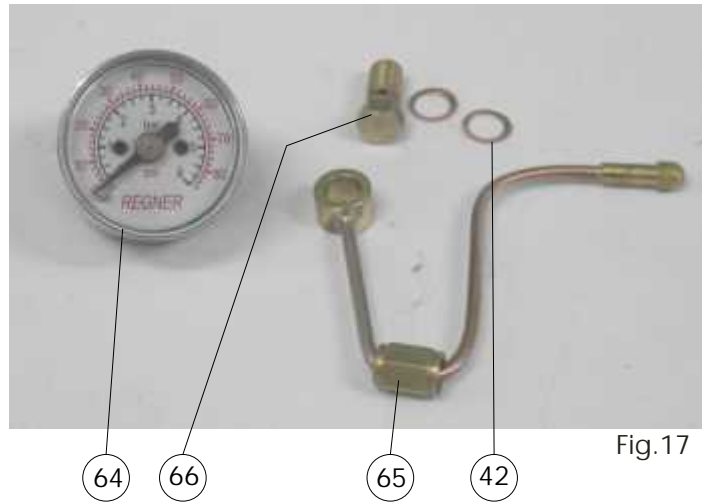


Fig.17

Part list for Fig. 17

No.	Designation	Units
42	Copper gasket Ø 5 mm	2
64	Manometer	1
65	Siphon	1
66	Siphon screw	1

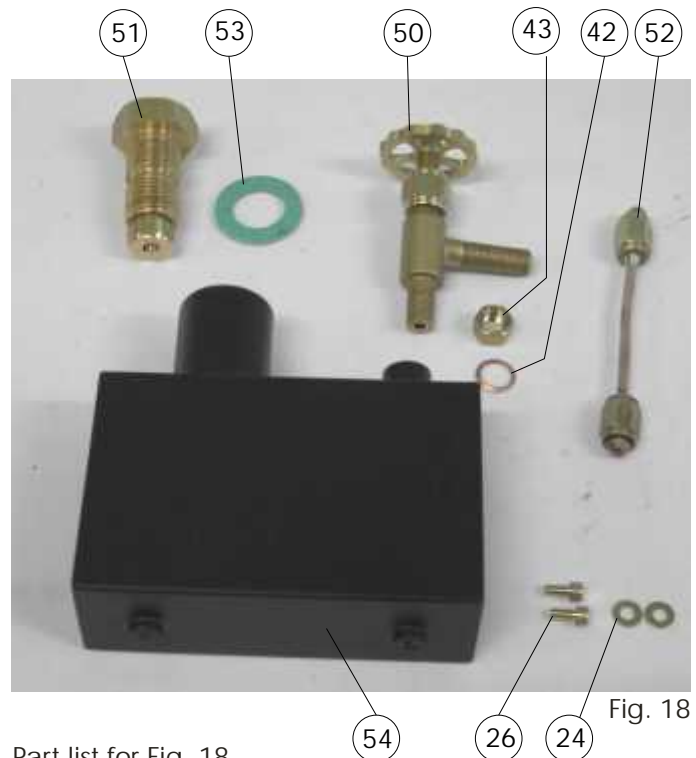


Fig. 18

Part list for Fig. 18

No.	Designation	Units
24	Washers Ø 2 mm	2
26	Hexagon head screws M2x4 SW	2
42	Copper gasket Ø 5 mm	1
43	Lock nut M5x0.5	1
50	Gas cock	1
51	Gas fill valve	1
52	Gas line	1
53	Gasket	1
54	Gas tank	1

Screw the gas fill valve 51 with gasket 53 into the gas tank, and tighten with a 14 mm fork wrench. First place a lock nut, copper gasket and two layers of Teflon tape on the thread of the gas cock. Wrap the Teflon tape in the direction of rotation so that it will not unwind and screw in the gas cock.

Align the gas cock and secure with the lock nut. Plate 4. Fastening the gas tank onto the circular sheet metal from the bottom. Use gas line 52 to fasten the nozzle assembly is screwed on the burner with the thread of the gas cock. Insert the grab iron 70 in the holder on the front part of the housing and fix in place with super-glue.

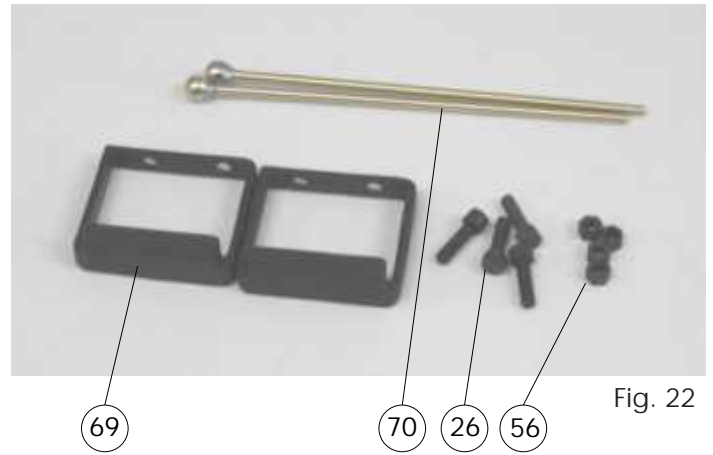


Fig. 22



Fig. 19

Part list for Fig. 20/21/22

No.	Designation	Units
26	Hexagon head screws M2x4 SW 3 black	4
26	Hexagon head screws M2x4 SW 3	2
56	Nuts M2 SW3 black	4
60	Roof	1
62	Roof supports	4
63	Rear housing wall	1
67	Washers Ø 3 mm	4
68	Nuts M3 SW 4	4
69	Steps black	2
70	Grab irons	2



Fig. 20

Fit the housing part 63 on the floor plate and screw it on from below with the hexagon head screws. Fasten the two steps under the floor plate with the black screws from top to bottom using the nuts. Now insert the four roof supports and secure them from below with the nuts.

Place the roof -

*That's it, you're done!*

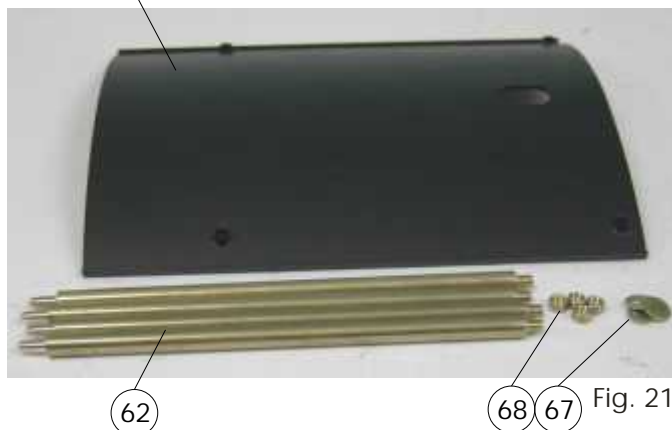


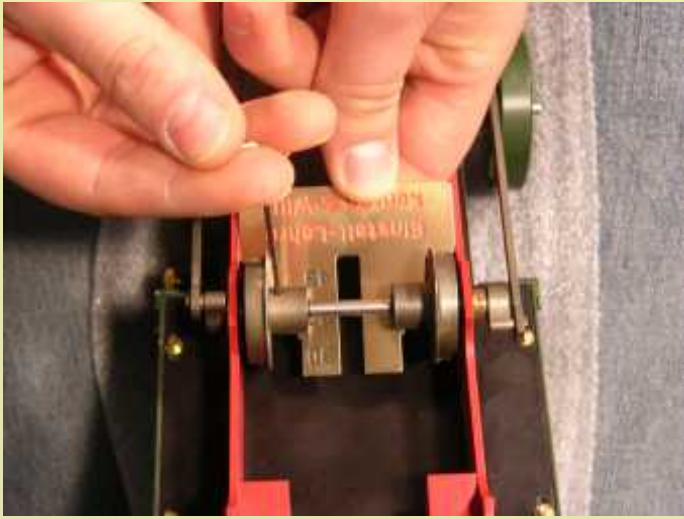
Fig. 21

# Operating instructions for the Lumber Jack

*The following steps are required to operate the locomotive:*

- Adjust the desired gauge with the template.
- Oil the bearings
- Fill the oiler
- Fill the boiler with water
- Fill the gas tank
- Set the reverse valve for the desired direction of travel
- Ignite and wait for the pressure to build up
- Open the steam cock after the pressure build up

## Adjusting the gauge



Use the supplied Allen wrench and the wheel gauge to set the wheels to the desired track gauge. Be sure to tighten all set screws on each wheel.

## Oiling the bearings

All points that move or turn must be lubricated from time to time with acid-free oil. During the run-in period (the first 5-10 times the boiler is filled) you should lubricate prior to every trip. After the run-in period, lubricate occasionally.

## Oil in the steam oiler



Unscrew the lid of the oiler and fill with steam oil to the level of the adjustment spindle. Do not use any other oil. Steam oil is not washed off by the steam. It contains tallow which resists being washed away and in addition it has a supplemental sealing effect. A different type of oil could lead to premature wear, or in the worst case, it could cause the pistons to jam. Now screw on the oiler lid again.

Unscrew the adjustment screw a quarter turn. If you are not sure of the starting position of the adjustment spindle, then close it completely and then open it a quarter turn. Once the machine has been run in, less than a quarter turn could be sufficient under certain circumstances.

Before the next trip and before the next fill-up, open the condensate discharge screw and drain the condensate from the last trip.

Viton rings that can withstand these temperatures are used as gaskets for the oiler. It is not necessary to use force to close the sealing screw and the discharge screw, hand tightening is totally sufficient.

If the rings are worn or get lost, you can order replacement rings at any time.

Specify the locomotive and the part number as listed construction manual.

## Fill with water



Unscrew the pressure control valve. Use the water bottle to add water to approximately 2/3 of the height of the glass tube. Use distilled water, to which 3-5% tap water has been added. This minimizes the aggressive characteristics of distilled water and allows residual water to be able to be left in the boiler without draining for storage or inactive periods without resulting in the dreaded pitting.

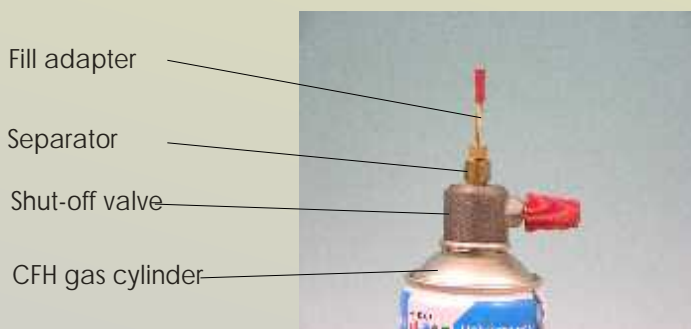
Water from condensation dryers or air dehumidifiers is also very well suited. If too much water has been filled, then squeeze the bottle to suction out excess water. Practiced hobbyists will install a backfeed (also known as a goodall valve), particularly after assembling this locomotive. This is why there is a mounting hole for the feed valve in the floor plate, to the right in the direction of travel, in front of the door. Screw the feed line on the water level in place of the sealing screw. This offers many advantages: You can see how the water runs in, even under pressure and during operation, a possible bubble is eliminated due to the pressure, and the glass tube always stays clean. What is particularly important is that the water comes underneath the flame tube into the water and not in the volume of steam. For a feed pump use a special bottle that we offer in the catalog.



### Fill with gas

The supplied gas fill adapter is suitable for camping gas holders with replaceable Bleuel C206 cartridges. The holders are available as stove and lamp. Soldering devices from the same company are not suitable. Remove everything above the shut-off valve. Also unscrew the nozzle. Screw in the fill adapter in place of these items.

The separator that is also supplied makes it possible to screw this fill adapter onto a CFH glass cylinder. Use the soldering device for CFH gas cylinders and structurally identical units from Rothenberg. Screw in the fill adapter with the separator, in place of the solder neck.



It is much more convenient to fill gas into the tank with the one-hand gas fill adapter. Hold the locomotive securely with one hand, and use the other hand to forcefully press the cylinder onto the fill valve.

One-hand gas fill adapter for CFH and Rothenberger gas cylinders

1 unit order no. 50829



*When is the gas tank full?*

After the fill process depress the fill pin of the fill valve and liquid gas will escape. If it escapes in gaseous form, i.e. invisible, then continue the filling process.

*Troubleshooting.*

Burner does not ignite.

Gas tank is empty. Fill with gas

Nozzle is plugged: Remove the nozzle, invert it and press it onto the fill adapter. In this process open the gas briefly to remove the fouling. The gas speed is too low if the nozzle is clogged, consequently not enough combustion air that is required for combustion is taken in. Fig. 1



Fig. 1

*Gas cannot be added*

The seal is too dry.

The continuous icing associated with the filling process washes off the lubricating film of the sealing rings. This means that they will no longer slide, the fill bore is not released and gas cannot flow in.

Remove the fill valve, lubricate sealing rings with Vaseline and reinstall the fill valve. In this process do not screw the sealing screw tight, only screw it in until it reaches the gasket, app. 1 mm clearance. Fig. 2

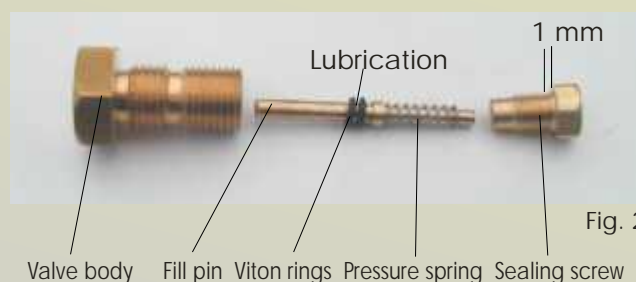
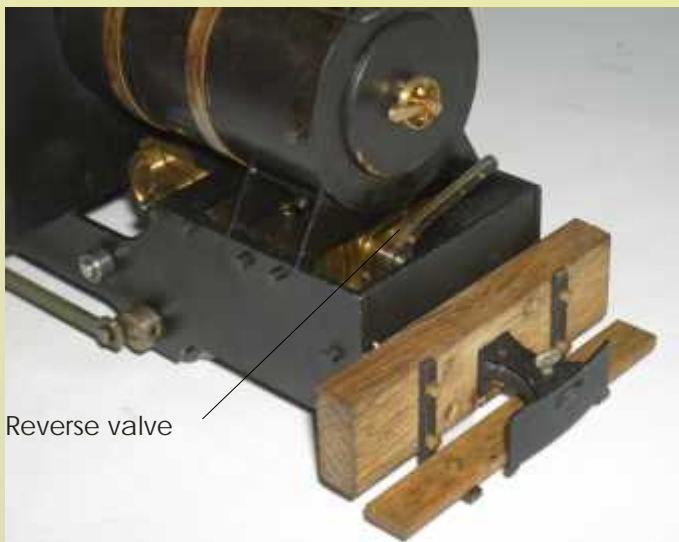


Fig. 2



Filling gas with the one-hand gas fill adapter

*Set the reverse valve for the desired direction of travel*



Reverse valve

*Lighting a fire*



Prior to ignition open the gas cock briefly and listen to determine whether the burner is blowing cleanly. If it is sputtering then discharge a little gas via the fill pin until a clean jet is audible.

Start the lighter and at the same time open the gas slightly. The gas ignites at the smokestack and fires back into the flame tube. If it gets stuck in the smoke box then close the gas regulator slightly, until it burns in the flame tube. If this measure does not succeed, then shut off the gas regulator until the flame goes out and repeat the ignition process.

*Caution! Do not hold your face over the smokestack during the ignition process. Children should only drive and handle the locomotive in the presence of an adult who is familiar with the locomotive.*

### *Starting up*

If the manometer shows 2-2.5 Bar (30psi), then open the steam cock. The steam flows into the cylinders, however it is now condensed because the cylinders are still cold. Subsequent steam pressure forces the water out of the cylinders and after some jerking and shaking the machine will slowly start moving. If during the heating up process you open the steam valve slightly, then the cylinders will be pre-warmed and the machine will start moving automatically.

Without backfeed you will have an operating time of approximately 25-35 minutes. With backfeed you will have an operating time of up to 1 hour depending on the route. In many cases the even gas tank can be refilled immediately because it does not get hot in operation.

Approximately 10 boiler fillings are required to run in the locomotive, and the machine will run better with each trip. Run the machines until the pressure noticeably drops. Then extinguish the fire. If the water is completely used up then the machine thus comes quickly to a standstill, the boiler is dry. Immediately extinguish the fire. If the machine gradually slows down then it is usually out of gas. As long as you do not heat a dry boiler, the flame tube boiler will not be destroyed. If the machine comes to a standstill due to a lack of gas, then usually enough steam will still be available in the boiler so that it is still cooled.

Naturally the less often this happens the longer the boiler will last. Vigilance is the top priority!

Shut off the steam cock after operation. But be careful! When closing the steam cock just turn to the stop, do not close with force. These fine-pitch threads expand with heat and retract when cooling down. If closed too tightly the consequence is a jammed cock that can no longer be moved.

The same applies for the gas cock.

Wait until the locomotive has cooled to clean it. Under heat the stove enamels are sensitive on the surface and cleaning smears can remain. Once the enamel has cooled it is completely resistant in this regard.

Keep your eye on the excess pressure safety relief valve. This new generation of safety valves works with Teflon inserts. They are extremely leak-proof and reliable, however they have the disadvantage that when the boiler cools generates an extreme vacuum. If a backfeed system is installed then the boiler can "breathe". If this is not the case then we recommend that you loosen the pressure control valve a few turns. When installing this new safety relief valve, tighten by hand only. Do not use a wrench or over-tighten, as it relies on an O ring for sealing to the boiler. Excessive force will damage the safety relief valve body.

# Operating instructions for REGNER Genuine Steam Locomotives

## Remedies for malfunctions.

### 1 Burner does not ignite!

Gas tank is empty. Fill with gas

Nozzle is plugged: Remove the nozzle, invert it and press it onto the fill adapter. In this process open gas briefly to remove the fouling. Insufficient combustion air because with a clogged nozzle the gas speed is too low and thus too little air is pulled along with it.

You can also push the nozzle assembly forward to increase the air speed.

If this does not help, then it may be necessary to slightly enlarge the air bore.



Fig. 1

### 2 The burner does not have enough power!

Nozzle is clogged (see Fig. 1 above)

If there is insufficient air, (see above), then there is also poor combustion. You should only smell hot air above the smokestack. If it smells like unburned gas then there is poor combustion.

### 3 Gas cannot be added

The seal is too dry.

Due to the constant icing when filling the gas the lubricant film on the sealing ring is washed away, the sealing ring can no longer be pushed away, the fill bore is no longer released and the gas no longer flows in.

Remove the gas fill valve, take it apart, smear the Viton rings with Vaseline, put the valve back together again. The rings must be able to slide easily on the fill pin. See Fig. 2



Fig. 2

Valve body    Fill pin    Viton rings    Pressure spring    Sealing screw

After the trip the gas tank is warm. If it is filled now, then the gas will expand and will not allow any more to flow in.

### Remedy

The gas tank must be cool. You can purchase a second locomotive, then one can always cool down. Open the gas cock (gas regulator valve) slightly and allow a small vent action to take place while filling. This venting will allow some gas to vaporize and help to cool the tank. Pressing down on the fill valve tip on the fuel tank, and allowing a strong a strong gas jet from the cartridge on the fill valve will cool the tank, then it will take gas again. Do not let the locomotive stand in direct sunlight, this will also warm the gas tank.

Now a little physics in order to understand why you cannot get any gas into the tank when it is hot.

The first gas jet that flows into the gas tank in liquid form is immediately converted into a gaseous state by the heat of the tank. Immediately higher interior pressure occurs, which prohibits more gas from flowing into the tank. Cooling allows the pressure to decrease and enables us to fill the tank with more gas.

For steam model railroading we use butane. Butane liquefies at 4°C. This means that when the outside temperature approaches 4°C, manufacturers add propane. However propane liquefies at only at -17°C.

This mixture of butane-propane is available in the ratio 90/10, 80/20, 70/30, 60/40.

A ratio of 80/20 can actually be used under any weather conditions. If the propane content is higher then it should be used at lower outside temperatures, and should be used with caution in summer temperatures.

At higher temperatures it is difficult to keep the propane in a liquid phase during the filling process. In addition, propane generates extreme pressure in the gas tank and we certainly do not want to own any rolling bombs.

### 4 Nozzle clogged!

Remove the nozzle and press it in its inverted position onto the gas fill adapter, open the gas and let some gas flow through the nozzle. This will clean the nozzle. Re-install the nozzle. See Fig. 1

### 5 How can I determine if the gas tank is full?

After filling the gas tank press down the fill pin with your fingernail or with a small screwdriver. If the gas tank is full, a visible liquid gas jet will escape. If the gas that escapes is invisible, add gas. If the nozzle in the burner tube ejects liquid gas, then let a little gas escape via the fill pin. Another way is to slightly open the gas cock (gas regulator valve) when filling and look in the air holes on the side of the burner assembly and listen for liquid gas escaping. When you see or hear liquid gas escaping, then the liquid level in the tank is up to the gas cock and the tank is full. If the gas fill procedure takes too long, then relubricate the valve. See Fig. 2 Chapter 3.

Usually the locomotive seldom consumes the entire gas volume if the machine is operated in the 30 psi (3 bar) range.

# Operating instructions for REGNER Genuine Steam Locomotives

## Remedies for malfunctions.

### Water is leaking everywhere

If when heating up water escapes at the pressure control valve and at points, such as water level screw fastenings, cylinders, etc. then it is quite likely that too much water has been filled. Water expands during heating and takes up a greater volume. When there is no more room in the boiler the water will look for other routes. Because water cannot be compressed, it will penetrate all cracks, seals, etc. to escape. You might think that there are leaks everywhere. And the machine will not be able to run at all. However this is a steam machine and not a water machine. Consequently 60% water level, the rest should be volume for steam. Since the cylinders are cold the first steam will condense, wait a bit, the water will be forced out on its own.

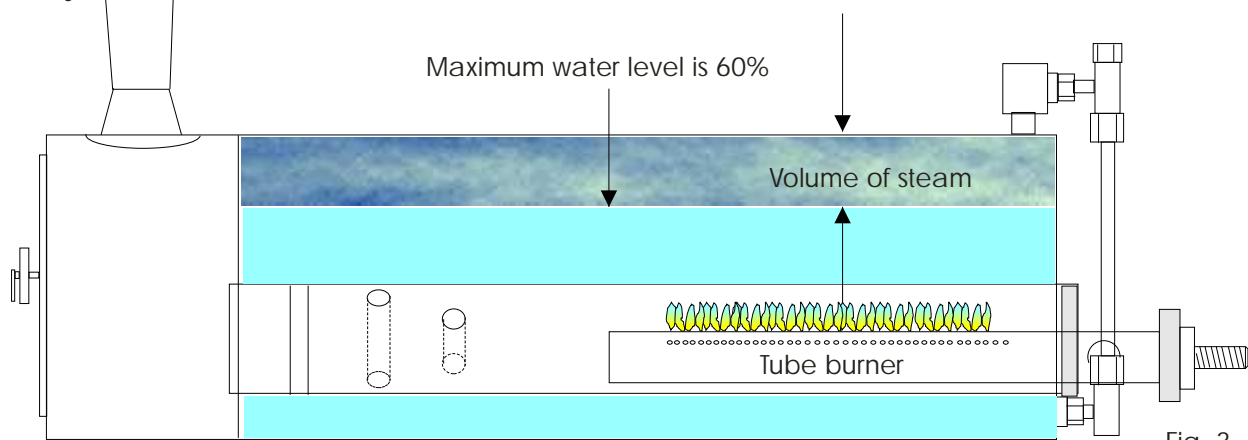


Fig. 3

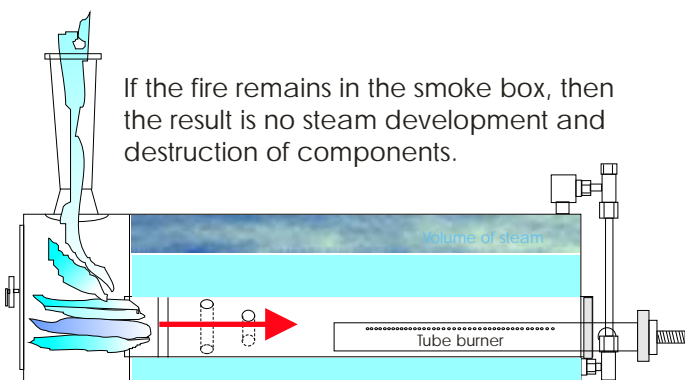


Fig. 4

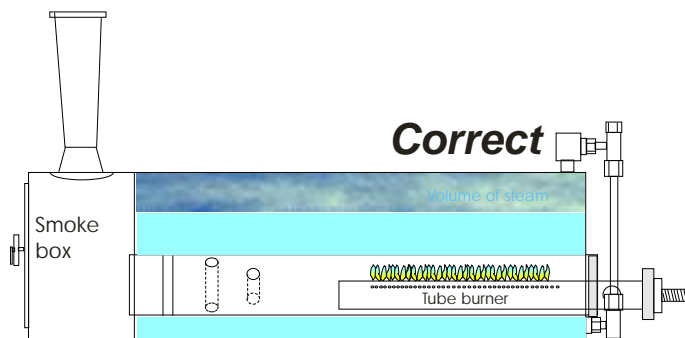


Fig. 5

Optimum fire, good steam development.

Pay strict attention to the fire in the boiler. Proceed as follows to ignite!

Light lighter and hold it over the smokestack, at the same time open the gas cock. The gas flows through the flame tube into the smoke box and through the smokestack to the lighter's flame. There it is ignited and it fires back into the smoke box. Fig. 4 Immediately close the gas regulator on the gas tank slightly in order to starve the fire in the smoke box. When turning further to close, the fire will fire back into the flame tube with an audible change in sound. Fig. 5 Ensure by looking into the smokestack that there really is no fire to be seen in the smoke box. If this does not succeed the first time, close the gas cock and repeat the ignition process. It is fatal for the fire to remain in the smoke box. It unavoidably results in overheating and destruction of coupling, lights, and often destruction of the cylinder unit as well. Logically steam is not generated there either. If this does not succeed, see point 1.

### 6 Oiler

Prior to each trip fill the oiler with steam oil until it is over the adjustment needle. During the run-in phase (approximately 10 boiler fillings) open the adjustment wheel two turns. Later do not open the adjustment wheel so far. Drain the condensation via the discharge screw. Clean condensation is an indicator for perfect lubrication.

## Tips for operating genuine steam locomotives

*The gas cock or the steam cock can no longer be moved.*

This certainly because the cock has been closed with too much force. For this the following instructions must be heeded.

When the machine starts up the armatures become quite warm, the steam cock even becomes extremely hot. The metal expands. If the cock is then closed with a lot of force it will not be capable of movement in a cold state. It is unavoidable that the counter lock of the hand wheel will loosen. Bear in mind that the fine pitch threads with 0.35 mm pitch, (i.e. it takes three turns to move the spindle one millimeter) get jammed into each other in such a manner that nothing will move.

*I apply steam to the cylinders and nothing moves.*

Patience! If you open the steam cock, steam will flow into the cylinders. However because the cylinder is still cold at the time the steam condenses to water. With our large prototype the engineer would open the dewatering cocks and the water would be blown out by the inflowing steam. With our small machines the water also is converted to steam however it is blown out via the smokestack. However since this occurs via the control channels, it takes a little longer. The first time the machine starts up it will jerk and shake until the water is removed. The newer the machine the longer this can take. This situation can be improved through reversing and always applying some steam. Naturally due to this process a puddle will form underneath the locomotive, and this is not because there is a leak somewhere, as some suppose. Consequently for start up you should set up a starting track where the water can be knocked off.

*I have a new machine and the screws are loose already.*

See gas cock - steam cock will not turn. Since a significant interplay of hot and cold occurs with a genuine steam locomotive, involving material that expands and contracts, it is unavoidable that screws will also expand and contract. Consequently we recommend that you re-tighten the screws after the first trips.

If you watch old movies you will see that the locomotive personnel are always tapping with a hammer to determine whether something has loosened.

For a machine that is true to its prototype this is an everyday occurrence. If you do not want to deal with this, you must purchase an electric locomotive.

*How can the start of the steam locomotive be easier?*

Open the steam cock a little during the heat-up phase. This allows the first generated steam to flow into the cylinders. Because a machine can never be totally sealed, the condensate will exert pressure on the pistons and heat the cylinder.

If the machine has cylinder dewatering, then it will open, also the steam cock will be opened a little, and consequently the cylinder will also be pre-warmed via the steam. The condensate can leave the cylinder through the dewatering bores. In the most favorable case the machine will not buck and will immediately start running.