

# **Kettenschaltung einstellen (Fahrrad)**

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# Inhaltsverzeichnis

<b>1 Kettenschaltung einstellen</b>	<b>3</b>
1.1 Im Beispiel verwendete Technik: . . . . .	3
1.2 Kette prüfen . . . . .	4
1.3 Vorarbeiten . . . . .	5
1.4 Einstellung des Schaltwerkes . . . . .	11
1.5 Umwerfer einstellen . . . . .	17
1.6 Weblinks . . . . .	21
<b>2 Autoren</b>	<b>23</b>
<b>Abbildungsverzeichnis</b>	<b>25</b>
<b>3 Licenses</b>	<b>29</b>
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3.2 GNU Free Documentation License . . . . .	30
3.3 GNU Lesser General Public License . . . . .	30



Dieses Buch steht im Regal Technik<sup>1</sup>.



Es ist eine PDF-Version<sup>2</sup> dieses Buches vorhanden.

Kategorie: Buch mit PDF-Version<sup>3</sup>



**Auszeichnung:**  
**Buch des Monats<sup>4</sup>**  
Oktober 2004

2 <http://de.wikibooks.org/wiki/%3ADatei%3AKettenschaltung%20Einstellen%20Fahrrad.pdf>  
3 <http://de.wikibooks.org/wiki/Kategorie%3ABuch%20mit%20PDF-Version>  
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Kategorie: Buch des Monats<sup>5</sup> Kettenschaltung einstellen (Fahrrad)<sup>6</sup>

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<sup>6</sup> <http://de.wikibooks.org/wiki/Kategorie%3AFertiges%20Buch>

# 1 Kettenschaltung einstellen

Die hier beschriebene Methode ist nicht die einzige. Tests in der Ausbildung von Zweiradmonteuren haben aber gezeigt, dass ein blindes Abarbeiten der hier beschriebenen Schritte immer zum Erfolg führt. Nur wenn man etwas ausläßt, kann es unter Umständen nicht klappen.

## 1.1 Im Beispiel verwendete Technik:

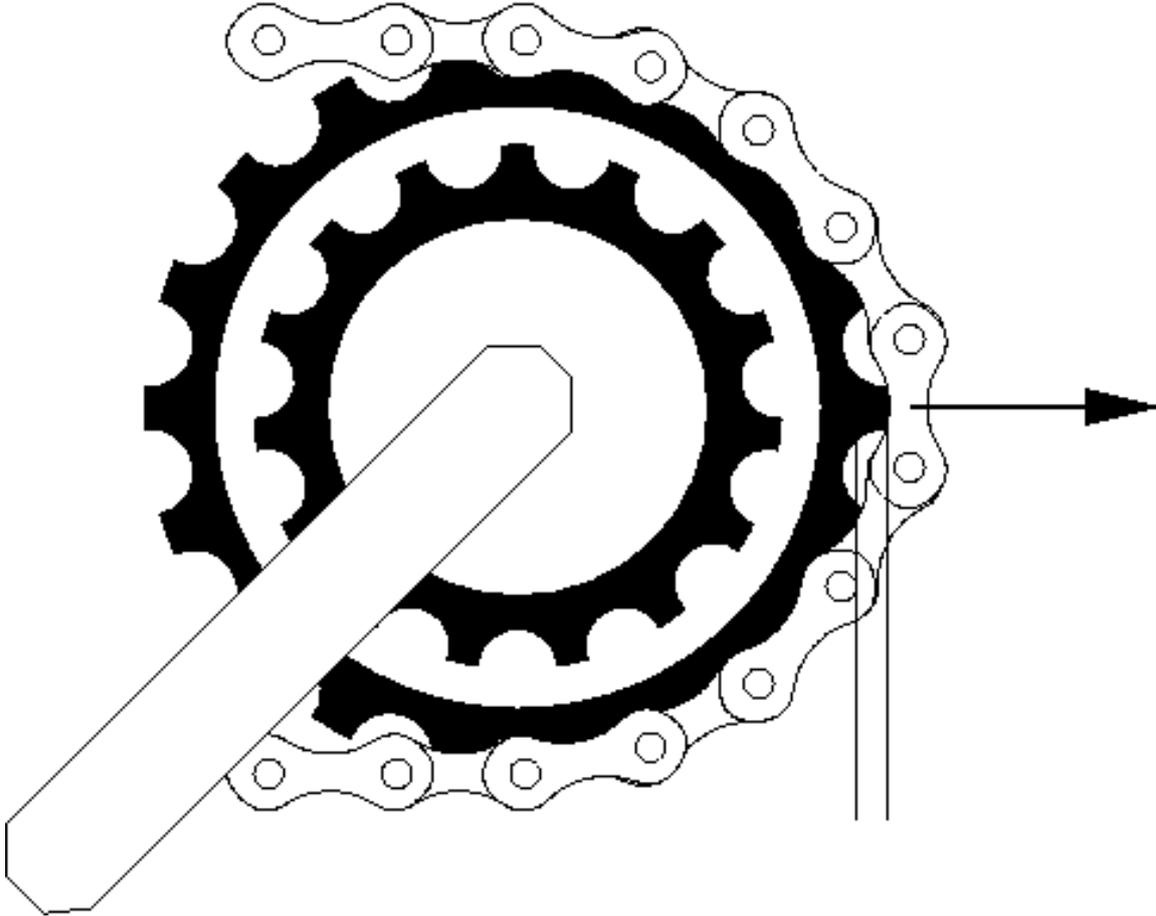


Abb. 5 Kettenschaltung am Reiserad

- **Schaltwerk:** Campagnolo C-Rekord Long Cage '91
- **Schaltgriffe:** Campagnolo Bullet Drehgriff '92
- **Umwerfer:** Campagnolo Chroche d'Aune 3-fach '92
- **Rahmen:** Spezialanfertigung ATB mit Mannesmann- Oria Rohren
- **Ausfallenden:** Campagnolo (modifiziert)
- **Kette:** Rohloff SLT-99
- **Naben:** Campagnolo C-Rekord 36-Loch '92
- **Schraubkranz:** Regina America Silber '91

- **Kettenblätter:** Campagnolo C-Rekord Duraluminium
- **Bowdenzüge:** Shimano 2mm (nicht mehr lieferbar)

## 1.2 Kette prüfen



**Abb. 6** Einfache Prüfung der Fahrradkette auf Verschleiß

Auf das größte Kettenblatt schalten und die Kette nach vorn ziehen. Wenn man nun von der Seite fast die Zahnspitze sieht, ist die Kette längst hinüber!

Ebenso kaputt ist die Kette, wenn sie sich auf der Länge zwischen Umwerfer und Schaltwerk von der Seite her sehr stark eindrücken lässt und bei Gegenhalten immer noch eine "Kurve" macht. Diese Art von Verschleiß kommt durch falsches Schalten (kleinster Zahnkranz auf kleinstes Blatt oder größtes Blatt auf größtem Zahnkranz) zustande. (ein bisschen Erfahrung braucht man schon für beide Methoden, man erkennt verschlissene Ketten eigentlich erst, wenn es schon zu spät ist)

## 1.3 Vorarbeiten

### 1.3.1 Achsbefestigung



**Abb. 7** Schnellspanner festziehen

Das Hinterrad muss fest sitzen und darf kein Spiel in der Achse<sup>1</sup> aufweisen, sonst ist jede Einstellerei sinnlos.

Also Schnellspanner oder Muttern festziehen bzw. prüfen, ein bestehendes Spiel in den Kronen muß korrigiert werden.

Bei der Gelegenheit sollte auch die Parallelität der hinteren Ausfallenden<sup>2</sup> geprüft werden - sowie der Zustand des Schaltauges<sup>3</sup>. Ist dieses verbogen, kann man vorsichtig versuchen, es zu richten - aber nicht mit der angebauten Schaltung!

1 <http://de.wikipedia.org/wiki/Achse%20>

2 <http://de.wikipedia.org/wiki/Ausfallende>

3 <http://de.wikipedia.org/wiki/Schaltauge>

Zum Richten der Ausfallenden gibt es Spezialwerkzeug, Improvisation hilft hier nicht viel. Als Notlösung kann man ein komplettes Vorderrad in das Schaltauge einschrauben und es so richten, ganz genau ist diese Methode nicht.

### 1.3.2 Schaltwerkbefestigung



**Abb. 8** Schaltwerk festziehen

Das Schaltwerk<sup>4</sup> muß fest am Schaltauge des Rahmens befestigt sein; bei wechselbaren Schaltaugen ist die Augenbefestigung ebenfalls zu prüfen

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<sup>4</sup> [http://de.wikipedia.org/wiki/Schaltwerk\\_%28Fahrrad%29](http://de.wikipedia.org/wiki/Schaltwerk_%28Fahrrad%29)

### 1.3.3 Schaltzug kontrollieren



**Abb. 9** Schaltzug kontrollieren

der **Schaltzug** ist zu kontrollieren:

- ist eine Endkappe vorhanden? (zur Not tut es auch ein Speichennippel)
- ist der Zug unversehrt? Auch den oberen Bereich am Lenker sowie in Tretlagernähe kontrollieren - 'aufgesplissene' Züge klemmen, die Schaltung kann nicht funktionieren
- Außenhülle des Zuges kontrollieren. Wenn aufgeriebene Stellen, Knicke usw. vorhanden sind, ersetzen!
- Leichtgängigkeit des Zuges testen

Ziehen Sie einmal **kräftig** an jedem Innenzug<sup>5</sup>! Risse innerhalb des Außenzuges versagen nun, außerdem setzen sich neu verlegte Züge in die Endkappen.

<sup>5</sup> <http://de.wikipedia.org/wiki/Bowdenzug>

### 1.3.4 Klemmschraube kontrollieren



**Abb. 10** Klemmschraube kontrollieren

Der Zug ist an der **Klemmschraube** zu kontrollieren. Hier liegt manchmal schon die Ursache für das Fehlverhalten der Schaltung.

Im Sitz der Klemmschraube ist ein ausgefräster Sitz (eine Nut). Wenn der Zug nicht exakt dort zu liegen kommt, schalten nur 2-3 Gänge sauber, da der Hub je Rasterindex verändert wird.

Andererseits hat man an dieser Stelle die Möglichkeit, nicht zueinander passende Schaltwerk/Schaltgriffkombinationen durch Ausprobieren anzupassen indem man den Zug **nicht** exakt in die Nut einlegt.

### 1.3.5 Feineinstellschrauben



**Abb. 11** Feineinstellschrauben

Die **Feinstellschrauben** an Schaltung und Schaltgriff sind zurückzudrehen:

- am Schaltwerk in eine etwa mittlere Position, so dass ein Verstellen nach rechts und links möglich ist
- am Schaltgriff festziehen und ca. 2-3 Umdrehungen lösen

### 1.3.6 Endanschlagschrauben



**Abb. 12** Endanschlagschrauben

Bei Schaltstellung auf einem mittleren Kranz ist zu prüfen, ob sich die **Endanschlagschrauben** in beide Richtungen drehen lassen.

Diese sollten nicht zu leichtgängig sein, um ein selbstständiges Verstellen zu verhindern. Idealerweise sichert man diese Schrauben mit einer speziellen Feder sowie einem Tropfen Schraubensicherung.

## 1.4 Einstellung des Schaltwerkes

### 1.4.1 Kettenstellung

vorn

mittleres oder kleines Kettenblatt

hinten

kleinster Kranz



Abb. 13 Übersicht

Bei einigen wenigen Schaltungen (z. B. ESP-Schaltwerke der Fa. SRAM) ist die Anordnung der Einstellschrauben genau andersherum.

Bei einigen Firmen sind die Einstellschrauben bezeichnet:

- H (high)
- L (low)

High bzw. low bezieht sich auf die Geschwindigkeit. Bei hoher Geschwindigkeit (high speed) verwendet man den kleinsten Zahnkranz, folglich wird mit der durch "H" gekennzeichneten Schraube das Limit beim kleinsten Zahnkranz eingestellt. Bei den Kettenblättern vorn verhält es sich genau andersherum, da bei "high speed" das größte Kettenblatt verwendet wird, regelt die "H"-Schraube die

Begrenzung beim größten Kettenblatt. Man sollte sich jedoch nicht allein auf diese Kennzeichnung verlassen, denn manchmal ist sie nicht korrekt.

### 1.4.2 Grobeinstellung



**Abb. 14** Grobeinstellung

Der Bowdenzug wird stramm gehalten und wieder mit der Klemmschraube befestigt.

Drehen Sie die Kurbel und stellen Sie mit der Einstellschraube an der Schaltung den Bowdenzug so ein, daß nichts mehr 'rasselt'. Nun einen Gang tiefer schalten. Die Kette muß gutwillig den höheren

Kranz erklettern, hier ebenfalls noch mal leicht korrigieren - dabei immer die Kurbel drehen. Das Zurückschalten ist ebenfalls zu prüfen! Läßt sich nur eines von Beiden korrekt einstellen, gibt es folgende mögliche Ursachen:

- schwergängiger Bowdenzug (verrostet, geknickt, angerissen, zu enger Radius verlegt...)
- müde Rückholfeder der Schaltung (nicht reparabel, Schaltwerk muss komplett getauscht werden)
- falsch eingeklemmter Bowdenzug (siehe oben)
- falsche Kombination Schalter - Schaltwerk - Kranz (wenn nur eine Komponente nicht passt, funktioniert das ganze System nicht)
- verdrehte Kette (steife Glieder)
- Kette und/oder Zahnkranzpaket verschlissen

Nun wird auf den größten Kranz geschaltet.

Jetzt mit der unteren Schraube (bei SRAM wieder vertauscht) einstellen, wie weit das Schaltwerk nach innen schwenken kann. Dazu müssen Sie schauen, daß der Käfig genau in der Flucht unter dem größten Kranz steht. Diese Arbeit sollten Sie mit Sorgfalt ausführen, da sonst leicht die Kette in die Speichen kommen kann.

### 1.4.3 Oberes Schaltungsrädchen



**Abb. 15** oberes Schaltungsrädchen

Bei einigen großen Kränzen (ab etwa 30 Zähnen) besteht die Möglichkeit, dass das obere Schaltungsrädchen zu dicht an den Kranz gerät. Es sollte immer ein Abstand von mind.  $1\frac{1}{2}$  Kettengliedern sein - maximal jedoch  $2\frac{1}{2}$  Glieder.

Wird dieser Abstand größer, erfolgt der Gangwechsel unwillig, da sich die auch seitlich bewegliche Schaltungskette zu weit abbiegen kann. Ist der Abstand zu klein, kann es bei kräftigen Wiegetritten infolge von leichten Rahmenverwindungen zu ungewollten Gangwechseln kommen.

### 1.4.4 Einstellung Rädchenabstand



**Abb. 16** Einstellung Rädchenabstand

Die Einstellung dieses Abstandes des Schaltungsrädchens vom Kranz erfolgt **bei leicht gelöstem Schaltwerk** an der versteckt hinter dem Schaltwerk liegenden Einstellschraube, die auf das Schaltungsauge drückt.

Ein häufig anzutreffender Fehler ist die Montage der Schaltung unter Mißachtung dieser Schraube. Laien befestigen die Schaltung, ziehen sie mit Gewalt fest und verbiegen dabei die Einstellschraube UND das Ausfallende mit dem Schaltauge. Da die Schaltung mit dieser Methode nicht gerade montiert werden kann, wird dann meist mit Gewalt daran herumgebogen.

Hier ist viel Fingerspitzengefühl nötig, alles wieder geradezurichten - im Extremfall ist der Rahmen Schrott.

### 1.4.5 Feineinstellung



**Abb. 17** Feineinstellung

Die Feineinstellung des Schaltwerkes erfolgt mit der Einstellschraube am Ende des Bowdenzuges. Hierbei ist in Schritten zu schalten - und je nach Vorliegen von leichten Schaltfehlern die Einstellschraube vorsichtig zu drehen.

Falls notwendig, lässt sich die Schaltung auch während des Fahrens an der Einstellschraube am Schaltgriff einstellen.

### 1.4.6 Parallelogramm



**Abb. 18** Parallelogramm

Das Schaltwerk bewegt sich etwa im Winkel der Zahnkränze und stellt so sicher, dass immer etwa der gleiche Abstand zwischen oberem Schaltungsrädchen und Kranz existiert. Wenn der Winkel der Schaltung (üblich sind ca.  $25^\circ$ ) zu sehr vom Winkel des Zahnkranzpaketes abweicht, kommt es zu unsauberem Schalten. Die Geometrie sogenannter Long-cage-Schaltungen ist anders als die der

reinen Rennradschaltungen.

Eine Ausnahme sind die seit einigen Jahren üblichen Rennräder mit vorn 3 Kettenblättern - aber hinten fein abgestuften Zahnkranzpaketen. Dafür sind spezielle Schaltwerke mit mittellangem Käfig erhältlich. Die 3 Systeme sind untereinander nicht oder nur bedingt kompatibel.

## 1.5 Umwerfer einstellen

### 1.5.1 Großes Kettenblatt

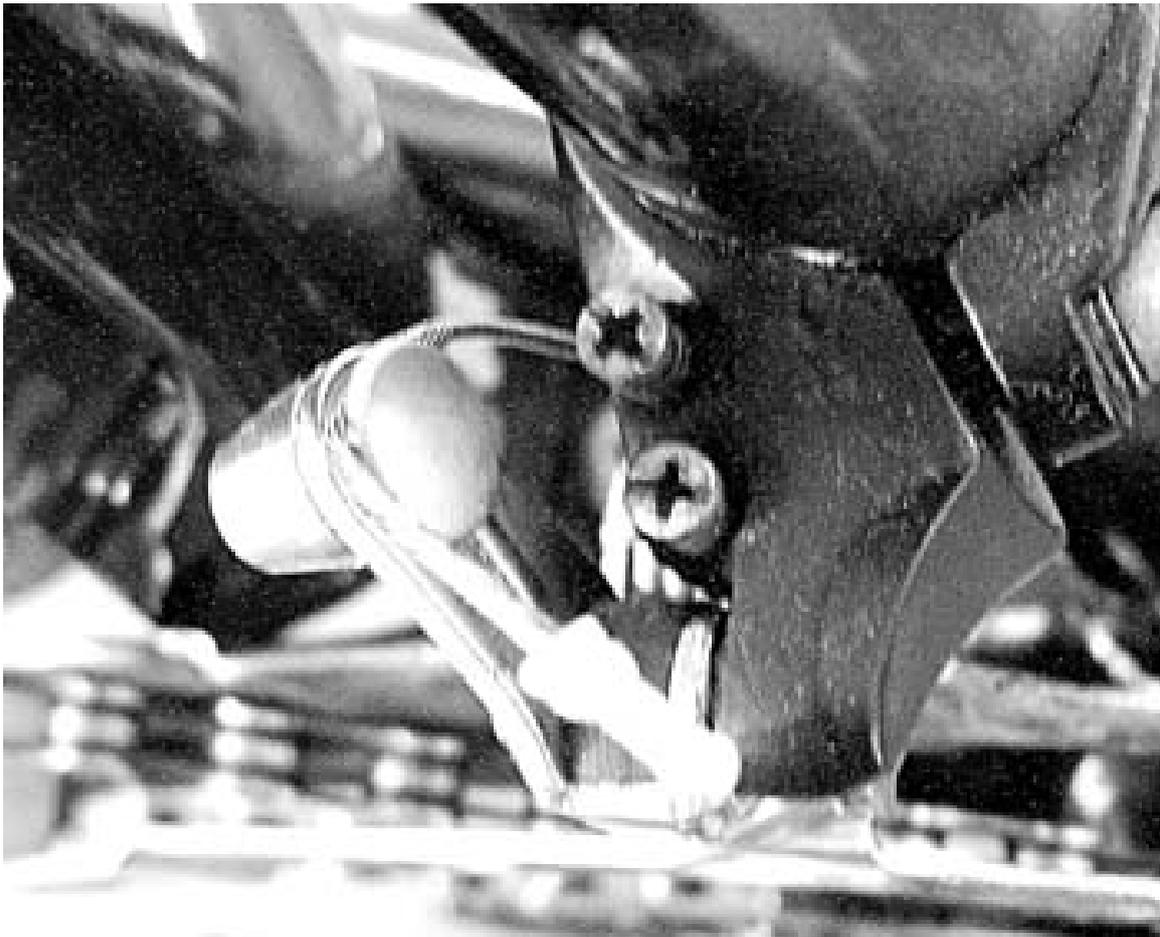


**Abb. 19** großes Kettenblatt

Zunächst müssen Sie den Umwerfer auf seine richtige Position überprüfen. Damit Sie sein gesamtes Leistungspotential ausnützen können, müssen Sie sich zunächst versichern, dass das äußere Leitblech im oberen Bereich einen Abstand von ein bis zwei Millimetern zu den Zahnspitzen des großen Kettenblattes hat. Außerdem muß der Umwerfer exakt parallel zu den Kettenblättern stehen. Am besten können Sie dies mit einem Blick von oben überprüfen. Nicht selten kann schon dieser geringe Zeitaufwand eine wesentliche Verbesserung der Funktion dieser Komponente mit sich bringen.

Der Umwerfer muß wirklich nur wenige Millimeter über dem größten Kettenblatt eingestellt werden! Hier wird oft zu großzügig eingestellt - und dann schaltet der Umwerfer unwillig.

### 1.5.2 Einstellschrauben



**Abb. 20** Einstellschrauben

Für den nächsten Arbeitsgang muß die Kette vorne aufs kleinste, hinten aufs größte Ritzel gebracht werden und der Schaltzug vom Umwerfer gelöst werden. Nun stellen Sie mit der äußeren Schraube den Abstand des inneren Leitbleches zur Kette so ein, daß die Kette gerade noch berührungsfrei am Blech vorbeiläuft. Bevor Sie den Zug jetzt wieder ankleben, überprüfen Sie, ob sich die Einstellschraube am Schalthebel in beide Richtungen drehen lässt. Jetzt schalten Sie auf das große Kettenblatt (vorne) um mit der inneren Schraube den äußeren Anschlag des Umwerfers einzustellen. Auch außen muss die Kette am Leitblech, ohne es zu berühren, vorbeilaufen. Zum Schluß können Sie mit Hilfe der Einstellschraube am Schalthebel die Feineinstellung vornehmen.

### 1.5.3 Umwerfer parallel stellen

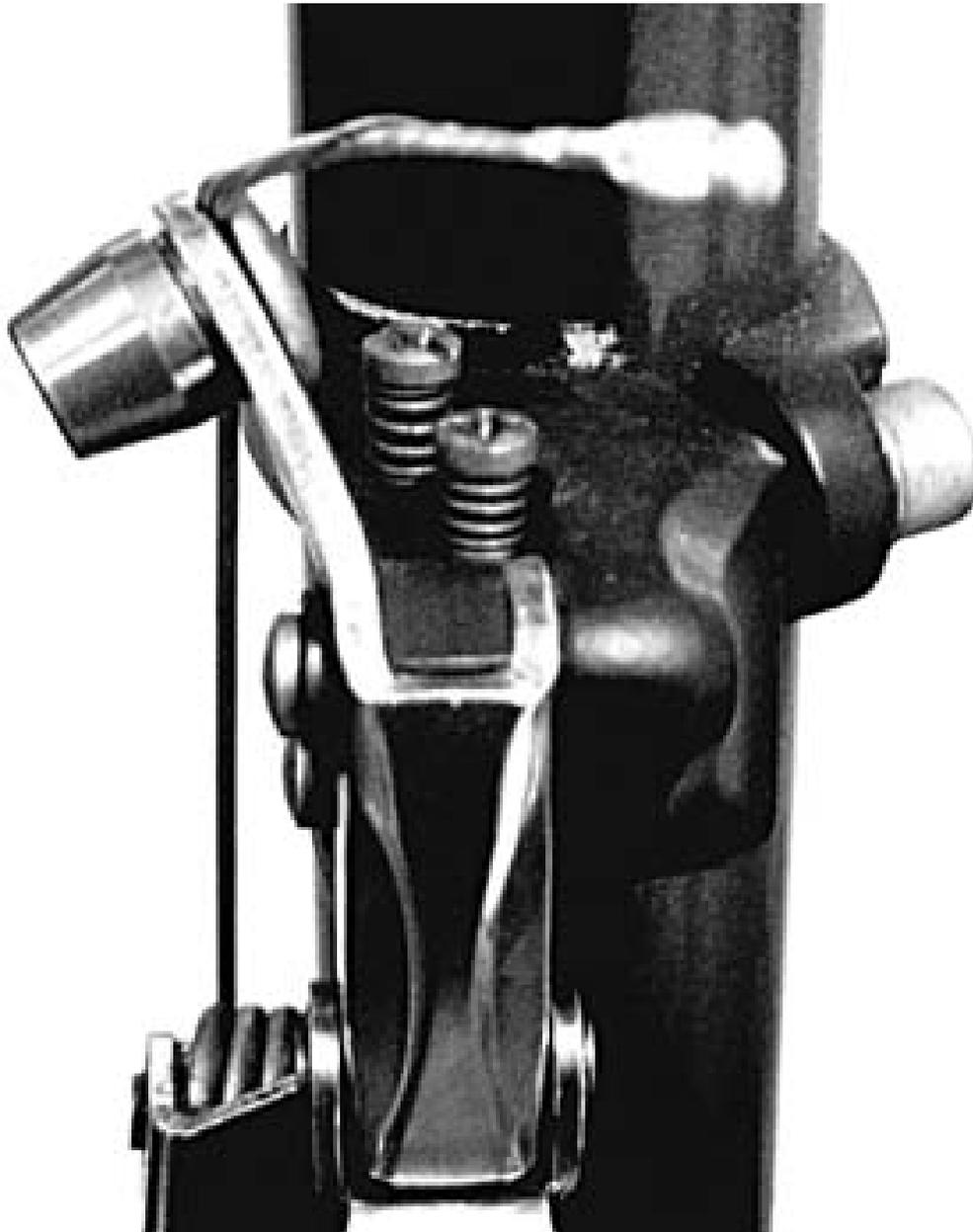


**Abb. 21** Umwerfer parallel stellen

Nachdem Sie auf das mittlere Kettenblatt (vorne) geschaltet haben, sollte die Kette in allen Gängen, die auf dem mittleren Blatt gefahren werden, reibungslos an den Leitblechen vorbeilaufen. Dies ist auf Grund der extremen Schräglage der Kette bei 8-Fach- und 9-Fach-Schaltwerken oft nicht zu verwirklichen.

Mit der Spannschraube am Schalthebel können Sie nun die Zugspannung so einstellen, daß die Kette entweder am kleinsten oder am größten Ritzel reibungsfrei vorbeiläuft.

### 1.5.4 Grobeinstellung

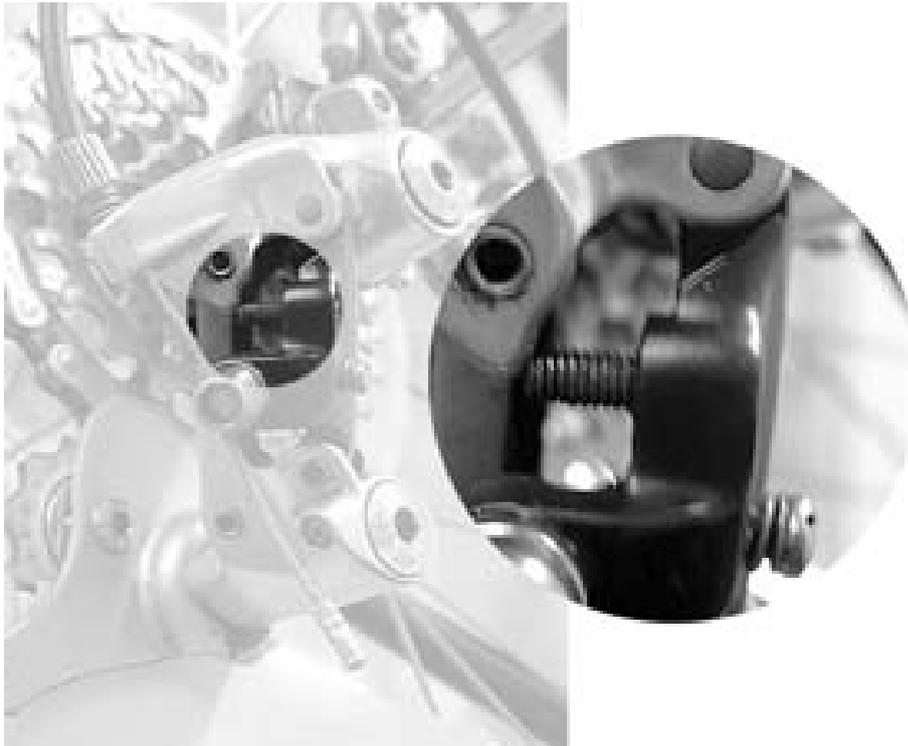


**Abb. 22** Grobeinstellung

Schalten Sie mehrmals - auch sehr schnell - Umwerfer und Schaltwerk von der kleinsten in die größte Stellung und umgekehrt.

Verwenden Sie auch die Kombinationen, die man aufgrund der zu großen Kettenschräglage vermeiden soll: Groß-Groß und Klein-Klein. Fast immer ist es möglich, diese zu schalten - auch wenn man es beim Fahren unterlassen sollte.

### 1.5.5 Feineinstellung



**Abb. 23** Feineinstellung

Ziehen Sie noch einmal kräftig an jedem Bowdenzug (entlang des Rahmens). Dadurch wird gewährleistet, daß sich bei neu montierten Zügen die Hüllen erst später setzen. Auch bereits montierte Züge können sich leicht setzen.

Nach einem abschließenden Test wird sich herausstellen, ob alles gut läuft. Falls dies nicht der Fall ist, können Sie mit der Einstellschraube am Schaltwerk noch Feineinstellungen vornehmen. Tasten Sie sich mit Viertelumdrehungen an die richtige Einstellung heran.

## 1.6 Weblinks

- Hinweise zur Kettenpflege<sup>6</sup>
- Kettenmontage<sup>7</sup>

*Erfasst von:* --Ralf Roletschek<sup>8</sup> August 2004

Fahrrad<sup>9</sup> Kategorie:Fahrrad<sup>10</sup>

<sup>6</sup> <http://www.fahrradmoteur.de/kettenpflege.php>

<sup>7</sup> <http://www.fahrradmoteur.de/kettenmontage.php>

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<sup>20</sup> Kapitel 3 auf Seite 29

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